

NEVSKY PROSPECT

CIA vs KGB A Cold War
Espionage Techno Thriller

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Printed in the United States of America

ISBN: 9798876996787 (paperback)

ISBN: 9798877009127 (hardcover)

ASIN: B0CTL1YQJF (eBook)

Cover background image by jackmac34 via Pixabay

This is a work of fiction. All characters, organizations, and events portrayed in this novel are either products of author's imagination or used fictitiously.

But strangest of all are the events that take place on Nevsky prospect. Oh, do not believe this Nevsky Prospect! I always wrap myself tighter in my cloak and try not to look at the objects I meet at all. Everything is deception, everything is a dream, everything is not what it seems to be!

Nikolai Gogol, Nevsky Prospect, 1835

PROLOGUE

November 1985, Berlin, Germany

In the grip of a November wind tearing down Goerzallee, diesel buses rumbled like impatient bears, their exhaust plumes blending with the enticing aroma of freshly baked bread wafting from a nearby bakery. Bundled crowds, shielded against the bone-chilling air, flowed along cobblestones, a river of gray coats and hushed conversations.

Within this bustling scene, Maria carved a path down Goerzallee, a triumphant adrenaline buzz pulsating through her veins. Her long, curly black hair cascaded behind her, resembling a kite dancing in the breeze. Eyes sparkling with excitement, an uncontainable smile etched on her face, Maria carried the lingering exhilaration from her seamless presentation. The presentation

replayed itself in her mind.

"Field Programmable Gate Arrays, or FPGAs," she had begun, her voice steady and poised, "are chips that can be programmed and customized like software. Essentially, they usher in the era of custom-crafted hardware, finely tailored to the specific demands of any given scenario." Maria paused for effect, allowing the significance of her message to permeate.

The audience's excitement echoed in her memory as she revealed FPGAs' capacity to create custom hardware solutions that would allow AEG Telefunken to dominate the market. She saw Dr. Andreas Gieter, the Chief Technology Officer, leaning forward in his seat, engrossed in her words, particularly when she underlined the flexibility of FPGAs. These reconfigurable chips, the Swiss Army knives of hardware, were poised to reshape the market, and Maria, their champion, had spearheaded the charge.

I've done it! She thought. I won this contract! The intoxicating elation enveloped her. Maria knew she just left an indelible mark on the world of technology, and she was certain this was only the beginning.

"Masha, is that you?" A vaguely familiar voice pierced her thoughts. A gust tore through the air, swirling Maria's curls around her face. A shiver ran down her spine as if a sudden, icy breeze had swept over her. No one had called her Masha, her

childhood nickname, in 20 years.

Maria spun around, her heart lodged in her throat. Her smile snagged, replaced by a flicker of disbelief. There, staring at her with cold, calculating eyes, stood Vladimir Putin.

Maria stared back at him, stunned and rendered speechless. She hadn't seen Putin since their days as schoolmates in the Soviet Union. He was the last person she expected to run into in Berlin. The memories rushed back to her like a cold flood.

THE BEGINNING OF A NEW FRIENDSHIP

March 1968, Leningrad, USSR

Maria had first noticed Vladimir Putin, who everyone called Volodya, at the high school Sambo championship. She found Sambo an exciting sport because it combines wrestling, judo, and boxing. Sambo's fusion of diverse techniques, such as throws, ground grappling, and striking, injected an element of dynamism and unpredictability that made it enthralling to witness. Amid the April matches, she noticed the skinny blue-eyed boy sitting on the gym bench. His slight frame stood in

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contrast to the other more robust boys, a fact that naturally inclined her to root for the underdog.

When the time came for him to step onto the mat, Maria became consumed by a mixture of nerves and excitement. His gaze was locked onto his opponent, an unflinching intensity that betrayed no hint of fear. As the whistle blew, initiating the match, Maria felt a twinge of apprehension on his behalf. After all, his adversary, a burly heavyweight, looked twice his size; the matchup hardly seemed fair.

Yet, much to her astonishment, the skinny boy exhibited an unexpected lack of intimidation. He circled his larger opponent, searching for an opening. The heavyweight charged forward, but the lithe competitor evaded the attack, landing a swift jab to the face. The larger boy staggered, recovering quickly, as an exchange of punches and kicks ensued. Both combatants refused to cede an advantage, resulting in a riveting showdown that kept the audience on their feet, their cheers echoing through the gym.

It was evident that Volodya's strategy hinged on leveraging his speed and agility against his imposing foe. With deft movements, he connected a powerful kick to the opponent's stomach, causing him to double over in pain. Following up with a well-placed punch to the head, Volodya sent his opponent crashing to the mat. The referee counted to ten, and Volodya was declared the

victor. The eruption of cheers from the crowd was electrifying, a roar of appreciation for the underdog's triumphant display. With arms raised in a gesture of triumph, Volodya basked in the glory of his win, effectively proving that size held little sway in the world of Sambo combat.

In the midst of the jubilation, Maria cheered loudly, jumping up and down. She was so proud of the skinny boy; after all, she picked him to win despite how unpromising his appearance was at the beginning of the match. Fueled by a potent combination of admiration and excitement, she couldn't resist darting toward him, her voice ringing out, "I knew you would win! I knew it!"

Volodya was energized with a surge of adrenaline and exhilaration in response to the crowd cheering for him. Victory was clinched, and a resounding one at that. He had proven himself to be the better fighter, and he had the taste of victory on his lips. Volodya liked that the cute girl with curly hair told him she predicted he would win. He wanted everyone to anticipate that he was going to win. Always. It was a constant theme in his mind.

Where did that cute girl go? he wondered.

And then, as though pulled by an invisible force, his gaze found her amidst the sea of faces. He approached her, fighting his way through the crowd.

"What's your name?" he inquired, his tone a blend

of curiosity and genuine interest.

"Masha," she replied, a touch of shyness in her voice.

"Where are you headed now?" His gaze flickered to her gym bag, a sign of her ongoing journey.

A small smile tugged at the corner of her lips as she responded, "I've got gym class next. Gotta pass Phys Ed to graduate. Don't want to repeat a grade." Her determination was obvious, and her commitment to her goals clear.

A spark of enthusiasm lit up within him as he offered, "If you want, I can help you practice."

They walked to a transformed ballroom, its floor a canvas of vinyl tumbling mats bearing the scars of countless training sessions. The mats were torn on the corners from use and shiny from the sweat of other students. Maria pulled back her dark hair into a ponytail and changed into gym shorts and a shirt she kept in the locker room. She wished it wasn't a Friday since her mother did laundry and washed all her clothes on the weekends. By Friday, her clothing was not fresh, and her socks could stand on their own from the perspiration crusting and stiffening the threads. This had never bothered her before, but for some reason, she worried about it now. She wanted to make a good impression on this boy.

Maria swung on the uneven bars, her legs spread wide like the wings of a plane. Her back and rear

muscles were taut under her gym clothing, and her face set in a determined expression. Volodya, with his arms folded, watched her from the mats.

Maria reached the upper uneven bar and attempted a swing spin to the lower bar. Her hands jammed against the wooden surface, and she grunted with effort. She managed to complete the spin, but she landed awkwardly on the lower uneven bar. Maria did not let this discourage her. She slowly regained her balance and raised herself into a handstand. Her legs were spread wide, and her toes pointed. She held the handstand for a moment, then reversed and rolled back to the upper bar. She was not good enough to be graceful, but she was strong and able to finish the maneuver before landing awkwardly on the mat.

Volodya watched her with a mixture of amusement and surprise. She was awkward! Yet, there was something profoundly appealing in her persistence, a refusal to be deterred by the challenges before her. He recognized a kindred spirit in her, someone who would never give up on a challenge, undeterred by its seeming difficulty.

Feeling slightly winded, Maria looked at Volodya. "How did I do?" she asked, trying to catch her breath. The hint of uncertainty in her voice was met with a smile from Volodya.

His response bore a playful honesty. "Well, you're not the most graceful gymnast I've ever seen, but you're definitely one of the most persistent," he

said. The sincerity behind his words brought a smile to Maria's lips.

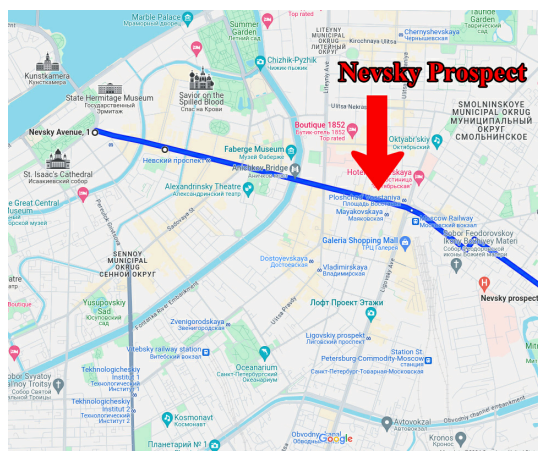
"Thanks," she replied, her gratitude evident. Her eyes were anxious with anticipation as she posed a question. "Do you think my performance will be enough to pass my gym test?"

Volodya's response carried a reassuring confidence. "I will tell the gym teacher that I helped you practice. I think he might think your routine is better if he thought it was designed by the Sambo champion himself."

The confidence in his tone invited a laugh from Maria. "I could use any help I can get!"

THE JUNE WHITE NIGHTS

June 1968, Leningrad, USSR



Hand in hand, they strolled along Nevsky Prospect, the bustling heart of Leningrad. Despite the lateness of the hour, their elongated shadows stretched before them. The sun refused to relinquish its hold during the June white nights, bathing the city with a constant soft, silvery light. When they reached Dvortsovaya Ploshchad (Palace Square), they took a right to walk along the banks of the Neva River. The cool and crisp air felt pleasant, and the only sounds they could hear were the lapping of the river's waves against the granite embankment and the occasional cry of a seagull.

They stopped to look out at the river. The water was a deep blue, and the bridges that crossed it silhouetted against the sky. The city skyline glowed with lights, and the domes of the churches seemed to float in the air. Their heads were close together. When Maria looked into his eyes, she thought their pale blue matched the color of the sky. He talked quietly about the clumsy opponent in his recent Sambo match, his favorite Russian combat sport. Their laughter echoed in the stillness of the night. Lost in each other's

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company, they seemed like the only two people in the world. They stopped and looked at each other's eyes again. She was excited and scared at the same time. They had been meeting for walks and chats for a few months. She wanted to kiss him, but was too shy to make the first move. He leaned in slowly, and Maria closed her eyes in anticipation. His lips were soft and gentle, and a wave of warmth washed over her. Her stomach fluttered. They kissed for a long time, and when they finally pulled away, both smiled as they looked at each other. Maria felt like she was floating on air. She had never been happier or closer to anyone before.

Am I in love with him? she wondered. Does he feel the same way?

Volodya was also surprised by the gentleness and softness of his kiss. He had always thought of himself as being a bit rough around the edges, but Maria made him feel different. She made him envision himself as a refined and polished gentleman.

The magnetic pull of emotion led them to another kiss, and this time, it seemed even more magical. They knew they had found something special and wanted to hold on to it. A promising future danced with endless possibilities.

AN OBSESSION WITH WINNING

June 1968, Leningrad, USSR

M aria and Volodya became inseparable after the Sambo championship. They attended each other's practices and cheered each other on. Maria's gymnastics skills did not improve significantly, but her confidence and strength grew. The gym teacher no longer saw her as the worst student in the class, and he even smiled at her occasionally. She was not sure if Volodya's chat with him had anything to do with their improved relationship, but she didn't care. She just wanted to make sure she graduated on time.

Volodya flourished after winning the high school

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championship. He basked in the sun of victory. High school champ, a title that tasted like golden honey on his tongue. He wanted it again and again, like a delicious treat he couldn't stop craving. Victory at any cost, his new mantra. Rules? Mere suggestions to be bent like cheap tin. Opponents? Puzzle pieces to be twisted and broken, their screams a symphony of submission. To get his opponents to tap out, he would do whatever it took, even if it meant hurting them. He started using sneaky tricks, bending the rules like pretzel dough.

Volodya's quest for victory didn't end within the confines of Judo and Sambo matches. He began to employ his skills in street fights and even dabbled in petty crime. His approach was straightforward: if you get into a brawl, throw the first punch.

His life contracted, squeezed into the narrow prism of winning. Morals? Tossed out like yesterday's newspaper. Kindness? A weakness for the losers. He was a shark, sleek and ruthless, carving through life with a single-minded purpose: victory.

His obsession with winning was all-consuming, and he was willing to sacrifice everything to achieve it. He had to be a champion in everything he did. He always wanted more, always wanted to win, no matter what the cost, no matter the casualties. He craved the crowd's cheers, just like that first time.

A CHANGE OF PLANS

June 1968, Leningrad, USSR

The tranquility of the summer and the enchantment of first love were abruptly interrupted by Maria's mother.

"Maria, you know you will not be able to get into the university. Only one percent of admissions are allocated to Jewish kids; you will be unlikely to make the cut. Do you want to be an elevator operator for the rest of your life?" Her jarring words cut through the air.

Maria's response was a stunned silence, her thoughts a swirl of disbelief and uncertainty. The weight of the situation loomed heavily, casting a suffocating shadow over her newfound happiness.

"I want a different future for you. Understand,

honey? I've asked my friends for help by arranging an invitation to move to Israel. They've come through. They've arranged for an invitation to emigrate to Israel using your namesake, Aunt Masha."

Maria looked puzzled. "But didn't you say Aunt Masha was in the United States?"

Her mother's hand tightened on hers. "I'm not sure where she is now, but that's not important. What matters is we are required to have an invitation from Israel. Thanks to Aunt Masha leaving Russia in 1907, they've made it seem like she's settled in Israel. Next week, I'll start the application process. This is our chance to escape, Maria." Despite a tremor of worry, her voice resonated with unwavering determination.

"But what about my friends?" Maria finally managed to voice her concerns. "What about Volodya?"

A sigh escaped her mother's lips, her gaze heavy with a mix of resignation and maternal resolve. "You can't keep seeing your friends. It's better for everyone if you distance yourself. They shouldn't be associated with someone leaving the motherland. It's for their own good. You need to vanish, Maria. You need to disappear. It's the best course of action."

The weight of her mother's words pressed down on her chest, a stifling realization that her world

was about to be upended. Maria had been worried about being accepted into the university; she studied hard but knew her chances were not good. She was scheduled to take exams this month, but now her mom said she will not be taking exams but packing to leave the country. The university exams that had been her focus were now a distant concern. Instead, the looming prospect of leaving everything she held dear behind consumed her thoughts.

How could I fit all my favorite things into two suitcases, she wondered. That is just not possible!

As her mind whirled, Maria's thoughts inevitably turned to Volodya. *And what about Volodya? What will he think? But mom said if I contact him, I will ruin his life! I don't want to ruin his life.*

"What about my graduation ball?" Maria exclaimed. Maria's heart sank as she remembered her upcoming graduation ball. She had spent weeks dreaming of dancing with Volodya in her custom-made dress. Maria had never had such a beautiful dress before. The mere idea of wearing it filled her with eager anticipation.

Her mother, a blend of determination and gentleness, relented, saying, "Alright, you can go to the ball, but you cannot tell anyone about our plans. The ball will be the last time you see your friends. Okay? While you are dancing with your friends, I will speak with the principal and tell her that we are leaving the Soviet Union."

Maria was confused. She puzzled over her mother's words, "Why do you need to tell her?"

"The principal has to start the process of expelling you from Komsomol. That's required before we can get permission to leave."

"But why?" Maria asked, her voice trembling.

"Because Komsomol members aren't supposed to leave the country," her mother explained. "The regional leaders will have to meet and vote on your expulsion. It's a formality, but it's necessary."

Maria's stomach churned. "What will happen at the meeting?" she asked.

"Sorry, sweetheart, they'll probably say some unpleasant things," her mother said. "They'll tell you that your decision to leave is shameful and that you're no longer a good Komsomol member. But you don't have to say anything. Just try not to listen to anything they say and ignore them."

"Even if they don't feel that way, they have to say those things, as this is what they are expected to say. And some of them could be really angry and envious because they can't leave. But remember, they are doing it because I asked them to do it. After all, it is what the exit visa process requires. You are likely not to know any of the people in the room. This will be a meeting of Komsomol leaders in your districts, not students in your school. You can ignore angry strangers, right? I will ask your principal to schedule this meeting as soon as

possible before these people leave for the summer vacation." Her mother spoke in a quiet, comforting voice.

"Will you come with me?" Maria asked in a quaking voice.

"Of course, we will go together, and I will wait right outside the door of the meeting. But I cannot attend the meeting; it is a closed meeting for Komsomol members only."

THE GRADUATION BALL

June 1968, Leningrad, USSR

The graduation ball took place in the cavernous gym, with high ceilings and bright lights. Red velvet curtains softened the stark gym walls, and flowers decorated the monkey bars. Exercise mirrors reflected dazzling outfits instead of gym class participants' clumsy jumps and tumbles. Music, laughter, and conversation filled the air.

The reel-to-reel tape recorder played a waltz, and couples twirled around the dance floor, their gowns flowing behind them. Maria stood on the

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sidelines, her heart heavy with sadness. Maria knew this was her final night among friends and classmates, but she struggled to savor it. Her friends were all around her, laughing and talking, but she felt like an outsider looking in. She no longer sensed belonging to the group as she watched them dance and laugh, knowing she would soon leave them all behind.

She turned away and walked over to the refreshment table. She picked up a plate of food and began to eat mechanically. She didn't taste anything.

After a while, she decided that she couldn't endure the evening any longer. Enjoyment was out of reach. Her friends chatted about dresses and boys. These conversations seemed so trivial and Maria's mind kept drifting back to her impending departure.

She excused herself early and slipped out of the ballroom before she had a chance to dance with anyone. She wanted to avoid Volodya, fearing she would burst into tears. She walked down the empty hallway, her footsteps echoing in the silence.

Maria stood outside the ballroom for a moment, looking back at the door and listening to the music and laughter filtering out from inside. She was certain that she would never forget this night, but she also realized that it was time to move on. She had a new life ahead of her, and she had to be

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brave. She took a deep breath and turned around. She walked away from the ballroom, leaving her past behind her.

THE KOMSOMOL EXPULSION

June 1968, Leningrad, USSR

Two weeks later, Maria faced her Komsomol expulsion hearing. She was called into a room with a long table and seated at the head. The sole agenda for this meeting revolved around Maria's expulsion. The regional leaders took turns delivering speeches condemning her shameful decision to leave the motherland. Maria, following her mother's instructions, kept her head down and tried not to listen, tuning out the discourse. To keep her mind busy on something else, she planned the chores she needed to complete the following week.

Angry speeches did not surprise Maria. She

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knew that the Komsomol members could not publicly express support for her. Some genuinely disapproved of her decision to leave the country, while others feared jeopardizing their own futures. Backing someone who abandoned the socialist ideals of the motherland would invite censure, permanently etched in their student records, dooming their future prospects. Maria had heard of individuals barred from pursuing postgraduate studies due to similar situations.

When the leaders finished their speeches, they voted unanimously to expel Maria from Komsomol.

Okay, good, Maria thought. Mom said this is what we need. She looked up and said, "Thank you!"

Then she realized that was not the right thing to say after the expulsion. She was not supposed to be happy or thankful for this type of outcome. She quickly left the room before they had a chance to change their verdict.

Her mother waited for her outside the room. As Maria stepped out of the hostile room into her mother's warm embrace, she felt better. After a big hug, her mother said, "Let's go have some ice cream!"

SOLITARY DAYS

June 1968, Leningrad, USSR

The next few months marked the loneliest period in Maria's life. The endless days felt like an isolated exile. She was unable to talk to any of her friends or neighbors. Even conversations with relatives were marred by omissions and half-truths. She could not answer any questions about her university exams, her plans for the future, or her summer vacation. Mom was right; just disappearing seemed the simpler choice.

Maria's family did not have a telephone in their apartment. They waited in line for one for eight years and would probably get it soon, in the next year or two. But having no telephone made it easier to disappear. The absence of a telephone became a paradoxical blessing. The lack of a means

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to communicate cut ties, rendering her invisible in the city's social tapestry. She was unreachable by phone, and if someone rang the doorbell, she simply ignored it and did not answer, sparing herself the ordeal of crafting fictitious answers about her future.

The window became her connection to the outside world. From its frame, she observed the ebb and flow of life on the Nevsky Prospect. The city's inhabitants moved with purpose, always in a hurry, often walking shoulder-to-shoulder as if in a formation. Sometimes, a solitary figure broke free from the current. She likened those individuals to the metaphorical salmon navigating against the tide, a stark contrast to the stream's persistent flow.

Almost every day, she would see a trio of men sharing a bottle of vodka. A vodka troika represented a magic number to share a bottle as it combined economic prudence and the desired effect. A bottle of vodka, priced at three rubles, required each person to contribute one ruble, exemplifying a form of primitive communism. The principle of "From each according to his ability, to each according to his needs" found expression in this ritual. Vodka was the liquid taxation, and the public joyfully participated. At times, watching the trio was her sole entertainment for the day.

A PERILOUS SUMMER

September 1968, Leningrad, USSR

For Maria, the doldrums of the most boring and lonely summer continued until September. However, in stark contrast, her mother's summer became a frenzied whirlwind of activity.

"Look at all this paperwork!" her mother muttered, staring at a mountain of forms. "This is a game to make our life complicated."

Each document was a maze, demanding meticulous attention. Debts to the government loomed, demanding repayment for the "free" healthcare and education Maria and her mother received. Signatures from relatives had to be solicited, each stroke of the pen a crucial decision

which some of them produced with reluctance out of fear for what it would mean for their own future. Each relative had to assert that the family had no financial obligation to them and held no objections to Maria, an underage child, leaving the country with her mother.

"Please sign this," Maria's mother pleaded with each. "I want a better life for Maria. I already started the paperwork, so she will have no good future here if we are rejected. You can say you disagree with my decision, but as her mother, it is my right to make this decision. And then confirm I don't owe you any money."

The dance with Soviet bureaucracy unfolded as an encounter filled with animosity and ill will.

"You are missing a stamp, woman!" a clerk would sneer, throwing the form back with a flick of the wrist as if it was casting a bad smell. "Back you go."

"Don't you know these forms need two more signatures?" shoving the stack of forms back would scorn a receptionist.

The Soviet bureaucrats overseeing the process openly displayed hostility and suspicion, intentionally making the necessary paperwork as challenging as possible. They made each step a deliberate challenge, an exercise in endurance against an unyielding system.

Maria remained shielded from much of this bureaucratic turbulence, a protective measure

orchestrated by her mother. However, one inescapable challenge loomed—the demanding interview where their motivations for leaving the Soviet Union would be scrutinized. During this interview, both she and her mother underwent separate and thorough questioning regarding their desire to depart the Soviet Union. They had to provide clear explanations for abandoning their extended family to relocate to Israel and live with Maria's aunt. It was imperative that their narratives and rationales aligned perfectly. Any discrepancies would lead the bureaucrats to deem their story false, resulting in a denial of permission to leave.

"We have to be seamless, Maria," her mother stressed. "One wrong explanation, and they'll unravel our story."

The day of the interview arrived. The interrogator was a tall, dour man in his forties. He began probing Maria's motivations and scrutinizing her dreams.

"Why leave, young lady?" the interviewer's voice was a cold knife. "Why don't you appreciate everything you have here?"

The relentless questioning veered into territory that Maria preferred to keep shrouded in silence. The taunts and anti-Semitic slurs she endured on the tram ride to school, the unspoken knowledge that her academic prowess might not unlock the doors to higher education—these aspects of her

life formed a painful narrative to construct. To navigate this treacherous terrain, she rehearsed her responses as though they were responses to an exam. This distancing served as her coping mechanism, allowing her to discuss her experiences as if they were stories separate from her own existence.

"It's... about family," she stammered, parroting the practiced lines. "An opportunity to live with my aunt..."

Maria's throat tightened. The taunts on the tram rides and the whispers about her future all turned into stories she was able to retell.

Finally, the interview was over.

"Just another exam, Mama," Maria said, seeing concern in her mother's eyes as they walked home.

The decision to grant or deny permission didn't come swiftly. Instead, it lingered in the air for over a month, a protracted period of suspense that wielded the power to reshape their lives. The stakes were remarkably high. Denied permission doomed the family to excruciating poverty and a hard life. The act of attempting to leave the country was not merely viewed as defiance; it was an act of treason, a transgression that would condemn them to being unemployable. It would be impossible for either of them to get a job doing anything but the most undesirable manual labor jobs, like sweeping streets or cleaning toilets.

If permission was granted, the family would be given a fleeting window to leave. They would have just a few days to condense all of their worldly possessions into two suitcases per person. A paltry sum of 100 rubles^[1] each was all they could carry out of the country, a reminder that the act of starting anew came with stark limitations.

The decision, when it finally arrived, would reshape their world, one way or another. But for now, they lived in the limbo of waiting, their hearts heavy with anticipation, their dreams held hostage by the whims of a system that reveled in crushing hope.

DON'T EAT TOO MANY BANANAS

November 1968, Leningrad, USSR

Finally, in early November, the letter containing the emigration decision arrived. A mix of anxiety and anticipation fluttered in their chests as they opened the envelope. The family had been granted permission to leave, a window of opportunity with a tight leash. They had just two weeks to book their flight. If they failed to depart by the deadline for any reason, the permission was rescinded, but the stain of the desire to leave the motherland would remain. A path to freedom demanded a swift and committed response. The following two weeks turned into a whirlwind of ceaseless activity.

Every waking moment was consumed by an unrelenting list of tasks: finalizing the paperwork, settling the debt for so-called "free" education and medical care, packing their lives into suitcases, and discarding possessions that couldn't be taken along. Maria also had the task of memorizing the addresses of their contacts, both the ones abroad and those left behind. No written materials or phone books were allowed on the plane, so they had to commit them to memory.

Deciding what to take and what to leave behind was a painful ordeal. Items got categorized as necessary and nice-to-haves, and most of the nice-to-haves had to be left behind. One of the most difficult items to buy in Leningrad was toilet paper. The scarcity of this mundane necessity in Leningrad bordered on the surreal. Rare appearances in grocery stores triggered frenzied queues, swiftly depleting the stock. To manage the frenzy, each person was limited to two rolls. Throughout the summer, Maria used her free time to take on the responsibility of a toilet paper hunter-gatherer, acquiring two rolls whenever fortune allowed. By summer's end, her efforts accumulated into an impressive stash that could fill an entire suitcase. Maria's mother decided they would dedicate one suitcase out of their four suitcases to toilet paper. This would be one luxury item they would have to combat the worldwide

toilet paper shortage. Both of them were completely convinced that the toilet paper issue was a worldwide problem. Otherwise, why would they encounter such difficulties? They expected numerous unforeseen challenges on their journey, but at least they would have comfort when using the bathroom. They estimated that they needed at least a full suitcase of toilet paper to last them for a year.

The toilet paper shopping came to an abrupt end when Maria slipped on the ice, fell, and badly twisted her ankle. In two days, her leg swelled up like a balloon, making it a challenge for her to move around. The suitcase likely had space for a couple more toilet rolls, but her mother insisted that walking from one store to another all day was beyond her capacity in her current condition. Despite the ankle problem, the frantic activity of packing the other three suitcases continued. They both agreed on selecting one item each that was not a "necessity item." Maria opted for a thick book of poems by Pushkin. Her mother decided to take a pretty Asian urn that her father gave her when she herself was a little girl.

Then, with remarkable speed, the day of departure materialized. Miraculously, all four suitcases got packed, and their apartment was empty, all the old possessions thrown out or given away. On the evening before their scheduled departure, Maria and her mother stopped by to say goodbye to

Maria's grandmother. The grandmother spent the evening crying, not saying much, just crying and crying. She did not consider it to be a good idea for them to leave the motherland and move to some place unknown. As they were leaving, she put her arms around Maria and whispered the final words of wisdom to guide her granddaughter in her new life. "Don't eat too many bananas."

The farewell left Maria pondering the meaning of the grandmother's words. Maria had heard of bananas, but she had never tried them. Bananas are harder to get than toilet paper. Why did her grandmother think they could eat too many bananas or even any bananas when they left the Soviet Union?

THE GIFT OF FREEDOM

November 13 1968, Leningrad, USSR

Departure day had arrived, and in a twist of fate, it fell on Maria's birthday. This realization dawned on her when they were already aboard the plane, a fact that she overlooked in the chaos of the moment. The hours preceding their flight had whirled in a frenzy. They arrived at the airport with their four suitcases without anyone to say goodbye to. The atmosphere held an unspoken truth—the danger of being linked to those emigrating believed to be great. Surveillance lurked in the shadows, spreading uncertainty over every interaction. One could only wonder who observed

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the people bidding farewell to the deserters of the motherland.

The cold air clung heavy with suspicion as Maria and her mother shuffled through customs. The customs agent's eyes pierced them like a hawk searching for prey. The room was noisy with the clang of metal trays and the curt questions of the agents. The agent inspected every item in their luggage to ensure nothing valuable or suspicious was taken out of the country. Every fold of their suitcases was examined, fingernails scraped along seams, sweaters were unfolded, shoes were yanked from bags, toiletries unscrewed and sniffed.

Maria watched, heart pounding. Her injured ankle, swathed in bandages, added a layer of nervousness to the ordeal. The bandaged ankle throbbed, each glance cast its way felt like an impending disaster. Inside Maria, fear coiled like a viper. Could they suspect jewels hidden within the layers of gauze? Her imagination conjured a scene of forced unwrapping, leaving her support vulnerable like a damaged tree lacking the protective bark that once shielded its strength.

The minutes seemed interminable as customs agent scrutinized their belongings, touching and examining every piece of clothing and every roll of toilet paper. The inspector paused as he fingered a large collection of new wool socks. Then he plucked a handful of socks from the suitcase, his eyebrows arched in disbelief. "Such an abundance

of warm socks for Israel's balmy climate? How curious." His voice slithered around the words, each syllable laced with insinuation and thinly veiled hostility. Maria's mother squared her shoulders, meeting his gaze with an icy calmness that belied the trembling in her hands. "Even in warm weather, my toes get cold," she retorted, her voice firm despite the tremor in her fingers.

Their gaze locked, a silent battle for power. Then, the agent's eyes shifted to the small, intricately carved urn nestled among their belongings.

"Now that," he rasped, his fingers tracing the smooth wood, "looks like something from a museum. You shouldn't be taking treasures out of the Soviet Union. Did this vase come from the Hermitage Museum? You'll need to see the special assessor to determine its value. If it is valuable, you must leave it behind." The agent's words dripped with vile, and he looked quite pleased by his discovery.

Biting her lip, Maria's mother clutched the urn tight and ventured to the special assessor's office to determine the urn's fate. The little vase was not a necessity, but its significance was steeped in cherished memories of her father. Her father's touch still lingered on its smooth curves. It was a talisman of sorts; she thought it would bring them good luck on their journey. The special assessor took his time studying the urn. As the examiner's fingers lingered on its surface, her breath hitched.

Would this piece of her past be sacrificed in order for them to leave?

Finally, the assessor looked up. "Okay, you can take it," he grunted, his voice rang with a mocking dismissal. He shoved the urn back into the mother's hands, a sigh escaping his lips like a cold draft through a cracked window. The ordeal came to a close, replaced by a bone-deep exhaustion. Relief, yes, but laced with the bitter taste of vulnerability. They had passed through the gate, but a part of them had been stripped bare by the experience.

Maria and her mother found themselves settled within the aircraft, a moment of respite after the whirlwind they'd weathered. Maria pulled out a blank piece of paper and began writing down all the addresses she had memorized. These contacts were the lifelines connecting them to their past, present, and future: relatives at home, contacts in Israel, and those within the United States. The addresses of her friends were conspicuously absent. She did not memorize them. She realized that contacting them again would be impossible. A veil had been drawn, sealing them off, their ties severed for their own protection. As soon as all the information got written down, it evaporated from her memory. Not a single address or phone number stayed in her memory. The adrenaline helped her remember all the information, and now, as the adrenaline rush left, so did the

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memories.

In the cocoon of the aircraft, they were holding hands. Now Maria remembered it was her birthday.

"Mom," Maria began, the irony of the timing tugging at her lips, "You know, today is my birthday, and you did not even give me a present!"

Her mother looked at her and then smiled.

"Leaving the Soviet Union," she responded, her voice warm and comforting, "is the greatest gift I could ever give you."

CROSSROADS OF DESTINY

December 1968, Vienna, Austria

Vienna, Austria, served as the crossroads of the journey for the emigrants from the Soviet Union—a place where they declared their intentions and set off on the path toward their new lives. Within the Austrian capital resided the United Nations High Commissioner for Refugees, responsible for resettling refugees from around the world. For Maria and her mother, Vienna became the place where the blueprint of their fresh start began to take shape.

Aunt Masha's fabricated invitation, a lifeline spun from a distant relative's past exodus, allowed

them to escape from the Soviet Union's grasp. Yet, it left the question of their final destination open. They did not know anyone in Israel, while in San Francisco, a warm circle of Maria's mother's friends awaited, their outstretched arms promising the comfort of friendship. The friends were willing to sponsor their entry into the United States. Sponsoring an emigrant family entailed the responsibility of covering the newly arrived family's medical and initial living expenses. Taking on a family's sponsorship was more than just a bureaucratic formality; it was a pact woven from duty and friendship, a promise to guide them through the choppy waves of a fresh start. In this pact, the weight of financial responsibility intertwined with fellowship as the sponsors pledged guidance through the unfamiliar maze of their new world.

San Francisco was more a concept than a concrete reality for Maria. Maria did not know much about the city besides the fact that it had several universities. That was good enough since Maria and her mother had only one requirement for their new home; Maria needed to continue her education at a good university in some computer-related field. This career path would not have been available to her in the Soviet Union due to Jewish quotas restricting entrance exams. Her only option would have been to become a sanitation engineer with a career in designing

sewage systems, a profession that did not excite her. The memories of classmates' crude humor still lingered. *"It might sound like shit to us, but it will be bread and butter to you."* But now, the old jokes held no power over her aspirations.

Maria and her mother met with the officials from the United Nations, and it took a couple of weeks for their case to be assessed and for travel documents to their next destination, Rome, Italy, to be issued. The US Embassy's Immigrant Visa Unit, located in Rome, investigated applicants for immigration and, if approved, issued them visas for resettlement in the United States.

Vienna at Christmas time was magical. Festive decorations adorned the streets, bustling street markets filled every corner, and the happy music was played by the street speakers. Maria and her mother lacked the money to make purchases, but they reveled in the joy of window shopping. They marveled at the plethora of extraordinary items they had never encountered before, feeling as though they had stepped into a fairytale. The windows looked exceptionally clean compared to those in Leningrad, causing Maria to occasionally bump her forehead against them due to their pristine transparency. It was much easier to notice the dust-streaked windows of Leningrad.

The most amazing sight was the incredible display of fruits like bananas and oranges outside grocery stores. At first, Maria thought they were

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artificial, unable to comprehend how such alluring produce remained on display without attracting immediate queues. Maria stood in awe, fingers reaching out to touch the seemingly surreal fruit.

"Mom, they're real!" she exclaimed, her wonderment escaping in a delighted outcry.

Could this be the reason behind her grandmother's parting words not to eat too many bananas? How could she have known? It was not something they had ever seen on Soviet television!

Maria felt as though she had stepped into a captivating movie where she was simply an observer. It was as if the enchanting scenes unfolding before her were too magical to be real, yet she embraced the experience, finding it interesting and exciting. In this moment of transition, even though the future held many unknowns, she was not worried; Maria had unwavering trust in her mother's ability to handle any challenges that lay ahead.

FURNITURE- TOSSING TRADITION

December 31, 1968, Rome, Italy

Maria and her mother embarked on their journey to Rome with all the necessary paperwork in hand, arriving in the city on the evening of December 30. Their plan was to reside in a centrally located hotel for a few days and then rent an apartment. This choice stemmed from knowing that their dealings with the US Embassy would take three to four months, rendering an extended hotel stay too expensive.

New Year's Eve was a major holiday in Rome, ensuring their immediate future would entail a

few days of relaxation as all business activity shut down. On that first day, fatigue from their travels overcame them, and they just went to sleep. Thus, it was on December 31, New Year's Eve itself, that they ventured out to explore the city.

In Rome, New Year's Eve held greater significance than a mere holiday; it stood as a grand celebration engulfing the entire city. Vibrant festivities animated the streets, alive with music, dance, and the tempting aroma of food emanating from every corner. The Romans, famed for their innate sense of style, had upped their fashion game for this special occasion. To Maria, raised amidst the drab attire of Soviet citizens, the array of elegant outfits represented a revelation. She quietly hoped that someday she would be able to have such beautiful outfits as well.

They spent the entire day walking around, window shopping, and people watching, and they were excited to explore their new surroundings, soaking in the sights and sounds of Rome in celebratory fervor. Streets adorned with colorful lights and festive streamers added to the enchantment.

"It's so beautiful," Maria couldn't help but exclaim. "It's like a party!"

As the evening approached, the celebrations reached a crescendo, with fireworks lighting the sky above the city. Suddenly, they heard a loud crash. A large object had fallen out of a window

and landed right in front of them. Startled, they turned their attention to the source of the commotion. The large object was a piece of furniture that plummeted from a window, landing perilously close to them.

"What was that?" Maria's mother inquired, her voice full of concern.

"I don't know," Maria replied, her eyes scanning the buildings above. "But it seems like someone is tossing furniture from the windows."

They took a few hesitant steps forward, only to witness another crash emanating from across the street. This time, they looked up and saw people hurling an assortment of items out of their windows—chairs, tables, sofas, and even a refrigerator descended upon the pavement below.

Perplexed and curious, Maria voiced her bewilderment, "Why are they doing that? Are they throwing those things at us?"

As they navigated through the chaos, now walking down the middle of the street to dodge the falling furniture, they couldn't help but notice that the people partaking in this unusual activity seemed far from angry. Instead, they laughed and shouted excitedly in Italian. Neither Maria nor her mother knew Italian. The language barrier left Maria and her mother with no understanding of their exclamations, but the general air of festivity was infectious. Despite their confusion, they found

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themselves joining in the laughter, embracing the jubilation that surrounded them.

It wasn't until later that night, after talking to the hotel staff and inquiring about the falling furniture, that they learned the significance behind the furniture-tossing tradition. On New Year's Eve in Rome, it was customary to cast off the old and make way for the new. And so, with this newfound knowledge, giggling with laughter and remembering their obstacle course race, they retired to bed that night—tired yet happy. Their first day in Rome had been a unique adventure. What a memorable way to start their stay in Italy!

OSTIA APARTMENT

January 1969 – March 1969, Rome, Italy

Maria and her mother were not the only Soviet refugees in Italy. Other families undertook the same journey, with one or two families arriving and departing each week. The families had a chance to meet each other at the US Embassy while submitting their paperwork and going through interviews. The embassy staff had proven invaluable, offering suggestions on locating affordable, clean, and safe apartments.

Their budget-savvy counsel suggested considering apartments in Ostia, a suburb of Rome. Ostia was only a short train ride away

from the bustling Rome center. The rent for apartments in Ostia was hovering at around half the price of comparable accommodations within Rome itself. To further economize, the embassy staff recommended a practical arrangement: two families sharing a single apartment. Each family would have a private bedroom, while the living room, kitchen, and bathroom would be shared.

A communal bulletin board facilitated the search for potential roommates, and it was here that Maria stumbled upon a note posted by someone named Alex. He actively sought a family to share an apartment he found in Ostia and had left an address for those interested in inspecting the premises. Eagerly, Maria penned a response on the note, expressing their interest and intentions to visit the apartment later that afternoon following their embassy appointment.

Their trip to Ostia began at the Roma Termini railway station. With its grand architecture and bustling atmosphere, it was an experience in itself. Maria and her mother did not speak Italian, but the universal language of train travel, the schedule, needed no translation. They took a regional train, which offered comfortable seating and large windows to enjoy the passing scenery. The ride took 30 minutes. As the train chugged along the tracks, Maria and her mother gazed out of the windows to take in the ever-changing landscape. The journey started in urban Rome,

with glimpses of historic buildings and bustling streets. Then, the train gradually transitioned into an Italian countryside scene with rolling hills and vineyards. As they approached Ostia, the scenery turned into a seaside landscape. As the train snaked its way towards the coast, the azure expanse of the Tyrrhenian Sea came into view.

As they stepped off the train, a refreshing sea breeze carrying the faint scent of saltwater greeted them. In January, the town lay tranquil, devoid of summertime visitors. In the winter, Ostia belonged to its residents. After the bustling streets of Rome, Ostia appeared to be a place where time seemed to slow down. The buildings were a blend of ancient Roman remnants and modern structures; the town looked like a mosaic of history. The cobbled streets led them through buildings with terracotta roofs and pastel-colored facades. Scattered remnants of Roman columns sporadically punctuated the town, a testament to Ostia's bygone era as a pivotal port city.

Maria and her mother navigated towards Alex's address, leading to a small, three-story building nestled in a quiet neighborhood. Upon their knock, a tall, slender man in his mid-20s with long dark hair, a well-groomed beard, and a handsome face answered the door. He smiled when he saw them, introduced himself as Alex, and welcomed them inside. His warm smile and friendly manner eased any lingering apprehension.

The apartment had two large bedrooms, a good-sized living room, a kitchen, and a tidy bathroom. Alex showed them around the apartment and explained that he was a musician traveling with his two friends. He showed them the available bedroom, which was bright and airy, with a large window that overlooked the courtyard. Then he knocked on the other door. The door opened, and they saw a room cluttered with musical instruments and two other young men. All three fellows were in their 20s with long hair and beards. Alex's friends introduced themselves as Yuri and Alexei. All three were from Moscow. After they chatted for a bit, they learned that the guys were also heading to San Francisco.

Maria's mother, impressed by the apartment's condition and the politeness of their potential roommates, wasted no time in making a decision.

"The apartment looks nice, and the price of the apartment is very reasonable," Maria's mother said. "I think we will take the room."

"Great!" replied Alex, visibly pleased with their decision. Then, he added cautiously, "But I must warn you that we are musicians, so we will play guitars and sing sometimes. I promise we will not do it late in the evening. Are you okay with that?"

Maria and her mother nodded in unison. The young men's respectful demeanor and the shared need for roommates overruled any potential concerns. They all needed each other, as they had

no other options for prospective roommates. They would make it work.

With the arrangement settled, Maria and her mother headed back to Rome to retrieve their belongings from the hotel and check out. The streets were deserted, but the town was still alive with the sound of the sea.

On the train ride back, Maria reflected on everything she and her mother went through. They had left their home and everything they knew behind to start a new life. But they had each other and were determined to make a better life for themselves. Maria smiled at her mother, feeling certain that they would be okay.

HAIR IN THE SOUP

January 1969 – March 1969, Rome, Italy

Maria and her mother settled into their new apartment, finding it much more comfortable than the hotel. They had comfortable beds, could cook their own meals, and resided just a 30-minute train ride from Rome.

One evening, as they sat in their new home, Maria's mother gently turned to Maria and asked, "Do you remember our first communal apartment? You were only five years old when we moved out, so I don't know how much you remember."

Maria furrowed her brow, casting her mind back into the depths of her childhood memories.

"I remember someone kept pooping in our tub,"

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she replied, squinting as she attempted to bring back those hazy recollections.

Her mother nodded. She began, "Let me remind you so you can better appreciate what you have now. Leningrad had a terrible housing shortage. The city had withstood the 900-day siege during World War II, a period marked by a lot of hardship. Hunger, cold, and relentless shelling claimed the lives of a million people. The bombings destroyed countless buildings."

Maria's expression clouded with sadness as her mother recounted the history. "Yeah, it was a terrible time," she said, her head shaking slowly. "My grandmother used to tell me stories about how they resorted to eating rats and wallpaper glue just to stay alive."

"In the aftermath of the shelling, with so many buildings in ruins, Leningrad's housing crisis loomed large, lasting for many decades," her mother continued, her voice carrying the weight of those years. "To address the housing shortages, many families were forced to live in communal apartments, where unrelated families shared one apartment, with each family occupying a single room. The rest of the space—kitchen, a room with a toilet, and bathing room with a tub—was shared among all the residents. We lived in one of these communal apartments. Your dad and I had one room; my mother, father, and younger sister had another, and a third room was allotted to another

unrelated family. You were born there, so you also spent a few years in that apartment as well."

"Random families were put together purely by timing and luck, similar to how we found this apartment. However, we weren't particularly fortunate in our Leningrad communal apartment. We shared it with neighbors who held deep anti-Semitic feelings. They reveled in tormenting us, devising cruel pranks and nasty tricks," Maria's mother explained, her voice turned somber as the sad memories streamed back. "One of their favorite tricks was throwing hair into your grandmother's soup. Your grandmother suspected they spit into the food as well."

Maria's eyes widened in disbelief. "That's terrible, Mom. How did you endure it?"

Her mother sighed, a heavy cloud of the past casting a shadow on her expression. "We needed to stay vigilant. There always had to be someone keeping an eye on the food during its preparation. Even if it was just boiling water, someone had to watch it."

Maria's face contorted with anger, empathy surging for the suffering her family endured. "That's terrible! So much wasted time just standing there and watching the food!"

"And that's not all," her mother continued, her voice quivering as she recounted their ordeals. "The neighbors would place excrement in the

bathtub on our designated day to use it. That's the memory you've held onto, the one about the poop. It must have been traumatizing for a young child. Each of us had to spend a great deal of time scrubbing and disinfecting the tub before we could even think of using it. Every single time. We didn't know when they might sneak in and put something nasty in there."

Maria felt disgusted, grateful she didn't recall all the details. "Glad I don't remember all of it!"

"After several years of searching for someone willing to swap apartments with us, I eventually found a family who was open to it, and when you were five, we managed to move out," her mother concluded, her voice softer but tinged with the enduring scars of their past.

Maria listened attentively, her heart heavy with the knowledge of the difficulties her family faced. She leaned closer to her mother, touched by the profound strength that had carried them through those challenging days.

"Thanks for reminding me, Mom," she whispered, her voice filled with gratitude. "I can tell it's difficult for you to remember those days, but it makes me appreciate our new neighbors all the more."

UNEXPECTED ROOMMATES

January 1969 – March 1969, Rome, Italy

The three young neighbors, polite and friendly, had quickly woven themselves into the fabric of Maria's new life in Ostia. Each evening, with clockwork precision, the cozy living room transformed into a concert hall, filled with the strum of guitars and the soaring voices of Alex, Yuri, and Alexei.

"Another round of 'Where are you, mother?'" Alex grinned, plucking the opening notes.

Maria's heart leaped. "Oh yes, it is one of my favorites!" she exclaimed, familiar goosebumps rising on her arms.

She leaned back on the threadbare sofa, eyes half-

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closed, letting the music wash over her. Alex's fingers danced across the fretboard, coaxing forth the opening notes of the nostalgic song.

The voices of three singers blended like honey and cream, Alex's rising above the rest, clear as a crystal bell. Each note he sang radiated flawlessness, and his singing possessed the ability to transcend the confines of their small apartment.

The songs they performed were familiar to Maria; she owned records of these melodies back in Leningrad. Initially reserved about their lives in the Soviet Union, the young men gradually opened up as weeks passed, unveiling an astonishing truth. It seemed almost unbelievable, yet undeniably thrilling: these talented singers were not just performing renditions of the songs Maria cherished; they were the very members of the band that had created those records. Alex, with his mesmerizing voice, anchored the group as the lead singer. No wonder he sounded so remarkable in their living room; he filled large venues teeming with adoring fans with that voice.

The revelation left Maria breathless. The fact that she and her mother shared an apartment with these famous and incredibly talented musicians almost exceeded belief. Every evening, they were treated to private concerts, their living room turning into a venue filled with melodies and emotions. It felt like a dream realized, an

encounter that surpassed all expectations.

Maria smiled, listening to a wistful echo of the song "If You Love." Back in Leningrad, this melody had been her refuge. "If you wait for me in the rainstorm, it means you love me," the lyrics crooned, and Maria experienced a pang of bittersweet memory of Volodya, waiting for her in the rain.

Back then, I'd huddle beneath my blankets, listening to this very melody on my record player, she thought, a smile tugging at her lips. And now, here they are, playing it just for me.

"Do you like this one, Maria?" Alex's voice rumbled, mingling with the bass notes.

"I love it!" she whispered, opening her eyes to meet his gaze. The shared laughter that followed was a balm to her soul, a testament to the unlikely bond they'd forged in this unexpected sanctuary.

"Alex, I remember you asking if we would not mind you playing music sometimes. Music is such a special part of sharing this apartment with you! I am so lucky."

But beneath the surface of this musical paradise lay a poignant reality. The stories they'd shared in the late hours painted a portrait of a life stifled by censorship and control. The censorship imposed strict regulations on song content and themes to align with Soviet ideology. While Western-style rock concerts were a rarity, Alex's band

had a unique style, blending rock and Russian folk music, often referred to as "Estrada" music. Despite the popularity of their concerts, Alex experienced stifling constraints as an artist. He yearned for creative freedom, the ability to craft music and lyrics without the oppressive yoke of censorship. He wished to break free from the confines of state-controlled radio stations that restricted their best work. He was ready to forsake fame and start anew in America. None of them knew if they would be able to have a musical career in another country. But they believed they could not stay and be controlled by the state.

"America," Alex said softly, the word a whispered dream. His gaze fixed on the peeling wallpaper as if it held the contours of a distant horizon. "A place where our music could be free, stages where our songs can breathe, where words aren't strangled by rules."

A knowing silence settled over the room. America, with its promise of artistic freedom and unfettered expression, was a dream they shared. Even if it meant leaving everything behind, even if it meant starting over in a foreign land, the dream was too strong to resist.

Maria watched them, these three talented souls who used to be trapped in a gilded cage, their creativity clipped by the invisible wires of censorship. A deep empathy stirred within her, a kinship forged in the shared desire for a world

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where music could truly soar.

The future, like the blank sheet of music before them, held no guarantees. But for now, with the intoxicating power of their music and the shared bond of their dreams, they found their own perfect harmony.

So it was that, by a twist of fate and perfect timing, Maria found herself melting away each evening to the intoxicating sounds of love songs, serenaded by a singer whose concerts were so sought after that tickets were nearly impossible to come by back in Russia. The magic of those evenings, with Alex and his friends sharing their artistry in their Ostia apartment, became a cherished treasure, a respite from the complexities of their new life and a connection to a world of music that transcended borders.

THE PINK CLOUD

March 1969, Albany, USA

After three long months of paperwork and anticipation, Maria and her mother received approval for their application, granting them the ticket to their American dream. They arrived in America in March 1969, brimming with optimism and eager to start a new chapter in their lives.

Maria and her mother settled in Albany, California, just across the Bay from San Francisco and a stone's throw away from the UC Berkeley campus, which Maria hoped to attend. They found an apartment near San Pablo Avenue. They liked Albany's tree-lined avenues flanked with brick apartment buildings. The air carried the scent of freshly baked bread from local bakeries and the aroma of coffee from corner cafes.

Daytime bustled with families and shoppers, while evenings brought a sense of cozy seclusion under the warm glow of streetlights. Maria's mother found clerical work in an insurance company a few weeks after arriving in California. Maria's job was to get ready for university entrance exams.

One of the big discoveries they made when they went shopping for the first time is that the worldwide toilet paper shortage they believed in was greatly exaggerated. As Maria walked through the aisles of the grocery store, she noticed a vibrant rainbow blooming before her in the hygiene aisle. She was standing in front of a glorious mountain of multi-colored toilet paper. Soft, pillowy rolls in shades of rose and azure beckoned to her, their softness and sweet scent whispering promises of indulgence.

Maria reached for a roll, fingers trembling with anticipation, imagining the caress of plush paper against her skin. "Mom," she whispered, voice hushed with longing, "can we buy this?"

Her mother scanned the aisle with her practical eyes. A crease carved itself between her brows. "We have plenty of toilet paper, Maria. A whole suitcase, remember?"

Maria's shoulders slumped. She remembered, she really did. The worn suitcase tucked away in their closet, brimming with rolls of scratchy, gray paper, each sheet resembling a dry corn husk more than comfort. But this pink toilet paper was different.

This was a fluffy cloud, not a prickly desert shrub. "Just one, Mom, you know, to try it," she pleaded. "It's so soft. Not like... not like those."

Her mother's heart softened. She saw her daughter yearning for something simple, yet so unattainable in their old life. "One," she conceded with a sigh. "But just one. We must use what we have, Maria. It's a lesson; you need to remember where you came from, what you had back in Leningrad, and what is possible now."

Maria's face bloomed like a sunflower lit by the sun breaking through the clouds. She hugged the roll, its softness warming her heart. They walked to the checkout, not only with a triumphant trophy of toilet paper, but also with a newfound understanding of each other, a lesson about practicality, and a small dose of indulgence.

Their apartment that night held a new fragrance, a whispered scent of comfort and tomorrow's dreams. As Maria used the precious squares, she noticed something. The Soviet paper, stacked beside her like a grim sentinel, didn't seem so unbearable anymore. Those gray sheets of paper, once a grim reminder of scarcity, now stood less menacingly, its rough texture a tangible relic of their journey. Each sheet, she realized, wasn't just a simple necessity, but a symbol of appreciation for all they had, from the freedom to apply to the university of her choice to choosing the most basic comforts. It was a reminder of their journey,

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of resilience, and of the quiet joy in appreciating what they had now, represented by a single roll of a fluffy pink cloud.

THE EGG ROLL FACTORY

March 1969 – August 1969, Berkeley, USA

In March, the university admission season was already well underway, and Maria immersed herself in the exams assessing her math, science, problem-solving, and English academic skills. She found the exams remarkably easy. She had never taken multi-choice exams in Russia; the tests in Leningrad were much more rigorous. In multi-choice exams, the answer was given to you; you just had to select it. Even when Maria did not know the answer for sure, she could eliminate a couple of wrong answers, which reduced the choices of possible correct answers. This was much easier than the written and oral

exams she took in Leningrad, where you had to give comprehensive answers and write them on a blackboard before a panel of teachers grilling you. The multiple-choice format, where the task merely involved selection, seemed almost like a game. Maria's logical thinking swiftly guided her to success, allowing her to pass the exams and gain admission to Berkeley.

With the school year starting several months away, Maria sought to make the most of her free time by earning some money over the summer. She had no prior work experience and no particular skills, but when she spotted an advertisement for a job at an egg roll factory, she decided to give it a shot.

Upon arriving at the factory, her eagerness led her to secure a job on the spot. "When can you start?" inquired the man who hired her.

"Today!" Maria replied with enthusiasm.

The man nodded and started by showing her around. The facility was divided into different sections: a locker room for changing, a preparation area for rolling egg rolls, a cooking area where they sizzled in hot oil, and a packaging zone for shipping.

Following a quick tour, they returned to the preparation room, where ten identical tables filled the space. Rows of Chinese ladies diligently rolled

egg rolls, each sitting opposite another at their assigned stations. A lone figure stood apart, the only non-Chinese worker in the room, who was working by herself on one of the tables. The manager took Maria to that workspace, introducing the woman as Betty.

"Betty will show you what to do. Lunch is at noon. You can go home at 5 o'clock," the manager informed her before vanishing.

Betty, a friendly, motherly figure, immediately took charge. She gestured toward a bowl filled with chopped vegetables and said, "This big bowl has cabbage, carrots, and sprouts. They're kept on ice to stay fresh. Grab a handful, drain the water by squeezing it in your hand, and place the vegetables on a dough sheet. The small bowl holds shrimp in ice. Take two shrimp, drain them by squeezing them in your other hand, and add them on top of the veggies. Roll the dough tightly, and seal it by wetting the edge with your wet finger."

"Once you have the full tray, take it to the cooking area," she said and took Maria to a very hot room with a large tub of boiling oil and a conveyor belt dropping egg rolls into it. "Be careful not to touch the conveyor belt. It is very hot as it is constantly going into boiling oil. Place your egg rolls on the conveyor belt, and make sure they are not touching each other. Once you place all your egg rolls onto the belt, you can go back and start working on the next batch."

As Betty skillfully demonstrated, everything seemed deceptively simple. However, as Maria started her work, the icy vegetables and shrimp quickly numbed her hands, leaving them hurting. She wished for gloves to protect her hands from the cold, but no one else wore them. Her hands became too stiff to roll the egg rolls tightly, and they paled in comparison to Betty's expert creations. Betty managed to complete two trays of exquisite egg rolls, while Maria struggled with just one tray of floppy, unimpressive ones.

Later, in the area with the bubbling cauldron of oil, Maria's hands burned as she gingerly placed her less-than-perfect egg rolls on the conveyor belt. After two hours, her hands resembled lobster claws, bright red in color and burning with pain. Relief washed over her when the clock finally struck five, signaling her time to go home and tend to her aching hands. The next day, she brought hand cream and generously slathered cream on her hands before entering the preparation room to ease the discomfort. Even though her hands remained cold, they didn't hurt as much. During the lunch break, she noticed her coworkers laughing at her as she reapplied the cream. They were seasoned experts, accustomed to the alternating exposure to icy ingredients and searing heat near the fryers.

With a few days of experience, Maria's egg rolls began to look less pathetic and more presentable.

However, her production speed still lagged far behind Betty's. Her hands remained crimson and tender, developing painful cracks. Maria continued treating them with hand cream, both at work and at home. Despite her discomfort, Maria soldiered on, determined not to give in to the pain. She did not enjoy the work, but quitting was out of the question. She hailed from a family that didn't give up.

After a week of labor, Maria earned her inaugural paycheck—a moment of triumph. Her hourly wage was \$1.60, and her paycheck, after taxes, amounted to \$38.16 for 40 hours of work.

With great pride, she handed the paycheck to her mother. "My first paycheck! It's for you," she said with a broad smile.

Two weeks later, the manager summoned her to his office. His words were blunt and unsympathetic. "Maria, you're too slow. Your production rate doesn't match that of the other women. Today is your last day. No need to come back tomorrow," he declared, handing her a second paycheck.

Maria left the office and hurried home. She had just been fired, but instead of feeling dejected, she was overjoyed. "Mom, great news! I was fired! I didn't enjoy working there at all. I'm so glad I don't have to go back!" Her relief was palpable; she hadn't quit, and yet she wouldn't have to return.

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The experience at the egg roll factory, though challenging, became a reminder of why she was going to college. She refused to let adversity break her; instead, she emerged stronger and more focused on what she needed to do to create her American dream.

FREEDOM OF SPEECH

September 1969 – June 1975, Berkeley, USA

It seemed like it had just been yesterday that Maria clutched her Berkeley acceptance letter, a grin splitting her face. Then, six years at Berkeley unfurled like a time-lapse movie. Bachelor's degree, Master's degree—the time flew by in a blur. The academic journey embraced Maria; studies came easily, a familiar tango with formulas and circuits. Electrical engineering came naturally, her brain thirsting for its logical puzzles. "Wow, Maria, you came up with that solution lightning fast!" Michael, her classmate, leaned over during a group project.

Shyness about her accent initially held her

back in class discussions, but her prowess in problem-solving propelled her into the spotlight. Slowly, the timidity melted away, making room for her confident voice to resound. A sense of respect emerged as classmates and teachers alike recognized she was often the first to get the correct answer.

"You're the resident problem solver here. No wonder Professor Thompson throws those extra-challenging questions your way," Michael grinned. "Yeah, maybe a bit too often," Maria joked, though secretly she thrived on the intellectual joust.

Striving to be the best in her class was something she always expected from herself. Back in the Soviet Union, girls were often the science aces, their studious nature a force to be reckoned with. So, it came as no surprise that she outperformed her predominantly male classmates. In fact, often being the only female in the class felt like an advantage, using her prior experience as a measuring stick. Back in Russia, her main competition was Galya Radar, the standout student in her classes. That girl proved to be quite a challenge!

Fortunately, I don't have Galya breathing down my neck here! she thought with a grin.

By her junior year, Maria juggled classes with a part-time gig programming reports in COBOL for the Video Center. Generating reports with the

COBOL language, however, wasn't exactly a dream come true. The COBOL syntax demanded ample typing, and she was not a good typist.

"Ugh, COBOL," she grumbled. "All that typing, and I never learned it back in Russia!"

Michael, ever the optimist, would offer words of encouragement. "Hey, at least it's teaching you logic. Consider it mental calisthenics for your brain!"

That was true. Beyond the typing challenges, Maria appreciated the satisfaction of making sense of the logic she needed to write to deliver the reports her boss required.

The political atmosphere in Berkeley buzzed with upheaval and transformation. The city surged with political energy. Students and activists demonstrated against the Vietnam War, racism, and other social issues. This activism was a culture shock for a recent Soviet emigrant like Maria, who had never known a world where people freely spoke their minds.

"You mean people can just... say things?" she'd asked Margie, her closest friend, her eyes wide with amazement. "You know, in the Soviet Union, criticizing the government was dangerous, like stepping onto thin ice. You could disappear for speaking out, while those who reported others were rewarded. Fear was a constant companion, even for me as a child."

She remembered her mother's whispered stories of kind uncles branded as traitors and vanished without a trace. "Never say the wrong thing to the wrong person," her mother warned, "even the walls have ears." It was a lesson in survival, a way to avoid sharing the fate of those who'd been silenced.

So, when she first witnessed people speaking openly, without fear, it was a shock. But that shock quickly transformed into admiration for a society that embraced the courage to speak out to power.

In Berkeley, people enjoyed the freedom to express their political views, no matter how radical or controversial. A multitude of opinions filled the air; some resonated with her personal experiences, while others stirred disagreements. Having firsthand experiences with socialism, enduring anti-Semitism, and suffering the shortages of food and simple necessities like toilet paper, she knew that socialism and communism were not viable alternatives to capitalism. With the ironclad grip of socialism still fresh in her mind, Maria understood its promises were mirages—shimmering illusions meant to deceive the people who want to believe in a positive future.

Even though she did not agree with everything she heard on campus, Maria reached a profound realization: debate, no matter how dissenting, was an invaluable asset to society. Here, she came to appreciate the democratic system that allowed all

voices, whether misguided or not.

"Even if I disagree, these debates are important," she said. "It's how we learn, how we grow."

"You've been through a lot, haven't you?" Margie asked gently.

Maria nodded. "And that's why I cherish this freedom, this right to speak my mind, no matter how different it might be from yours."

She squeezed Margie's hand and spoke with a voice trembling from emotion. "Some people take the freedom to say what they think for granted, but if they could only experience what I did, if they could spend a week in a different world, they would view it as a treasure. The freedom to express your views, even if they deviate from other people's convictions, is only possible in a society that values individuals. It is a way of life I deeply admire. I consider myself so fortunate to be here."

A NEW FRONTIER

June 1975, San Jose, USA

San Jose was a city on the cusp of change. The burgeoning tech industry, though in its early days, had already started to have a significant impact on the city. There were still plenty of traditional businesses, like olive groves, mom-and-pop shops, and diners, a large number of artists and musicians, and also a growing number of tech start-ups that brought together a diverse group of creative minds. The city was home to many immigrants who brought their own unique and vibrant cultures to the mix. San Jose was a place where old and new cultures collided and where anything seemed possible.

It had been a few months since Maria, fresh out of Berkeley with a Master's degree in electrical

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engineering, joined Monolithic Memories Inc. (MMI). At MMI, she worked on Programmable Array Logic, known by the acronym PAL, a new technology poised to change the way digital logic circuits were designed.

PALs were like Legos building blocks for logic circuits. They allowed designers to quickly and easily create complex circuits with a variety of features. This was a major breakthrough because it meant that designers could now create complex circuits without having to use a lot of small, individual components. This made the design process much easier and faster, and it also made the circuits more reliable.

Working at technology's forefront exhilarated Maria. As she walked through the office, a sense of belonging washed over her. The walls were lined with whiteboards covered in equations and diagrams, and the air buzzed with the sound of people talking about circuits and fresh approaches to solving problems. It seemed like they were talking in her native tongue. And they really were, as she did not know Russian words for the technical terms she used every day.

On the way to work, Maria took in the sights of San Jose. San Jose's cityscape consisted of plain, bland, nondescript buildings. She found it to be a stark contrast to Leningrad's beautiful, ornate architecture, but she didn't yearn for her birthplace. San Jose did not have to be pretty

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to be the city of her dreams. Anything seemed possible here. She knew that with hard work and dedication, she could make a significant impact. Every day brought new problems and new solutions. She was pioneering the future of digital logic design, and she looked forward to going to work every day.

She had only been in San Jose for a few months, but she fully adopted the city as her own. She had made new friends and started feeling like a girl next door. Yet, occasionally, thoughts of Leningrad lingered. The memories of the magnificent city seemed like a distant memory. Maria rejoiced in her new hometown but realized she would never forget the splendor of Leningrad or her childhood friends.

TURNING FAILURES INTO INNOVATION

1975-1985, San Jose, USA

Maria's life balanced within the finely tuned equilibrium of commitment and camaraderie rooted in her work at MMI. She enjoyed her job so much that most of the time, it felt like play. She also relished the company of her co-workers; even on days off, they hung out together, organizing cookouts, beach trips, hikes, and trips to San Francisco's Chinatown for dim sum. Yank Sing continued to be their preferred dim sum spot for years. Another culinary delight they indulged in

was the pan-fried sand daps offered at Scoma's on Pier 47 in Fisherman's Wharf. Their shared meals became a cherished tradition, offering a chance to relax and connect on a personal level. Work rarely crept into their off-duty conversations; they appreciated their time together and sought various ways to unwind and have fun.

Within the walls of MMI, Maria thrived on the challenges of her PALASM project. PALASM, a computer-assisted design program, converted logic equations into binary files for programming devices. She also contributed to designing a higher-level language for programmable logic design as part of a standards group. Climbing the corporate ladder held little allure; it might distance her from the hands-on nitty-gritty tasks she enjoyed. What mattered most to her was her ability to excel at her job and solve complex problems.

The air crackled with the buzz of innovation and the heat of competition. It was 1979, and the minicomputer market was a battlefield. Giants like Digital Equipment Corporation (DEC) ruled the landscape, but challenger Data General (DG) refused to play by the rules. In this battle, MMI faced a monumental hurdle: their chip yields were poor. Blown fuses plagued their chips, rendering them useless.

DEC, their biggest customer, demanded flawless

PALs, leaving DG desperate for chips to fill their orders. Maria, known for her unconventional thinking, hatched a daring plan.

"Ralph," she blurted out during their usual brainstorming session, "what if we sell them the defective chips?"

Ralph, her head of engineering, recoiled. "Maria, you can't be serious! Defective chips? We'd be laughed out of the industry!"

Maria pressed on, her eyes gleaming with the spark of an inventor. "But these aren't just any failures, Ralph. They have blown fuses, and those fuses hold a secret."

She explained how each blown fuse represented a 0 in the chip's logic, while intact fuses acted as 1s. The key, she reasoned, was to map these fuse patterns to specific, workable functions. DG, with their ingenuity, could then build custom workarounds for each chip, turning waste into valuable assets.

Ralph, initially skeptical, saw a glimmer of hope. It was unorthodox and risky, but it offered a lifeline. "It's a long shot, Maria, but if it works..."

Word spread like wildfire. DG, intrigued by the challenge, jumped on board. They meticulously mapped fuse patterns, devised ingenious workarounds, and breathed new life into the supposedly dead chips they used in their prototype computer. This bold strategy not only

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secured them much-needed parts but also forged a unique partnership with MMI, built on shared grit and resourcefulness.

Sometimes, the greatest innovations emerge from the ashes of failure, waiting to be discovered by those brave enough to think out of the box.

THE FPGA REVOLUTION

1985, San Jose, USA

Time flowed like a river, months turned into years. Maria's life was about to experience a new turn. She got a call from her former boss at MMI, asking her if she would be interested in joining him at psiBlox. PsiBlox was a small start-up, based in San Jose, working on the next generation of programmable logic. The psiBlox team envisioned developing a novel form of programmable logic device, aiming for greater flexibility and power than the PALs Maria had been working on at MMI. MMI work had etched valuable experiences into her repertoire, but now Maria was ready for a new challenge.

PsiBlox's vision centered around FPGA devices (Field Programmable Gate Arrays). These devices could be programmed and reprogrammed to perform various logic operations. While PALs were programmed to perform a specific function, FPGAs could be reprogrammed and changed as needed. They were also bigger and more powerful. One way to think about the difference between PALs and FPGAs is to compare them to a car and a bus. A car is designed to perform a specific task, such as the transportation of a few people. A bus, on the other hand, is a more flexible vehicle. It can carry either a few people or many people, with luggage or without luggage. Maria was intrigued by the flexibility FPGAs provided and wanted to work on the tools enabling users to reprogram the chip.

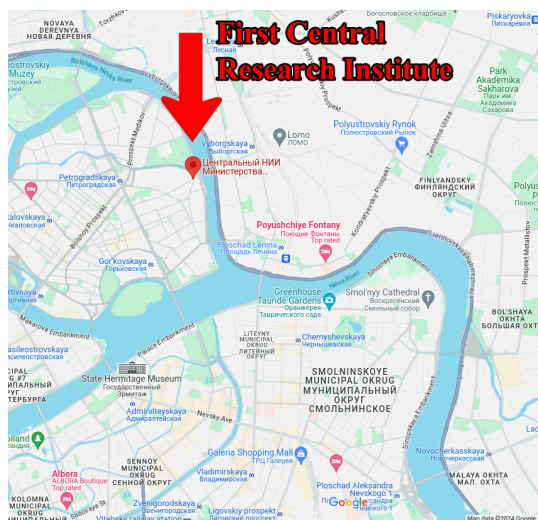
In 1985, soon after Maria joined them, psiBlox announced the release of its first commercial FPGA, the psi700. psiTools, the software development tool that Maria worked on, allowed users to quickly and easily program the psi700 to perform the desired logic. To put it simply, psiTools functioned akin to a "traffic cop" for the FPGA, ensuring optimal placement of various logic blocks on the chip and that the connections between the blocks were routed in the most efficient way possible. psiTools made sure the circuit performed as expected and that it used the chip resources efficiently.

That year, psiBlox began expanding its marketing

efforts into Europe, and AEG Telefunken became its first major European customer. A few months later, when the companies started working closely together, Maria emerged as psiBlox's technical bridge to AEG Telefunken. Regular visits to AEG Telefunken's Berlin offices added a new dimension to her role.

THE BASTION OF KNOWLEDGE

June 1985, Leningrad, USSR



1 985. A year of innovation on a global scale. While the West pushed boundaries in Silicon Valley, a quiet storm was brewing behind the Iron Curtain. Unbeknownst to each other, across continents, forces were aligning, setting the stage for a future clash destined to change the course of history. Technological advancements were not just leaps forward, they were battlegrounds.

Nestled within the heart of Leningrad resided the bastion of knowledge and innovation, the First Central Research Institute. This establishment stood as a pinnacle of scientific prowess. Gaining entry into its hallowed walls was difficult; it demanded a formidable combination of education and background, a testament to the rigorous standards that the institute upheld. The path to securing a position within its ranks involved intense competition that adhered to these demanding criteria. The institute demanded the best and the brightest.

Alexander Rifkin, known as Sasha to his friends, set his heart on joining the First Central Research Institute. He was tall, prone to being overweight,

and his wild mane of curly black hair seemed to have a personality of its own. Perched on his nose rested thick-rimmed glasses, a constant companion throughout his academic journey. Sasha had recently completed his university studies, emerging as the second-best student from the prestigious Leningrad Polytechnic Institute's physical-mechanical department. The coveted first place had been snatched by Sergei Kozlov, whose academic prowess matched Sasha's. The tiebreaker had come down to "social activity" points, a deciding factor in this tight competition, courtesy of Sergei's involvement as a Komsomol activist. The concept of "social activity" was the invisible hand that determined their positions, a reality with which Sasha had come to terms.

Being ranked second in his graduating class was still good, and Sasha remained optimistic about his chances of being accepted at the First Central Research Institute. He had reason to be hopeful about his future prospects, envisioning a career that would ignite his passions. The impending job distribution, the process of matching fresh graduates with suitable job openings, held both promise and uncertainty. Sasha was acutely aware of his unique challenge. The unspoken reality lingered in the air: his Jewish heritage cast a long shadow over his potential acceptance. The invisible walls, erected by unspoken social codes, were designed to restrict the number of Jews

allowed through the hallowed doors of academia. Sasha swallowed the bitter pill of this reality, his stomach churning with a mix of hope and defiance. Could his hard-earned merit crack these discriminatory foundations?

The stories of his predecessors echoed in his mind—bright minds from the year before who faced the bitter sting of rejection from their desired positions, some spiraling into the grim realm of unemployment, making ends meet by tinkering with electric appliances. With no job prospects available, their paths had inevitably led to emigration, a path Sasha was determined not to tread. His love for his country, city, and friends ran deep, as did his desire for a meaningful challenge.

THE RESIDENT DILEMMA

June 1985, Leningrad, USSR

Sasha spent the morning at the Polytechnic Institute practicing job interview questions with his friends. His buddies left, and now Sasha was leaning back in his chair, gazing out of the window as the afternoon sun cast a warm glow over the bustling streets of Leningrad. Born and bred in this city, he had never experienced the pangs of uncertainty that plagued those from other towns. Life had a certain stability when you were a registered resident of Leningrad. It meant you didn't have to worry about being shipped off to some remote outpost during job distribution, a fate that sent shivers down the

spines of many.

The classroom buzzed with the usual chatter, but Sasha's thoughts were focused on the unique advantage he held. While other graduates fretted about their uncertain futures, he knew that as a Leningrad resident, he was in control of his work location choices. Unlike his peers from other cities, he had a place to live. Without a resident status, the students were not allowed to stay in Leningrad after graduation.

As the days led up to graduation, the topic of conversation among his friends inevitably turned to their future prospects. Sasha listened with detached amusement as his classmates shared tales of cities they might be sent to. A surge of smugness washed over him as he witnessed their eyes widen with a mixture of envy and trepidation. For him, the dice had already been cast, and they had landed firmly in his favor.

He did not expect his unique advantage to lead to heartbreak. Sasha recalled a day a few weeks ago when he was sitting under a tree in the campus courtyard when a voice broke through his daydreaming. "Sasha, right?"

Looking up, Sasha saw a young woman standing there, a glint in her eyes. He recognized her; she was engaged to Sergei Kozlov, his academic rival. She had golden blond hair that seemed to catch the sunlight, and her voice sounded melodious.

Sasha's heart skipped a beat. He was not accustomed to beautiful females noticing him. His days were filled with textbooks, assignments, and solitary moments spent in the quiet corners of the library. He hesitated for a moment, his introverted instincts ringing an alarm in his mind. His palms grew sweaty, and his heart began racing.

He stammered, "Yeah, that's me. Can I help you?"

She introduced herself as Anya. "Do you mind sharing your tree with me?"

He spread his arms, "Welcome to my abode, Anya."

For the next hour, as they shared a spot in the shade, they spoke of books and upcoming exams, and discovered some common friends. Sasha was entranced by her charm, and as their conversation unfolded, her words acquired a subtle dance of flirtatious undertones. Her playful interplay of words carried an unspoken promise of making a connection. It did not take long for Sasha to sense a spark of attraction, casting a warm glow on their interaction.

"You know," she said after an hour of chatting, her tone light and playful, "I heard a new movie playing at the theater tonight. It's supposed to be pretty good. Would you be interested in checking it out with me?"

Sasha's heart began to race again. He blinked, momentarily taken aback by the unexpected invitation. His mind was caught between the

allure of the unknown and the comfort of his well-trodden routine.

"I haven't been to the cinema in a while," he admitted, his voice carrying a mix of hesitancy and anticipation.

She smiled, "How about we change that? A chance to escape into a different world, even if just for a few hours."

He found himself mesmerized by her smile. "Oh, uh, yeah, sure!"

Her smile widened, her flaxen hair catching the last rays of the sun. "Great! It's a date then."

He nodded, unable to suppress a grin spreading across his face. Then his smile faded as he remembered that she was engaged to Andrei.

"Wait," he interjected, "I thought you were engaged to Andrei."

Her smile faltered. "We were," she confirmed, "but we broke up last week."

"Oh," Sasha responded, his tone expressing sympathy. "I'm sorry about that."

"It's okay," she reassured him. "It was for the best."

"I'm glad you think so," Sasha replied. "I don't want to cause any problems for you."

"You won't," she insisted. "Andrei and I are both adults. We can handle this."

"Okay," Sasha agreed. "If you're sure."

"I'm sure," she replied with a confident smile. "So, are you still up for a date?"

"Yes," Sasha said with enthusiasm. "I'd love to see a movie with you."

At the theater, Sasha's mind struggled to recall the plot of the movie, entirely captivated by the enchanting presence of the beautiful woman seated beside him. Her inexplicable desire to be in his company consumed his thoughts, eclipsing all else. He eagerly anticipated regaling his friends with this remarkable encounter, silencing their incessant teasing that he only had eyes for books.

After the movie, they walked hand-in-hand along Nevsky Prospect. The street was ablaze with lights and still full of people. Anya's gaze held a spark of mischief. "Sasha, you're quite the enigma, aren't you?"

Sasha arched an eyebrow. "Oh? And what makes you say that?"

Anya's laughter echoed through the air. "Well, you're the studious type, the one who finds solace in books and the quiet corners of the library. You have an aura of complexity that makes you puzzling and, at the same time, interesting to those around you. But there's a world beyond the pages of those library books, Sasha."

Sasha's lips curved into a smile, a testament to the truth in her words. "I suppose there is."

As the night enveloped them, Anya's voice took on

a more contemplative tone. "You see, Sasha, life is an intricate dance of experiences. And sometimes, we need someone to guide us beyond our comfort zones, to show us the possibilities that lie beyond the familiar."

Sasha's gaze met hers. "Are you offering to be that guide, Anya?"

Anya's smile held a touch of flirtatiousness, a glint of mischief that danced in her eyes. "Perhaps I am."

Their shared laughter seemed to blend seamlessly with the city's symphony—the distant hum of cars and the echo of footsteps on the pavement.

It was against this backdrop that Anya's voice, once again, shifted the course of their conversation. "Sasha, there's something I've been thinking about."

Sasha looked her in the eyes. "What's on your mind, Anya?"

Her expression was a delicate balance of vulnerability and determination. "Sasha, you know, I've enjoyed our time together. There's a connection between us, something that seems like it's worth exploring further."

Sasha's heart quickened. "And what mysteries are you suggesting we explore, Anya?"

Anya's eyes held a glint of adventure, her tone hinting at a world of possibilities. "Perhaps we could spend the night together, Sasha. Unearthing secrets that only come alive under the veil of

darkness."

The suggestion hung in the air, a tantalizing proposition that stoked the fires in Sasha's mind. In that suspended moment, the world around them seemed to fade into the background.

Sasha whispered quietly. "I feel the same way too, Anya."

Anya took a breath, her eyes holding a mixture of anticipation and resolve. "Sasha, what if we let this night lead us to something more lasting?"

Sasha looked at her, a newfound clarity in his eyes. "Anya, are you suggesting...?"

Anya's voice was quiet and resolute. "What if we consider the possibility of marriage, Sasha? But we need to do it quickly, before we graduate."

Sasha's initial surprise gave way to astonishment. "Anya, your proposal is unexpected; we barely know each other."

Anya's expression remained steadfast. "I'm not even asking for long-lasting love, Sasha. I'm asking for a chance. You see, if I marry a Leningrad resident, I'll gain that status too, and that means I can work here. I've dreamt of building a life in Leningrad, and this might be my only shot."

Sasha's mind raced. The weight of her words hung in the air, and he couldn't ignore the gravity of the situation. Marrying someone he barely knew just to fulfill a practical need seemed ludicrous. But then again, so did the idea of leaving the city he

loved behind. The gears in his mind turned as he tried to reconcile his principles with the reality of the situation.

With a sigh, Sasha met Anya's eyes. "I appreciate your honesty, Anya, I really do. But marriage is a big step, and I'm just not ready for it. I can't make that kind of commitment without genuine feelings on your part."

Anya nodded; her disappointment was clear, but her resolve was unbroken. "I understand. It was a long shot, anyway. I'll figure something out."

And just like that, the encounter was over. Sasha watched as Anya walked away, her shoulders slightly slumped. As he returned to his thoughts, a wave of sadness washed over him. This beautiful woman did not really like him. He also couldn't shake off the sense of responsibility he felt. In a world where being a Leningrad resident held such coveted value, he had been handed an opportunity to change someone's fate, yet he did not do it.

And so, as job distribution day approached, Sasha found himself reflecting on the choices that were in front of him. Life was rarely as straightforward as the bureaucratic processes that governed it.

THE SIREN'S CALL

June 1985, Leningrad, USSR

Sasha's heart was set on the "complex automation" field at the renowned First Central Research Institute. The appeal of solving intricate problems and pushing the boundaries of innovation drew him like a moth to a flame. However, the professor overseeing the distribution procedure, a wise figure with a wealth of experience, offered a stern warning.

"I don't advise you to pick this place," he said. In the hushed tones of their conversation, Sasha asked the question that hung in the air: "Why not?" while both knew very well why.

The professor's reply was laden with an unspoken

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understanding, a silent language that transcended the verbal articulation. "I just advised you against it," he repeated, a statement with more weight than the literal meaning. Between those lines lay the somber truth that certain things could not be vocalized openly.

Undeterred by the professor's cautionary counsel, Sasha remained resolute in his decision. The allure of "complex automation" was a siren's call he found impossible to ignore, a path that beckoned him despite the challenges and unspoken barriers. As the distribution papers were laid out before him, he firmly placed "complex automation" as his top choice, his determination standing firm against the currents of caution and apprehension.

The journey that lay ahead was shrouded in uncertainty, fraught with the weight of unspoken truths and invisible walls. But Sasha Rifkin had made his choice, fueled by a blend of defiance and determination, ready to navigate the intricate maze of opportunities and challenges that would define his path in the world beyond the Polytechnic Institute.

THE CHOSEN ONE

June 1985, Leningrad, USSR

Sasha's anticipation was palpable as he sat in the small, dimly lit waiting room outside the interview chamber. His heart raced like a metronome, each beat marking the seconds that brought him closer to the verdict on his future. Beads of sweat formed on his forehead, and he caught himself fidgeting with the corner of his meticulously pressed shirt. The panel of experts quizzed him about his technical expertise, his problem-solving prowess, and his views on the intricacies of complex automation. He had navigated the intricate web of questions with grace, even managing to untangle the tricky ones

strategically planted to test his mettle.

As he recounted the interview in his mind, Sasha allowed himself a cautious glimmer of hope. The interview had gone well, but he was acutely aware that he was just one among many vying for the coveted position. The competition was a veritable ocean of talent, each contender brimming with the potential to work on cutting-edge projects. He couldn't ignore the fact that some of his competitors held a distinct advantage—the advantage of not being Jewish.

As Sasha awaited his fate in the hallway, the panel inside the conference room debated his candidacy. His command over knowledge and his quick wit had undoubtedly made an impression on them. His technical acumen was impeccable, leaving no room for criticism. Yet, as the conversation continued, they couldn't help but address certain aspects of Sasha's profile that warranted attention.

Dr. Ivanov, a seasoned engineer who had been part of numerous such panels, leaned back in his chair and spoke up. "His technical prowess is beyond question. The depth of his knowledge is impressive. But we must acknowledge the issue of social engagement. And, of course, we can't overlook the considerations tied to the Jewish quota."

Dr. Smirnova, another panel member who had a reputation for her candid assessments, nodded in

agreement. "True, he seems to be a bit of a lone wolf in terms of social activities."

With these points weighing heavily on their minds, they decided to call Professor Morozov, Sasha's advisor from the Polytechnic Institute. Using the conference room speakerphone, they initiated the call.

As the connection was established, Professor Morozov's authoritative voice resonated through the room. "This is Professor Morozov. How can I assist you?"

Dr. Ivanov addressed him, his voice respectful. "Professor Morozov, we just finished interviewing one of your students, Alexander Rifkin. We've had the opportunity to assess Sasha's technical abilities, and they are undoubtedly remarkable. However, there are some concerns regarding his level of engagement in social activities and certain background aspects."

There was a brief pause, and then Professor Morozov's voice rang out confidently, "Sasha is one of my best students. Sasha's dedication to his studies is unparalleled. His commitment to technical excellence has often left him with little time for other pursuits. It's not a lack of respect for such activities; rather, it's a testament to his unyielding focus."

Dr. Smirnova raised a valid point, her voice thoughtful. "And what about the matter of his

background?"

A hint of resolve entered Professor Morozov's tone. "If I recall correctly, Hannah Berkovitz has retired, hasn't she? If you are going to hire a Jew, hire my Jew. I strongly endorse my student, Alexander Rifkin. I have complete confidence in his abilities and potential."

With that, the call ended, leaving the panel members to absorb the weight of Professor Morozov's recommendation. Dr. Ivanov shared a knowing glance with his colleagues.

Dr. Smirnova leaned back in her chair, her expression pensive. "It's clear that Sasha's focus on his studies is unwavering. And if Professor Morozov is vouching for him, it certainly carries weight."

Unaware of the events unfolding behind the conference room doors, Sasha continued his wait in the hallway. Sasha's once neatly combed hair clung to his forehead, dampened by the heat of his anxiety. The suspense was torturous as he waited for the job interview results to be announced. He heard the rhythmic ticking of the clock on the wall, each tick magnifying the gravity of the decision that was about to be unveiled. His dreams of contributing to the automation project danced on the precipice, teetering between realization and disappointment.

Then, as if destiny had decided to favor him

amidst the uncertainty, Sasha saw the conference room doors swing open, framing Dr. Ivanov. His usually stoic face creased in a rare smile; his eyes met Sasha's gaze for a fleeting moment. Hope blossomed in Sasha's chest, even before the interviewer's voice, laced with a hint of good-natured humor, rang in Sasha's ears,

"Pal, you are in luck! We could hire a Jew if one left. Recently, one did, so we can hire you." The words hung in the air like a lifeline, tethering Sasha to the culmination of years of hard work and aspiration. Elation surged through him, a heady mixture of achievement and relief.

Yet elation quickly gave way to trepidation as the reality of his new situation settled in. Sasha had always known that such a rare opportunity came with its own set of strings. The price of his triumph was that he would have to work in a secret facility called the "box" [ящик], and he would have to get a security clearance. This meant he would have to surrender his freedom. The words "security clearance" reverberated in his mind, a double-edged sword that promised access to classified knowledge but shackled him to the Soviet labyrinth.

"This means that not only I can't tell anyone what I am working on," Sasha reflected, his thoughts a whirlwind of contemplation, "but the security clearance will lock me within the USSR." He understood that his newfound position was a pact

with the state, a commitment that would render him a "refusenik" [отказник] if he decided to escape the confines of his homeland. A refusenik who knows secrets would have to wait until his clearance expires many years in the future, while at the same time, he would be unemployable.

"The Soviet solution to brain drain," he thought grimly.

The realization nagged him, yet Sasha's determination remained unswayed. In the delicate balance between aspiration and fear, the desire to pioneer groundbreaking projects was irresistible. He was acutely aware that this was not just an occupation; it was an opportunity to shape the course of future technology. He was willing to embrace the forthcoming challenges, aware that he would be part of something significant, something that would have the potential to make a difference.

THE PERILS OF THE STATUS QUO

September 1985, Leningrad, USSR

The imposing building of the First Central Research Institute sprawled before Sasha like a grand labyrinth, its corridors a complex web of paths. As he stepped into the building's foyer, the air held a subtle dampness, and the muted lighting cast elongated shadows. His footsteps generated resonating sounds reverberating through the space, creating an almost symphonic background to his walk.

Sasha's gaze swept across the walls adorned with portraits of Soviet leaders, each face a testament to the ever-present gaze of authority. Dominating the center was the image of Mikhail Sergeyevich Gorbachev. Banners above the portraits bore

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fervent slogans, their bold declarations a rallying cry to the masses. "The Victory of Communism is Inevitable," "The Soviet Union is the hope of all mankind!" and "Glory to the Communist Party of the Soviet Union!"

Within the vast expanse of the institute, engineers worked in an open space workspace. Each large room accommodated a distinct laboratory and housed everyone working on one specific project. Here, hierarchy dissolved, and people of all ranks interwove; young specialists like Sasha, seasoned engineers with a wealth of experience, and graduate students feverishly crafting their Ph.D. theses shared the same space. The desk of the head of the laboratory was in the same area so that he could observe everyone. The lab director served as a gatekeeper of validation, inspecting the engineers' work and rendering judgment through meticulously generated reports.

The days adhered to a rigid structure dictated by precise schedules that allowed no flexibility. Arrival and departure times were meticulously recorded in a dedicated journal, a chronicle of punctuality that governed their lives. A mere ten-minute delay served as a warning of tardiness, a transgression that, if repeated, invited an uncomfortable confrontation with the boss and the forfeiture of a modest quarterly bonus of ten rubles.

Noon-time lunch provided engineers a welcome

break from the technical work. Engineers gathered together, their minds temporarily shifting from algorithms to anecdotes. The unity splintered along familiar lines. The women found comfort in each other's company, sipping tea, chatting, or working on crossword puzzles. The men, meanwhile, embarked on their own ritual, smoking cigarettes and discussing local sports.

In contrast to his high school and university experiences, the institute boasted bathroom stalls, a luxurious upgrade from his school days, when toilets stood a mere three feet apart without any privacy. However, it didn't take long for Sasha to notice a predictable scarcity—toilet paper. You were on your own in this regard, expected to furnish your own supply, typically in the form of a newspaper, as commercial toilet paper was an elusive commodity. The bathrooms themselves didn't look outwardly dirty, but the real issue lay in the absence of ventilation. The stench that hung in the air could permeate down the entire hall, a constant reminder of the challenges faced in this basic necessity department. Now, if someone managed to secure a garland of toilet paper rolls (with a strict one-garland limit per person), it was a precious treasure. People would hoard these, not for daily use, but for special occasions. A fresh toilet paper roll in one's bathroom represented a symbol of status, or at least a symbol of perseverance.

One day, a female co-worker shared some advice with Sasha, a young man who had not yet found a mate, "You know, Sasha, if you're trying to impress a lady, try to get one of those toilet paper garlands and present it to her. It'll turn you into a hero in her eyes."

She concluded her counsel with a joke, "Ever wonder why gentlemen insist on wearing their jackets when heading to the bathroom while visiting someone? Well, it's so they can inconspicuously roll the host's toilet paper around their wrists on their way out!"

Sasha belonged to what was derisively called "Club One Hundred." Like a typical young specialist, he started work with a monthly salary of 100 rubles, a meager sum that was barely enough to live on. But he knew that the First Central Research Institute would double his salary if he earned a Ph.D. Sasha quickly realized that not everyone in the institute was driven by ambition. A prevailing sentiment echoed throughout the workplace: "They pretend to pay us, and we pretend to work." This attitude was unlikely to get anyone fired, as it was nearly impossible to get fired once you got the job. In every statistical survey of the Soviet Union, there were no unemployed. However, workers with this attitude remained members of Club One Hundred their entire lives.

The air was laden with an absence of urgency, a rhythm that resonated with the peculiar dynamics

of the socialist landscape. The socialist system did not reward people based on productivity or the ability to create innovative solutions. Since no one could profit from the improvements or creativity, there was a general absence of interest in doing something more than required at every level of the organization. If you overachieved the annual plan, the only outcome was that the following year's plan would be increased, and you would be required to do more for the same compensation. It was not a desirable outcome. So often, all new ideas were put in a filing drawer, as the lab director did not want the extra work of pushing the new idea through layers of bureaucracy, dealing with the internal politics to get the new idea implemented, and then having more expectations from his bosses without any additional rewards.

THE RELUCTANT FARMER

September 1985, Leningrad, USSR

One morning, as Sasha sat at his desk engrossed in his work, his boss, Vasiliy Ivanovich Petrov, approached with a slight smile tugging at the corner of his lips.

"Sasha," Vasiliy Ivanovich's voice held a hint of cheerfulness, "I have news for you."

Sasha looked up from his papers, intrigued by the unusual tone in his boss's voice. "What is it, Vasiliy Ivanovich?"

"You're in for a little change of scenery," Vasiliy Ivanovich announced, leaning against Sasha's desk with a casual air.

Sasha furrowed his brows, curiosity mingling with

a hint of apprehension. "Change of scenery? What do you mean?"

Vasiliy Ivanovich's smile broadened, and he clasped his hands behind his back. "You'll be spending a couple of weeks at our sponsored collective farm."

Sasha's eyes widened in surprise. He hadn't anticipated this twist in his routine. "A collective farm? What exactly do they do there?"

Vasiliy Ivanovich chuckled, understanding Sasha's bewilderment. "Picking crops, sorting grains, and other manual labor. It's part of our contribution to the collective farm's efforts. Each institute in Leningrad sponsors a collective farm and has to donate one person-month a year to help the collective farm do farmwork."

Sasha's astonishment was evident. "But I'm an engineer. I'm not exactly cut out for farm work."

Vasiliy Ivanovich's laughter was warm. "Well, Sasha, it's a different kind of challenge. We all pitch in, and it's a chance for us, city folks, to get a taste of life beyond the office. If you can't do manual labor, you would need to bring me a note from your doctor."

A nervous chuckle escaped Sasha's lips. "I never imagined I'd be trading algorithms for crops."

Vasiliy Ivanovich clapped him on the shoulder reassuringly. "It's a valuable experience, believe me. Plus, it builds camaraderie among the team."

Sasha accepted the logic in Vasiliy Ivanovich's words, though the prospect of tilling soil was a far cry from his usual endeavors. "When do I start?"

"Tomorrow morning," Vasiliy Ivanovich replied. "The bus will pick you up, along with others from the institute."

As the day drew to a close, Sasha found himself grappling with a mix of curiosity and anxiety. He couldn't help but wonder how he'd fare amidst the fields and labor that awaited him. As he shared the news with his colleagues, the mix of reactions varied from amusement to empathy as they recounted their own experiences on collective farms.

"How hard you have to work, Sasha, depends on the farmer who will be the leader of your team. Some people work all day, others only work until noon, depending on when the leader determines it is time to start drinking."

"Sasha, have you ever taken a bath in a pond? No? You have something to look forward to! The work is very dusty. This farm does not have running water, so we wash ourselves in a cow pond just like the farmers do. The funny thing is that the path to the pond is covered with cow pancakes, so when we go to wash up in the dark, we often return dirtier and smellier than before we went to clean up," chimed in one of the women.

"Oh, it's not that bad, Svetlana. Once a week, we

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travel to use a sauna in the next village. We just need to find a way to get there. Sometimes, we can catch a ride; other times, we take a long walk."

The next morning, Sasha boarded the bus with his fellow engineers, the atmosphere a blend of anticipation and uncertainty. As they arrived at the collective farm, Sasha was greeted by rows of crops swaying in the breeze. His workmates exchanged knowing smiles, understanding the uniqueness of this experience.

Over the days that followed, Sasha found himself immersed in the rhythm of farm life. He picked crops under the sun's watchful gaze, sorted grains with a dedication that belied his urban origins; he navigated a world that was starkly different from the one he knew. The laughter of his colleagues and the bond formed over shared experiences became a comforting backdrop amidst the unfamiliar landscape.

The challenges were real—the blisters, the dirt that clung to his skin, the endless toil under the open sky. But as Sasha stood among the crops he had helped gather, there was a quiet sense of accomplishment. He also felt that he had bonded with his colleagues in ways that would endure beyond the fields they had worked in.

LAYERS OF SECURITY

September 1985, Leningrad, USSR

Within the labyrinthine corridors of the lab, an intricate dance of security rules governed daily operations, each regulation a step towards safeguarding the classified knowledge held within.

"The desk has to be empty and locked if you're not there," Sasha's colleague, Boris, remarked as he meticulously secured his workspace before stepping away.

Sasha nodded in agreement, sliding the keys to his desk out of sight. "And the keys can't be visible. Can't risk someone getting curious."

Boris grinned, a touch of mischief in his eyes. "Remember, Sasha, curiosity might have killed the cat, but around here, it could kill you."

Both chuckled softly, acknowledging the unspoken gravity that hung in the air. The lab's security was a code they lived by—a code that extended to every aspect of their work, down to the minutiae of copy requests.

"I need some copies of these flowcharts," Sasha said, handing a stack of papers to Boris.

Boris' expression shifted to one of mock exasperation. "Ah, the dreaded flowcharts. Clear it with the First Department!"

Sasha sighed, already anticipating the process ahead. "Yeah, the joys of bureaucracy."

As Sasha made his way toward the First Department, a sense of drudgery settled over him. The hallway stretched ahead, leading to a world of red tape. At the entrance stood a sentinel, a man with a rifle, a reminder of the layers of security that guarded their endeavors. Sasha's heart pounded as he approached, recognizing this as a rite of passage, a test of his resilience.

He presented his request, using a measured tone and not showing the exasperation he felt. The process proved to be painstaking, a ballet of paperwork and permissions that seemed to stretch time itself. Multiple trips between the lab and the special building for copies became necessary,

each step reinforcing the hard-earned nature of information access.

As holidays approached, a different ritual unfolded—one that centered around typewriters. Sasha observed as the machines were gathered and locked away in a room under management supervision. The rationale was simple: to prevent the use of typewriters for printing copies of anti-Soviet literature. It was a measure born from a different era, from a time when the hum of typewriters spoke louder than bytes.

Curiosity piqued, Sasha couldn't help but ask his boss, "What about computer printers?"

His boss's response was swift, laced with humor. "Mention computer printers again, and I'll have to show you the door." The computer printers were big and heavy, and the boss did not want to have to move them.

Sasha's lips twitched in a half-smile, recognizing the humor that bridged the gap between rules and expediency.

The building's routines were marked by quirks and customs that stood as relics. The instructions that described the locking procedure also assumed that, after typewriters were locked, people could not work and directed people to be dismissed early. The employees were happy about this directive! Everyone wanted to be dismissed early on the day before the holidays.

Nights at the lab carried their own aura, the dimmed corridors a stark contrast to the vibrant days. Everyone in the group took turns doing a night patrol of the building. At the end of the day, most of the lights in the corridors were turned off. The building became dark, cold, and still. Sasha was doing his first night patrol duty when he saw a scurrying furry shadow. It frightened him. He heard the sharp clacking sounds, and when he turned around, he saw a pair of large glowing eyes in the dark. The glowing eyes were watching, and the creature was following him. He started to run in total panic and smashed right into the night patrol officer. The frightening creature was the officer's dog, and they were doing evening rounds.

As the night patrol officer and his dog moved on, Sasha's heart rate began to steady. He hadn't been alone in his quest to keep watch over the building. The presence of officers doing supplemental patrols wasn't something he had been aware of.

"They have officers with rifles and dogs sweeping the building," he whispered to himself, his voice tinged with incredulity.

Sasha's eyes widened, the revelation a reminder of the layers of security that extended beyond the visible surface. The walls held more than scientific discoveries; they concealed a world of intricate safeguards, measures put in place to ensure that the repository of knowledge remained impervious to external threats.

The phone rang, and Sasha found himself speaking to his boss.

"Allo?" he said in a trembling voice.

"Who is speaking?" Vasiliy Ivanovich inquired.

"Who do you need?" asked Sasha, recovering slightly.

"Rifkin, you're not at home. Report your name."

"My mistake. Rifkin speaking."

"Report, Rifkin."

Sasha hesitated for a moment, gathering his thoughts. "What do you want to know?"

His boss's voice held an edge of urgency. "A report came in about a suspicious man running in the corridor. No one should be on the premises after hours."

Sasha's confession poured out, his voice laced with apprehension. "Sorry, that was me. I got frightened by the officer's dog. I saw something moving, and then those glowing eyes..."

A pause followed, and then his boss's voice resounded, firm and stern. "Don't let it happen again, Rifkin. Walk slowly and quietly. Remember, vigilance is paramount. Understood?"

Sasha replied with a relief in his voice.

"Understood."

THE MASTER PLAN

1985, Leningrad, USSR

"It's quite a paradox, isn't it?" mused Boris, who sat at the desk beside Sasha, his tone a blend of amusement and contemplation.

Sasha looked up from his work, intrigued by Boris's statement. "What do you mean?"

Boris leaned back in his chair, a thoughtful expression on his face. "Understanding infinity requires infinite time. And based on that, I conclude that whether we work hard or not at all, it's all the same."

Sasha raised an eyebrow, captivated by the philosophy that seemed to permeate the lab's atmosphere. "So, in a way, you are saying

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that no matter what we do, the outcome is predetermined?"

Boris chuckled, his eyes sparkling with a mix of skepticism and amusement. "Exactly. It's like a twist on determinism applied to work."

This was the prevailing attitude that seemed to dictate the rhythm of their days. Sasha couldn't help but feel a sense of irony in the air—a paradoxical dance where effort and apathy converged.

"Speaking of work," Svetlana chimed in, her voice laced with playful sarcasm, "have you heard about the 'post-trip recovery days?'"

Sasha's never heard of post-trip recovery days. "What's that?"

Svetlana grinned, her tone dripping with mock sincerity. "Well, apparently, people come back all peppy and rested from business trips. And what's the first thing they do? Take sick days to recover."

Laughter rippled through the group, a chorus of amusement that echoed the absurdity of the situation. Sasha couldn't help but chuckle, shaking his head in bemusement.

Sasha found himself embracing a different approach to his work. Unlike the prevailing attitude, he derived joy from the process of learning, creating, and delving into new challenges.

"For me, it's not about whether I'm working hard

or not. It's about the joy of continuous learning," he shared with a smile. "Discovery, that feeling of unraveling something new, it's a kind of happiness in itself."

Sasha's eyes drifted to the ceiling, his thoughts focused on the future he imagined. "I want to do something important, make a difference! And I want to make more money," he said softly.

Svetlana leaned in. "So what do you want to do?"

Sasha nodded, a determined glint in his eyes. "Well, if I keep working like this, I will get the standard raise of 10 to 20 rubles extra a month after five years. That type of raise is too small to make a difference. But I have a plan."

Boris's curiosity was piqued. "Oh? What's the plan?"

"Well, I want to get promoted to a Senior Researcher. As you're aware, there are two paths to becoming a Senior Researcher—earning a Ph.D. or joining the Communist Party and getting promoted by engaging in social activities."

Svetlana raised an eyebrow, a hint of curiosity in her voice. "Which one are you leaning towards?"

Sasha's answer was swift. "I want to earn my Ph.D. I don't like all the bullshit related to social activities."

Boris couldn't help but chuckle, a knowing glint dancing in his eyes. "If you succeed, your salary will double!"

Sasha's eyes gleamed with excitement. "Exactly! But it's not just about the money. I want to create something useful and create something that makes a difference."

As the conversation continued, Boris's curiosity got the better of him. "What about pursuing a Doctor of Sciences degree after your Ph.D.? Have you ever considered that? Achieving that level is quite rare, usually requiring nationwide implementation of your work."

Sasha paused, his brow furrowing in thought. "To be honest, I haven't given it much thought. I understand it's a requirement for a professorship at a university, but I'm not sure if academia is where I see myself. I want to be a practitioner, someone who's out there making things happen."

Amidst the jokes, his friends were impressed with Sasha's determination.

"So, about earning a Ph.D.," Svetlana mused with curiosity, "You know that each Ph.D. thesis needs to have a practical implementation in the field. The more broadly applicable the idea is, the better the chances of success in defending the thesis."

Boris nodded in agreement, his expression serious. "Right. They want to see that your research isn't just theoretical but can actually do something useful."

Svetlana looked into Sasha's eyes. "Are you ready for this challenge?"

Sasha nodded. "It is challenging, but that's the beauty of it. It pushes me to consider the real-world impact."

Boris asked curiously. "And what about the language requirement? Do you know English? English is the language of global scientific communication. It opens up a world of research in other countries. And you need to be on top of that research."

Sasha's nod was accompanied by a hint of pride. "Yes. That's not an issue for me. I've been studying English since second grade. I even used English as part of my community service."

Svetlana's expression shifted to one of curiosity. "What did you mean by using English in your community service? I recall that in high school, we had to do community service. I remember raking leaves or something."

Sasha's eyes twinkled with amusement. "Yes, I had an option to rake leaves, too. But there was another option—writing summaries of scientific articles published in English magazines."

Boris raised an eyebrow, intrigued. "Really? How did that work out?"

Sasha's smile widened. "It was a great learning experience. And later, at the Polytechnic Institute, I did it as a side gig that turned into extra income for me. There was always a demand for translating technical articles, and I was good at it."

Svetlana's curiosity was unabated. "What kind of articles did you translate?"

Sasha's gaze turned contemplative. "A lot of them were about American technology."

Boris was happy to teach a relative newbie like Sasha a few lessons. "Nice! American tech is admired and desired. Did you realize that our mainframe computer, the EC-1022-1033, was modeled after the IBM 360/370?"

Sasha's eyes widened in surprise. "Wait, we have our version of an IBM mainframe?"

Boris nodded, his voice carrying a note of pride. "Yes, we do. And our engineers use the same programming languages—PL1, Fortran, and Assembler—as their American counterparts."

Boris continued. "And the terminology for obtaining foreign-made technology is called 'Technology Pull.'"

Sasha raised an eyebrow with a knowing smile. "Technology Pull, eh? Clever! Sounds a lot better than some of the alternatives I can think of!"

"Yeah, sometimes it is more like Technological Tug-of-War than a Technology Pull!" Boris threw up his hands up in mock exasperation.

"Going back to requirements," Boris said, "It seems like you'll breeze through the language requirement. But how's your progress with philosophy? You'll need to immerse yourself in the philosophical ideologies of Marx and Lenin under

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the guidance of the Lizard!"

Sasha, with a puzzled expression, responded, "I'm aware of the philosophy requirement. I was told that a 'Soviet specialist first has to be Soviet, and only then, a specialist.' But who exactly is this Lizard?"

Boris grinned slyly and replied, "The Lizard is none other than Dmitry Fedorovich Grinkov. We call him the Lizard behind his back because his neck is remarkably similar in width to his bald head. I took that course with him, as it's a good thing to have on my record."

After checking to make sure no one was within earshot, Boris continued in a hushed tone. "Let me share a couple of insider tips with you. First, never display any initiative, independent thinking, or start a sentence with 'I think.' Just commit the quotes to memory and recite them verbatim. Secondly, as the course nears its end, and the Lizard leaves the room briefly, leaving his briefcase slightly ajar, discreetly stash a bottle of cognac or brandy inside it. That will help smooth everyone's path towards a successful passing grade. I did that, and we all passed."

Sasha nodded appreciatively, "Thanks for the tip!"

Surrounded by the support of his friends, he found validation for his plan, a confirmation that only fueled his determination further.

THE BREAKTHROUGH

1985, Leningrad, USSR

Sasha plunged ahead with his plan. He declared that he intended to pursue his Ph.D. thesis. This aspiration was met with approval, as employees earning Ph.D. degrees garnered substantial points for their respective laboratories. This, in turn, entitled Sasha the privilege of dedicating his full attention to his thesis. Young specialists, engrossed in their doctoral research, were granted the luxury of spending several days a week—commonly referred to as "library days"—at the Library of the Academy of Sciences of the USSR. This esteemed scientific repository was exclusively accessible to

individuals affiliated with academic institutions. Sasha relished the serene atmosphere of the library, where he could linger among the extensive collection of books and the latest scientific journals.

His days within the library were a deliberate quest, a dedicated search for resources that would elevate his research and lend substantial weight to his thesis. Each Ph.D. thesis had two fundamental requirements. First, the thesis could not be purely theoretical; it required an implementation. Second, it had to have a mandatory section that meticulously explained how the chosen topic was addressed abroad, juxtaposed against the methods practiced within the Soviet Union. While software-based innovations were relatively straightforward, as software implementation did not require substantial capital investment, Sasha's concept for his thesis encompassed both hardware and software components.

His proposal centered on the development of an autonomous control system governed by hardware temperature probes. Such a vision encompassed hardware intricacies alongside sophisticated software architecture. To realize this idea, Sasha contemplated the potential use of Application-Specific Integrated Circuits (ASICs)—integrated circuits built for specific tasks. These circuits found common usage in control systems.

However, creating custom ASICs demanded a substantial investment in specialized chip production machinery.

Having a practical mind, Sasha had doubts about the feasibility of obtaining the necessary resources for a capital-intensive project. He suspected he would be unable to convince his boss to do the necessary paperwork for such an expensive undertaking. However, as he immersed himself in the details of his research, he stumbled upon a glimmer of hope—a press release that announced a new technology called Field Programmable Gate Arrays. This new breed of ASICs held the promise of enhanced performance, high reliability, and significantly reduced initial costs, as it required no custom tooling for hardware.

His breakthrough, however, lay in a meticulous study of an article published in the IEEE Journal of Solid-State Circuits in January 1985—a piece entitled "Field Programmable Gate Arrays: A New Logic Structure" authored by LuVerne R. Peterson and David W. Page. The article's technical details painted a clear picture in Sasha's mind, illuminating a path through the intricate puzzle that lay before him.

He was convinced that he needed to obtain this new technology as the next logical step of action. The incorporation of Field Programmable Gate Arrays into his control system held significant implications. Such an integration would replace

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an entire minicomputer, a box that occupied the space of a kitchen stove, with a single chip, paving the way for a portable control mechanism for diverse devices. Its applications were manifold—a safeguard against overheating, a trigger for fire suppression systems, and a guard mechanism that would do a system shutdown in the presence of faults. And the mechanism would be small and not require a lot of power.

His idea embodied a solution to real-world challenges, promising to revolutionize control systems and contribute to technological progress. This was the transformative innovation he needed for his Ph.D.

PROOF OF CONCEPT

1985, Leningrad, USSR

Sasha immersed himself in crafting his thesis, his dedication often eclipsing basic needs like eating and sleeping. With a determined spirit, he aimed to substantiate the merit of his innovative idea before requesting to obtain Field Programmable Gate Arrays technology. This necessitated a tangible demonstration, a proof of concept that would lend credence to his vision. Since he couldn't use the actual Field Programmable Gate Arrays for this purpose, he turned to the trusty SM-2 minicomputer to simulate the intricate functioning of his envisioned controller.

He shared his strategy for the demonstration with his co-workers, "It's not the same as Field Programmable Gate Arrays, but it's a way to show how the autonomous control system would operate. You have to work with what you've got."

Svetlana asked, "Are you sure you will have access to an SM-2 for your demonstration? I believe there were shortages of these machines. The SM-2 machines are well-liked, so we don't have enough of them to meet the needs of all the engineers."

Boris, who had been listening intently, interrupted. "This is not a problem anymore. To tackle that problem, they introduced night shifts for the use of SM-2 computers. They made sure the computers were put to use around the clock."

Sasha nodded. "Good to know! I don't mind working at night to get this done."

Boris added, "Just remember to register with the First Department if you are going to work at night, or you will have another encounter with that dog."

Sasha blushed, "Oh, you heard about my run-in with the dog?"

"Oh, yeah, Vasiliy Ivanovich had a good laugh at your expense one lunch break. We all got a kick out of your little sprint down the hallway."

Boris worked at First Central Research Institute for a few years and wanted to share some history behind the SM-2.

"Remember, a few days ago, we talked about

"Technology Pull," our efficient method for acquiring foreign-made tech instead of starting from scratch. The SM-2 is a shining example of a success story and a testament to our history of technology pulls. Back in 1975, the Soviet Union licensed the HP-2100 minicomputer from Hewlett-Packard under the name SM-1. And later, through a bit of industrial espionage, technical documentation for the HP-2100 was obtained, which was used to develop the SM-2."

With a big grin, Boris added, "Have you heard that SM-2 has a 'lifesaver symbol' if you get in trouble?"

Sasha chuckled, his curiosity growing. "What was that about?"

Boris smiled. "Well, the original HP-2100 manuals were in English. When they were translated into Russian, the translators were not familiar with computer keyboards with special symbols since minicomputers were so new, and translated the text 'escape key' as the 'lifesaver symbol' [спасительный символ]. It took me a long time to figure out what the documentation was talking about since SM-2s used English keyboards, and I could not find a 'lifesaver symbol' for my life!"

Sasha laughed, "I love it! I will think of your story every time I look at my keyboard!"

Svetlana added with a smile, "But we learned to adapt! English keyboards and programming in English using languages like 'C' is not a problem!"

Just like engineers in the West, we learned from Kernigan and Ritchie's *The C Programming Language* book!"

Boris said with a hearty chuckle. "Hey, speaking of SM-2 machines, let me share something amusing. You won't believe it's not the first time Sasha encountered one!"

Sasha's eyes twinkled as he exchanged a knowing smile with Boris. "Oh, you're talking about my 'sorting machine' experience?"

Boris nodded, his eyes crinkling with amusement. "Exactly. So, while Sasha here was making strides in advanced technology, he also had his fair share of SM-2 encounters back on the collective farm."

Sasha leaned back, ready to share the tale. "Yes, indeed. Picture this: there I was, not too long ago, assigned to sort grains on the collective farm."

Boris interjected, "And by sorting, he means trying to salvage the mess when grains spilled all over the place."

Sasha chuckled, picking up the narrative. "Spot on! Now, what's interesting is that the machine I was using to sort those grains—well, that machine was also labeled SM-2 [сортировочная машина #2], which stood for Sorting Machine Number Two."

Svetlana raised an eyebrow in amusement. "Wait, so even on the collective farm, you were dealing with SM-2 machines?"

Sasha nodded, his tone light with amusement.

"Yes, isn't that a funny coincidence? It's like SM-2 followed me everywhere, whether sorting grains or doing minicomputer simulations."

Boris chimed in with a laugh. "It's like the universe was playing a little joke on Sasha, a reminder that no matter where he went, SM-2 was bound to make an appearance."

Sasha joined in the laughter. "Indeed. And the engineers here at the institute got a kick out of it when I shared the story."

Then Sasha got serious. He explained how he had coded the software to gather data from temperature probes, allowing him to gauge the temperature of various equipment or environments. He excitedly recounted, "The software generates an alert if the temperature surpasses a specific threshold—say, 70 degrees Celsius. This alert is crucial; it signals the need for corrective action to prevent damage or ensure safety."

As Svetlana absorbed the information, she mused, "So, your innovation could have wide applications."

Sasha's eyes shone with affirmation. "Absolutely. It's versatile—be it temperature or pressure, it would ensure the safety of various equipment."

Then, he shared his concerns that his audience had to exercise their imagination to visualize the full extent of his proposal. He could not

demonstrate the small size of his system. He was using an SM-2 minicomputer to simulate the programmable circuit. The audience will see a stove-size minicomputer, not the portable device he was proposing. He did not show the cooling process itself. Instead, his software detected when the temperature reached a specified threshold, generated an alarm, and then indicated that an action was needed. The SM-2 did not have a display; it only had a keyboard and a serial port for connecting to a printer. So, the output of his program was sent to a printer attached to the minicomputer. When the alarm was generated, his program printed the text "Cooling is required immediately."

As Sasha shared his concerns about the audience having to use their imagination, his friends listened attentively. After he finished explaining, Boris leaned forward, his expression thoughtful.

"They will remember you're demonstrating the concept. And you're doing it on an SM-2 minicomputer as a simulation."

Svetlana added in an encouraging tone. "Sasha, you're showcasing your idea's potential. The fact that it's operational, generating an alert—it's impressive in itself."

Sasha's lips curved into a faint smile, gratitude evident in his eyes. "Thanks, guys. I guess I am ready to present the draft of the thesis and the demo to the boss."

THE DISMISSAL

1985, Leningrad, USSR

Sasha's boss, Vasiliy Ivanovich Petrov, was not only his boss but also his scientific director. This meant that not only did he oversee Sasha's work, but he also held the power to determine when Sasha's thesis was ready to be presented to the scientific council for defense. The defense of a Ph.D. thesis in the Soviet Union was a rigorous affair designed to ensure that only the most deserving candidates received the coveted degree. After a scientific director gave his nod of approval, the Ph.D. students submitted their theses to a committee of local experts, who meticulously reviewed the work and provided recommendations. If the committee gave its blessing, the students would then be scheduled for

public defense.

The defense itself was an event filled with formality. A panel of industry experts, along with fellow students and faculty members, would gather. The candidate took the floor, presented their thesis, and braced for an intense round of questioning from the panel. The questions were designed to be challenging, aimed at uncovering any flaws in the student's work. Among the panel members, a specific expert took on the role of the critical challenger [черный оппонент], whose task was to scrutinize the thesis, raise objections, and probe for weaknesses. This critical challenger was usually a respected scholar, armed with an arsenal of intricate questions and the ability to pinpoint subtle flaws. This entire process ensured that the student's work was thoroughly examined, and that they were equipped to defend their findings against the most rigorous critique.

As Sasha shared the dynamics of this process with his parents, his father let out a low whistle. "Talk about pressure! I can imagine you standing there defending every aspect of your work."

His mother nodded in agreement. "It's like a mental obstacle course."

Sasha chuckled, a hint of nervousness in his tone. "It's like being in the hot seat while experts fire questions at you from every angle. But don't worry, I can handle it."

His mother asked in a concerned voice. "And what about this 'critical challenger'? Sounds like a real formidable opponent. Do you know who it will be?"

Sasha's expression turned thoughtful. "No, they don't tell us in advance. The critical challenger is like the ultimate devil's advocate, poking at every weak spot and challenging every conclusion."

His father grinned. "Sounds like a real intellectual battle."

Sasha leaned back in his chair. "You have no idea. But you know what? It's all in the name of ensuring the quality of the work and the credibility of the degree."

His father asked, "So where are you in this whole process?"

Sasha replied, "To be ready for the thesis defense, I have to develop a novel idea, write a paper about it, demonstrate the concept in a working system, have the paper and demo approved by the scientific director, and publish an article about it in a scientific journal. Once it is published, I can go in front of the scientific panel to defend my thesis. So far, I have come up with an idea, wrote a paper, and created a demo. I am about to show what I have to my scientific director."

His father smiled, "Well done, son! Good luck!"

As they chatted, his parents' support and belief in his abilities gave Sasha a sense that he wasn't

alone in navigating the challenges of this daunting process.

Encouraged by the positive feedback from his parents and friends, Sasha decided the time was ripe to present his concept to none other than Vasiliy Ivanovich, his boss, and scientific director. After all, it was Vasiliy Ivanovich's approval that held the key to his progress, and once granted, Sasha could proceed to publish his papers with his scientific director listed as one of the authors.

Vasiliy Ivanovich, a figure as ancient as the galaxy itself in Sasha's eyes, was undeniably knowledgeable in the technology field but not overly motivated. His wife Vera was well connected in the Soviet hierarchy, which probably accounted in part for her husband's success and his position as a lab director. At this stage of his career, he was inclined to avoid taking on any unnecessary workload. Being responsible for successful Ph.D. candidates certainly pleased him, as it boosted his credibility with management—a fact he was not oblivious to. Yet, Vasiliy Ivanovich exhibited a level of detachment from new ideas unless they came down from higher authorities.

The office buzzed with controlled chaos as Sasha navigated the sea of his colleague's desks. He felt their eyes follow him as Sasha steeled himself, venturing across the room toward Vasiliy Ivanovich. Sasha's throat rasped as he approached the island of his boss's desk, the chatter of his team

a distant hum against the roar of his own anxiety. Every tick of the clock on the wall sounded like a drumbeat, amplifying his nervousness. He felt the proposal crinkle in his hand, the weight of anticipation heavier than all the pages it contained. It wasn't just the proposal weighing him down; it was the knowledge that everyone was watching him. Clearing his throat, he squared his shoulders, took a deep breath, and addressed Vasiliy Ivanovich.

"Vasiliy Ivanovich," he said, his voice firm despite the tremor in his fingers, "may I have a few minutes of your time? I have a proposal I'd like to present."

Vasiliy Ivanovich nodded, and Sasha began describing his idea. As Sasha presented his proposal, Vasiliy Ivanovich's expression betrayed an air of skepticism, his raised eyebrow hinting at his reservations. He paced as he listened to Sasha, and an unintended rhythm of his footsteps seemed to mirror the inner conflict he was experiencing. He clumsily stomped in the same spot; it seemed that he wanted to go in all four directions at the same time.

Sasha, aware of the gravity of this moment, experienced an intense surge of heightened awareness. Every sound—the soft shuffling of feet, the creaking of shoes against the floor, the rustling of papers—took on a newfound significance. He sensed the air moving from the slightest shifting

of the people in the room. The very air seemed charged with anticipation as if the entire room held its collective breath. The silence that hung in the air was palpable, and Sasha was acutely aware of the weight of the room's attention focused on them. It was a tableau of expectancy, a moment where words were suspended, and anticipation filled the void.

Breaking the silence, with both of his eyebrows raised, Vasiliy Ivanovich's voice pierced through. "So..." His single word carried the weight of his scrutiny, causing a subtle jolt in Sasha's stomach. The unspoken undercurrents of doubt seemed to emanate from Vasiliy Ivanovich's arched eyebrows, silently conveying his reservations about the proposition before him. In a seemingly unrelated gesture, he lit a cigarette, the tendrils of smoke curling into the room like ethereal wisps, swirling around the furniture as a tornado. As Sasha seated himself, he discovered a steaming mug of coffee placed beside him. One of his co-workers clearly felt bad for him, and a cup of coffee was a small gesture of support.

Vasiliy Ivanovich's next words, uttered with a scoff, cut through the charged atmosphere. "Let's start with this: You presented a single temperature probe as your example. What sets this apart from our existing technology?"

Maintaining his composure, Sasha responded, determined to clarify the essence of his concept.

"Vasiliy Ivanovich, what I showed was a simulation—a glimpse of what could be. Imagine a compact, matchbox-sized computer instead of the cumbersome setup you see before you."

Vasiliy Ivanovich's skepticism persisted, his tone carrying the weight of his experience. "Simulations and prototypes will not suffice for a Ph.D. endeavor. For credibility, your idea should be implemented and validated in an industrial context."

"But, Vasiliy Ivanovich," Sasha countered earnestly, "I need access to the Field Programmable Gate Arrays technology to demonstrate the full scope of my concept."

Vasiliy Ivanovich's response was pointed and pragmatic. "An automated temperature probe, while practical, doesn't seem innovative enough. The Ph.D. thesis requires a scientific edge. Perhaps a novel algorithm for the probe software, rooted in cutting-edge science?"

With a resolute demeanor, Sasha defended his vision. "Vasiliy Ivanovich, the specifics of the probe are not the crux of the matter. The probe could be measuring anything."

"How is this different from what we already have?" Vasiliy Ivanovich sounded more irritated with each answer Sasha gave him.

Sasha's response was marked by unwavering conviction. "Vasiliy Ivanovich, this device is

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compact, portable, and power-efficient. While I can't present the complete solution without Field Programmable Gate Arrays, I believe it holds significant potential."

The culmination of their exchange arrived as Vasiliy Ivanovich's tone grew firm, and he waved his hand dismissively. "Your idea needs validation in a real industrial setting. I won't support it without tangible proof. I won't attach my name to the publication either. You're not yet prepared for scientific counsel."

With that pronouncement, Vasiliy Ivanovich walked out of the room. His dismissive gesture seemed to echo throughout the room, leaving Sasha feeling crushed.

THE DANCING ELEPHANT

1985, Leningrad, USSR

All of Sasha's days started the same way: with an alarm clock. That morning, he was having a nightmare about the scientific director dismissing his thesis proposal. Sasha had heard enough and lost his temper.

"Vasiliy Ivanovich, everything you are telling me, all your suggestions are useless delirium. It is rubbish! From your words, flies die."

"Rifkin, stop it immediately. Who the hell do you believe you are talking to me like this?" Vasiliy Ivanovich's voice shrieked in his ear, a torrent of anger cascading through the airwaves.

"I'm the one who brought a fresh idea to the table. You have been coasting along, doing your damn

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job half-assed. And let's get one thing straight—I don't let anyone, and I mean anyone, raise their damn voice at me," screamed Sasha, shaking with rage.

Sasha, drenched in sweat and panting, jolted awake, realizing it had been a dream. The shrieking noise that had shattered his sleep was not the boss's irate voice but the insistent blare of his alarm clock. With a forceful slap, he silenced the alarm, stopping the lingering memories of his dream.

He opened his window, saw the gray sky, and felt the sharp autumn chill. His mind turned to his presentation, and a wave of sadness and dejection washed over him. A decision formed in his mind—he would not go to work. He was going to quit. Attempting to steer his thoughts towards something positive, he took deep breaths of the cold air and started doing his morning exercise routine. After several dozen jumping jacks, his doorbell rang, and his neighbor from the floor below, still in his night pajamas, unshaven and clearly very unhappy, said, "What is going on here? The dancing elephant woke me up!"

Sasha apologized and left his apartment. He needed fresh air to clear his head.

DIFFICULT CHOICES

1985, Leningrad, USSR

Rain pelted down, each drop hurtling towards the Neva River, streaming off the boulevard traffic like tears. Across the vast expanse of the boulevard, the traffic lights struggled to pierce the shroud of rain, their colored hues blending into a mesmerizing tapestry of motion. Headlights carved through the downpour, casting a glow upon the slick asphalt, turning raindrops into shards of liquid crystal that sparkled. A few pedestrians, already braving the elements at this early hour, huddled beneath umbrellas, their silhouettes barely discernible against the backdrop of the rain-drenched city.

The dreary day mirrored Sasha's mood.

Sasha walked along the river, his mind consumed by bitter memories of his manager's unjust treatment of him. In his youth, Vasiliy Ivanovich had served as an inquisitor in the KGB, and even though his career there did not flourish, he kept some of his old habits. He yelled at Sasha for the slightest indiscretions. Once Sasha left his keys on the desk, an oversight that quickly drew Vasiliy Ivanovich's ire.

"You were trusted with the set of keys, and you left them piled up on top of your desk," his manager screamed loudly.

Sasha hung his head and remained silent.

"Why are you silent?" Vasiliy Ivanovich continued in a raised voice.

"It will not happen again," Sasha recalled saying quietly.

"You don't need to fully understand it; you simply need to internalize it, you need to absorb it, and have it ingrained as a habit that seems second nature. Vigilance must be on the highest level. Or you will be out of here. Understood?"

Vasiliy Ivanovich often reprimanded Sasha for refusing to join the Komsomol and be the Komsomol secretary deputy of the software department. He would say, "You make it very difficult for me to recommend you for a promotion."

The Komsomol, an organization for young people, organized various activities for its members, such as sports, cultural events, and volunteer work, but with a serious dose of Soviet-style enthusiasm. The Komsomol revolved around an unwavering zeal for Soviet ideas and leaders. Members were expected to wave the flag for Marxism and Leninism while doing fun activities. The Komsomol's goals were to educate and train young people in the ideals of communism, to help them develop into productive members of Soviet society, and to prepare them for membership in the Communist Party. While some Komsomol members wholeheartedly embraced the official ideology, others just saw it as a necessary way to get ahead. If he took on the role of a secretary deputy, Sasha anticipated the obligation to spout slogans and encourage people to join the Komsomol organization.

Sasha detested the Komsomol and everything associated with it. Still, he recognized that if he eventually had a family and experienced financial strain, he would have to agree to these extracurricular activities. He was acquainted with several young people with kids who chose to do it and eventually joined the Communist Party to get management positions. It was tough to swim upstream without doing it. Many people joined the Communist Party for career purposes; it was a checkbox for promotion. The Communist Party

controlled all aspects of life in the Soviet Union, from the economy to the media to the education system. Sasha likened joining the party for career advancement to marrying for money, a concept he found utterly disgraceful. While young and single, he wanted to stay true to his beliefs, but he was unsure how long he could resist the prevailing pressures. As a general rule, all managerial positions required membership in the Communist Party. While a few exceptions existed, these individuals possessed influential connections, and either knew or were related to important people. Sasha, however, lacked such advantages. He was not a nepo-baby; he lacked a relative with the influence to smooth his path to a Ph.D.

The rejection of his idea seemed vicious and mindless. Sasha lost the desire to fight for his idea. Surrender, he believed, was his only recourse. He had to leave the institute. The work at the institute, though intellectually stimulating, clean, and respected, offered little financial reward, a prospect he had once hoped to change. But it didn't matter anymore. Nothing mattered. He had trusted his boss, and his boss let him down. Some people he worked with were good, but there were other people. The ones with empty eyes and empty heads. They were not dumb; they understood on what side the bread was buttered, and they knew how to safeguard their own interests. They figured out how to play the system. They were calculating

people without principles. They possessed a knack for turning negatives into positives for themselves. They were not selective; they were like spiders, patiently laying their webs until they caught their reward.

He was disheartened and devastated. He found it hard to resist his foul thoughts. He thought Vasiliy Ivanovich dismissed his idea because he would have to fight for it. And Vasiliy Ivanovich was too lazy to do it. He hated slackers like that.

"Work turned a monkey into a human, and by the same token, lack of work turned a human into a monkey," Sasha said aloud. His face was wet from the rain. Or was it tears? "And Vasiliy Ivanovich is just a monkey! I can't work with him anymore."

As Sasha pondered his predicament, the weight of his choices hung heavy in the air. Sasha kept thinking of his next step, hoping some new brilliant idea would enter his mind. His thoughts were scattered, hindering his ability to concentrate and focus. Yet, the longer he thought about it, the more sure he was that the institute was not for him. But his job wasn't just a job—it was a commitment, a bond that tied him to the state's service for an extended period.

He found himself at a crossroads, torn between the desire for change and the fear of the unknown. The prospect of quitting his current position seemed daunting, not only due to the labyrinthine bureaucracy but also the potential implications it

might carry. Sasha knew that such a move might label him as a "troublemaker" in the eyes of the institute and jeopardize his professional prospects for years to come.

With each passing thought, Sasha's mind wove a tapestry of concerns—starting his thesis from scratch, the untapped potential of his FPGA controller idea, and the fear of professional stagnation. The desire for progress battled with the fear of being trapped in a bureaucratic quagmire.

As the sun began its descent, casting long shadows that painted the streets in hues of orange and gold, Sasha's footsteps carried him through the city's quiet streets. The rhythm of his thoughts echoed with each step, accompanied by a sense of restlessness that mirrored the complexity of his situation.

In the midst of his contemplation, the image of a bustling cafe caught his attention. The warm glow emanating from within seemed to beckon him, offering a respite from the chaos of his thoughts. Normally, cafes teemed with lengthy queues, but fortune favored Sasha that day, and he did not have to wait too long. As Sasha stepped inside, his senses were enveloped by the aroma of coffee and the gentle hum of conversation. Sasha was well aware that the coffee here was barely drinkable, but the primary goal was to find solace in warmth. As he settled into a corner table, a waitress

approached, wearing a scornful grimace. "Well, what is it?" she grumbled as she wiped her hands on a greasy apron.

Sasha looked up, finding a certain comfort in the unchanging aspect of this place, the kind of service his friends sarcastically referred to as "unobtrusive" Soviet service [ненавязчивый советский сервис], which essentially meant non-existent.

"A cup of coffee, please," he replied.

As the waitress left to fill the order, Sasha leaned back, his gaze drifting to the window that framed the city at dusk. The ebb and flow of life outside seemed a reflection of the choices he faced—constantly moving, shifting, and evolving.

As he waited, lost in his thoughts, a voice broke through. "Is this seat taken?"

Sasha looked up to find an older woman standing next to his table, looking at him with a friendly smile.

"No, it's not taken," Sasha replied, gesturing for her to join him.

The woman settled into the opposite seat. "I couldn't help but notice that you seem lost in thought."

Sasha chuckled softly, the tension in his shoulders momentarily easing. "You could say that. It's been quite a day."

She nodded with understanding. "Care to share? Sometimes, talking about it with a stranger can help clear the mind."

Sasha recounted his concerns and uncertainties. "My supervisor does not support my research endeavor. If I remain at the institute, my supervisor will withhold any funding for my research. If I quit, I'll be branded as a troublemaker; I may be unable to find another job. Requesting a transfer to another department could lead to retaliation from my current supervisor, who might create obstacles for me. A transfer request reflects poorly on his leadership abilities. I am not sure what to do."

The woman listened attentively, her gaze never wavering from his. When he finished, she leaned towards him, her expression a mixture of contemplation and sympathy. She tilted her head slightly. "It sounds like you're grappling with a significant decision, one that could shape your future. You know, big decisions like that should not be rushed. Give it some time. When you feel less emotional about it, the right resolution will come to you."

Sasha noticed it was getting dark. With a nod of gratitude, Sasha watched her depart, her presence leaving an indelible mark on his thoughts. As he stepped back into the city's embrace, even though he had spent the entire day walking around and was not any closer to a decision about what to do

next, the weight of his choices felt lighter.

THE ACCIDENT

1985, Leningrad, USSR

Sasha did not sleep well. When the alarm shrieked the following day, he found himself already awake, staring at the ceiling. Sasha resigned himself to going to work. Avoiding the office yet again would risk being branded a slacker. He neglected to record his absence in the designated journal, where the employees noted down when they had doctor's appointments or approved local business trips. Their boss sometimes allowed them to leave early on their birthday, but they still had to mark their early departure in that special journal. If illness prevented someone from making a journal entry, they better have a note from a doctor when they came in after they got over their sickness.

Absenteeism often resulted in fines or even termination of employment. It was a key factor in each worker's performance evaluation.

It had snowed overnight. It was a Russian snow, thick as cotton. The wind howled, sweeping tall snowdrifts next to the houses and wildly tugged and swayed the street lamps. Despite the early hour, the sense of nightly emptiness and dark quietness of the vast First Central Research Institute building disappeared completely. The foyer of the Institute was full of people covered with snow, their faces red from the wind. A cacophony of hushed voices, the shuffling of furniture, and the incessant ringing of telephones filled the building. The usual lively chatter and laughter had been replaced by somber, mournful voices. Amidst the din, the wail of a woman echoed in the distance.

"This is terrible!" "Goodness gracious, this can't be true."

Drawn by the murmur of hushed voices, Sasha walked towards the noise. The news was grim: the lab director had been killed in a trolleybus accident the day before. Vasiliy Ivanovich's trolleybus had been traveling along Nevsky Prospect when it collided with a car making a left turn. The force of the impact caused the trolleybus to overturn, killing ten people and injuring 20 others. The car's driver also succumbed to their injuries. Vasiliy

Ivanovich was among those who met their tragic end in the accident.

Groups of people stood huddled together, their voices hushed and somber. Some wept openly, while others stared blankly into space, their faces etched with disbelief. The news of Vasiliy Ivanovich's passing struck them all deeply. It was hard to believe that someone so vital and alive was gone.

Sasha stood frozen, his mind struggling to process the tragic news. For a few moments, he forgot to breathe, the weight of Vasiliy Ivanovich's demise pressing heavily upon him. A wave of guilt washed over him. He felt guilty about thinking all the terrible thoughts about Vasiliy Ivanovich the day before while he was involved in the accident.

"Do we know what happened?" he asked quietly.

The man beside him paused, caught in the grip of disbelief and somber realization. The man took a sharp intake of breath as he shared the unthinkable news.

"The only information provided was that the Leningrad Metro and Trolleybus Police had conducted an inquiry into the accident. Their findings determined that the car's driver bore responsibility for the collision, having failed to yield the right of way to the trolleybus."

Whispers of "Did you hear?" and "Is it true?" fluttered around as a heavy fog of disbelief hung

over the space. There was a shared vulnerability in the way people clutched their coffee cups as if seeking comfort from the warmth in their hands.

An unspoken closeness emerged in the midst of the shock. Colleagues exchanged knowing glances, a shared acknowledgment that this was a moment that bound them together in an unexpected way. Trivial squabbles and office politics seemed to fade into insignificance in the face of this shared experience.

A NEW BEGINNING

1985, Leningrad, USSR

A week later, the Institute appointed a new lab director. Viktor Borisovich Borodin was a force of nature. In his mid-40s, tall and stout, he sported a bushy beard and cheerful, sly eyes. He met with each lab member individually, listening intently as they described their work, goals, and concerns. He was refreshingly free of sugary pretense and never assumed a superior air, even though he was their new boss. He seemed comfortable among the workers as well as his superiors, often referring to himself as a "soldier among soldiers."

Viktor Borisovich stood out among the Institute

scientists by being capable of envisioning the entire product cycle. This appreciation for all the links in the product process gave him a powerful insight into how to improve it. He said he wanted his lab to become an incubator for new technologies and a new standard for excellence in product development.

In their one-on-one meeting, Sasha described his idea for an FPGA-based controller, where the logic would reside in a single chip instead of a minicomputer. Viktor Borisovich listened intently, then leaned forward with a thoughtful expression.

"You might be onto something here. Hold on..."

He unlocked a drawer in his cabinet and shuffled through some papers, looking for something specific. Then he pulled out a memo and read it.

"This is an inquiry from the military requesting a miniaturized controller," he said. "I suggested an SM-4 minicomputer^[2] to them, but they said it was too big. The SM-4 is the size of a kitchen stove, it weighs maybe 45 kilograms^[3]. What do FPGA chips weigh?"

Sasha scratched his head. "Ten grams, I'm guessing. And the whole system would be a couple of kilograms."

Viktor Borisovich's eyes widened. "A couple of kilograms? That's incredible! If we can miniaturize the controller using FPGA chips, we'll

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revolutionize the industry."

He stood up and paced the room, excitement building in his voice. "This could be the start of something big, Sasha. I'm going to take this to the higher-ups and see if we can get support for this project. We cannot buy this technology directly. The Americans will not sell it to us. So we will need to request a technology pull."

He shook Sasha's hand. "Keep working on this and keep it quiet for now."

Sasha left the meeting feeling energized and inspired. He couldn't believe the difference one week had made. With Viktor Borisovich at the helm, he was finally on the right track.

A COG IN THE KGB MACHINE

1985, Dresden and Berlin, Germany

In the cold, gray city of Dresden in 1985, Vladimir Putin was a young KGB officer with a bright future ahead of him. Operating under the guise of a translator, he served as a foreign intelligence agent for the KGB. Though his duties encompassed a broad spectrum of tasks, they all ultimately served a central purpose: gathering intelligence on the West. He spied on diplomats, politicians, and even ordinary citizens. Like a master chess player, he strategically moved his pieces on the geopolitical board, gathering intelligence and deciphering the ever-changing dynamics of the country.

But Putin was more than just a spy. He was also a master of disguise. There were many versions of Vladimir Putin's assortment of characters that lay submerged, each bundled on top of another, like the hidden figures in a Russian nesting doll. He could blend in anywhere, from the backstreets of Dresden and East Berlin to the halls of power in the Western world. He possessed a chameleon-like ability to alter appearance and persona to suit any scenario. Whether sipping coffee in a dimly lit café or strolling through the bustling markets, he honed his skills in observation and deduction, constantly vigilant for any signs of potential threats or opportunities. Putin's work in Germany carried inherent dangers, yet he reveled in the adrenaline rush of navigating perilous situations, thriving on the challenge of maneuvering along the precipice of risk. His ruthlessness as an operative allowed him to employ unconventional methods without hesitation, ensuring success at any cost.

In 1985, amid the vast machinery of the KGB, Vladimir Putin stood as a mere small cog, yet within him flickered the embers of ruthlessness and ambition that would one day propel him to the helm of Russia. He was a man on the rise, and the world would soon take notice. Little did anyone anticipate that this young KGB officer's experiences in Germany would become an integral chapter in the grand tapestry of his life.

A PLEASANT SURPRISE

November 1985, Berlin, Germany

When the request to pull FPGA technology came from Leningrad to the Berlin KGB office, the Soviet Union faced a U.S. government embargo. This restricted the Soviets from legally importing advanced electronic components from the US, including FPGAs, which were considered sensitive technology. Acquiring this hardware posed a significant challenge due to these restrictions.

Despite the embargo, Putin was determined to get his hands on FPGAs. The KGB, anticipating such circumstances, devised a contingency scheme. The Soviet Trade Office in Berlin established a network of shell companies capable of concealing

the true nature of their business dealings. These companies, carefully crafted to appear legitimate, had been meticulously prepared in advance, as establishing such entities required a considerable investment of time. One such shell company was Telemann Energietechnik, a German firm bearing a generic technical name. This company provided Putin with a German-based entity capable of purchasing FPGAs, effectively masking Soviet involvement in the FPGA industry.

At the same time, he set up full-time surveillance of the psiBlox employees when they came to work with AEG Telefunken in their Berlin office, trying to identify someone capable of assisting him in his task. Vladimir watched hours of video, his eyes bleary from staring at the footage. He was reviewing hours of surveillance, making a note of the Americans who worked for psiBlox. Suddenly, his eyes widened as he recognized someone in the video. He rewound the footage. Yes, here she was. He couldn't believe his eyes. Maria. Even after all these years, she still looked as beautiful as he remembered. Although her appearance had changed, with longer hair and a more mature, curvaceous figure, her eyes remained the same. She still had those deep, green eyes that had haunted his dreams for so long as a youngster.

Surprised, Vladimir took a break from the video review, pacing the room while his mind raced. What was she doing at psiBlox? Vladimir found

himself astonished by his stroke of luck. How might he leverage this unexpected advantage?

A smile spread across his face. "Any intelligence officer who claims luck plays no part in the game has either never had it or lacked the smarts to capitalize on it."

Vladimir knew what he had to do. He would stage a casual meeting with Maria. This task called for resourcefulness in fabricating opportunities to meet and cultivate his target. Patience was equally crucial. He would traverse Goerzallee, strategically navigating his path to maximize the probability of crossing paths with her. A seemingly coincidental meeting would feel natural. The following day, he put his plan into action.

THE UNEXPECTED REUNION

November 1985, Berlin, Germany

"Masha, is that you?"

At the sound of her name, Maria spun around, recognizing his voice without needing to look. She saw the familiar blue eyes and the blonde hair tousled by the wind, which stirred a flutter in her stomach. Vladimir stood frozen, waiting for her to recognize him. Their eyes met, and a surge of electricity ran through him. Then, she smiled, and he sensed it would work; she would trust him.

As she moved closer to him, he caught a whiff of her perfume, evoking memories of the times they

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had spent together. He reached out and clasped her hand.

"It's been ages," she remarked.

"Far too long," he responded. "It really is you! What are you doing here in Berlin?"

He reached out and gave her a warm hug. The familiarity of his touch evoked memories of their shared past, even though it had been two decades since their last encounter.

"You're looking great," he said, his voice cracking slightly. "Why don't we get a cup of coffee? We can catch up."

They entered a small cafe on a side street near the boulevard and took a table in the corner. Maria smiled.

"Who would have imagined that we would meet again?" She spoke quietly, though no one was in earshot. "I can't get over seeing you here. After all these years... I have always been really sorry about the way things ended between us. I've wanted to tell you for years that I never wanted to simply vanish without saying goodbye. You have to understand that I was young, and my mother thought it was best to do it that way. It was very difficult for me. Leaving without a word just ripped me apart. It's like I was floating around, lost and alone. Like I was an outcast."

Vladimir's expression showed some resentment, but then it softened. "Well, I understand that it

will sound blunt, but I can't find any other way to say it. Jews were declared to be enemies of the state. I never thought that way, but that's how things stood."

Maria took a sip of her coffee and nodded her head. Vladimir continued, "I thought you would be safer in another country."

They talked for a while, catching up on each other's lives. He told her about his job as a diplomat, and she told him about her work at psiBlox. They laughed and talked, and it seemed as if no time had passed at all.

As the conversation flowed, he noticed the changes in her. The carefree girl he once knew had matured into a woman carrying the weight of responsibilities and concerns. Yet, her beauty remained radiant, even more captivating than before. Reminding himself to focus on the immediate task, he aimed to guide the conversation toward psiBlox.

Vladimir said, "I am so impressed that you work at psiBlox. How do you like working there? My friend Walter, who works at Telemann Energietechnik, said he is super impressed with their Field Programmable Gate Arrays. He wanted to buy some to do some experiments with the medical application they are working on, but he's been having trouble getting them. He said that psiBlox people are very selective about who they sell to."

"That's true," Maria said. "We only sell to companies we consider a good fit for our products. Our production capacity is still limited, and our yields are currently not where we want them to be."

Vladimir squinted, "Yields? What do you mean?"

"Oh, sorry, yield is a measure of quality," explained Maria. "Not every chip that we produce is perfect, and even though the process is never perfect, we aim to have a high proportion of good chips compared to the total number produced to minimize the number of rejects."

Putin knew the importance of persuading Maria that Telemann Energietechnik was the ideal partner for psiBlox. Vladimir sighed and nodded. "I understand. This might be the reason for Walter's challenges. He's enthusiastic about collaboration; his company is developing an ultrasound device for medical purposes. To assist the ill. You know, to help sick people. Maybe... Perhaps you could introduce him to the right people? This would enable him to present his idea. Perhaps his company could turn out to be a suitable match."

Maria looked at him thoughtfully. Vladimir retained the same charm she recalled, but there was something different about him. The playful glint in his eyes had been replaced by a flicker of something cold and calculating. Vladimir met her eyes, his smile disarmingly familiar yet somehow

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off-kilter. There was an edge to it now, a hint of something unsettling lurking beneath the surface.

"And this Walter fellow, why are you trying to help him? Are you involved with Telemann Energietechnik as well?"

"No, no, not at all." Vladimir shook his head emphatically. "Just trying to help a friend. Hope he gets a promotion. Perhaps he'll treat me to a beer!"

Maria paused for a moment before responding, "I will talk it over with my boss and get back to you." Maria gave him her hotel phone number and suggested he call her in a few days.

Maria was excited about seeing him and reminiscing about the past, yet she also could not shake a nagging, unnerving feeling that something was not quite right. Why was a Soviet diplomat trying to help a German company? How did he know what the German company was planning to do? Why would Walter share confidential information about a project that has not started with a Soviet diplomat, even if that diplomat was a friend? She definitely needed to talk this over with her boss.

He will probably advise me not to get involved, mused Maria. And I will blame my boss when I say no to Volodya.

A SHADOW OF DOUBT

November 1985, Berlin, Germany

Hurrying back to the AEG Telefunken office, Maria wasn't surprised to find her boss, Bobby Borlin, burning the midnight oil. The psiBlox team members thrived on dedication to their work; they frequently worked late hours and occasionally convened on Sundays. For them, spending Sundays at home seemed dull compared to the excitement of advancing their projects. psiBlox, like most startups, had no slackers.

"Bobby, I need to talk to you. Something peculiar just happened."

She took a deep breath and recounted the

encounter with her high school friend, now a Soviet diplomat in Berlin. He requested a favor, seeking her help to introduce his German acquaintance to the appropriate individuals at psiBlox to facilitate his friend's company's inclusion on the approved partner list.

Maria's boss listened attentively; his brow furrowed. "That's... interesting," he responded once she had finished. "I'm not sure what to make of it. On the one hand, there's nothing wrong with talking to a German company. But on the other hand, having a Russian diplomat in the middle makes me uneasy."

He stood up and paced around the office, thinking. "Let me call our counsel back in San Jose and see what he thinks. In the meantime, don't do anything."

Maria nodded. "Okay," she said. "I'll wait to hear from you."

The door to Bobby's office shut behind her, questions bouncing around her skull like pinball machine in overdrive. What truly drove her old friend's actions? Was he genuinely just attempting to assist a friend? Or did something more sinister motivate him? Doubts lingered about whether she could place her trust in him despite her desire to do so. She remembered him being smart, ambitious, and thoughtful. A smile crossed her face at the memories of their time together. Her friends were surprised she fell for him; he wasn't

the most handsome guy, but she enjoyed his wit, the ease with which he made her laugh, the genuine fun they had together. Yet, something felt slightly amiss. She decided to wait and see what the legal counsel's opinion would be.

One certainty remained: she would not do anything without talking to Bobby again.

THE TELEMANN ENERGIETECHNIK FILE

1985, Berlin, Germany

Nathan Roarke, a seasoned Senior Operations Officer for the CIA stationed in the city of Berlin, faced a pivotal moment in his career. He found himself in a unique position: the ultimate authority on all matters concerning USA intelligence operations in Germany. This realization evoked a blend of pride and solemnity, acknowledgment that there was no higher authority to consult; the decisions lay solely on his shoulders.

Nathan, well-versed in espionage, refined his

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skills as a versatile jack of all trades. With a background in counterintelligence, he possessed the knowledge and experience to conduct investigations swiftly and effectively. He possessed an innate understanding of where to dig for valuable information and where to uncover hidden secrets. Nathan commanded an encyclopedic memory of CIA knowledge, particularly when it came to Russian intelligence, including the enigmatic KGB. Drawing from the past failures of fellow agents, he had a keen sense of how to steer clear of repeating those same mistakes. His philosophy remained simple: avoid getting bogged down in trivial details and focus on the bigger picture. His favorite expression was, "You don't want to get lost in the weeds."

Throughout his career, Nathan had formulated a fundamental rule for himself: never lie to the people he worked with. While there were moments when divulging certain information was impossible, he made it a point to be honest about it. In the clandestine world of espionage, one's reputation held immense value, and Nathan understood the significance of trust.

Interestingly, the CIA had not been Nathan's initial career aspiration. He had embarked on his academic journey at the University of Chicago, delving into international law, the inner workings of the United States, and even immersing himself in Soviet economics, literature, and foreign policy.

His aptitude for Russian studies had shone through, leading him to pursue graduate studies in international relations with a focus on the Soviet Union.

Faced with a critical decision, Nathan had two distinct paths before him: continue his academic pursuits and potentially become an academic or venture into government service. Ultimately, what tipped the scales was the feeling of being fed up with studying and textbooks. Government service emerged as the more enticing option.

While mulling over his next steps, CIA recruiters made their way to the University of Chicago. Nathan's knowledge of the agency was limited, but he knew one thing for sure—there would be no more textbooks, and it offered the opportunity to travel abroad. Most importantly, he recognized that the CIA's mission was to safeguard the interests of the United States against foreign adversaries. After a battery of aptitude tests, the agency extended a job offer, and Nathan promptly accepted. He yearned to venture out into the world and engage in something that mattered.

During his time at the University, Nathan had cultivated a unique skill that set him apart. He possessed a remarkable knack for quickly distinguishing the relevant from the irrelevant, effortlessly discarding superfluous information. His coursework demanded substantial memorization, and he excelled at

committing names, dates, facts, and their intricate connections to memory. He could effortlessly recite these details with pinpoint accuracy. Additionally, he had an innate talent for anticipating the material likely to appear on exams. This capacity to foresee questions, memorize facts, and retain them served him exceptionally well in his CIA endeavors.

Nathan was able to analyze vast volumes of seemingly disparate information and make sense of it. His skills were essential in untangling the complex web of intelligence. His job required constantly sorting through hundreds of loose threads in perplexing espionage cases. The challenge lay in uncovering whether any of these stray strands could be tied to the larger picture of suspicions. Could he unify all the hypotheses into one cohesive narrative? This analytical mystery-solving activity constituted the core of counterintelligence. Nathan did not believe in luck. For him, luck wasn't a random occurrence, but rather the convergence of preparation and opportunity.

The CIA concentrated its efforts in Europe on countering industrial espionage, particularly in preventing Soviet technology theft. The KGB had demonstrated astuteness in acquiring high-tech equipment that was under embargo by the Coordinating Committee for Multilateral Export Controls (CoCom), a NATO organization

established in 1949 to regulate the flow of Western technology that could be used for military applications to communist bloc countries. The significance of computers in weaponry and defense was evident. The evolution of Western technology was progressing rapidly, while the Soviet computer industry in the mid-1980s lagged behind. The Soviets recognized that theft was much faster and more efficient than internal Research and Development (R&D).

With that atmosphere of heightened tension and technological competition as the backdrop, the CIA's Berlin office had kept a watchful eye on Telemann Energietechnik for several years, skillfully concealing their interest in the company's activities. Through the art of open-source intelligence, they meticulously collected information from publicly available sources, including news articles and government documents. Additionally, they discreetly engaged with individuals who had ties to the company or provided services to their office suite. The company maintained a low profile, paid their bills on time, and no one they spoke with had anything negative to say about the company.

Although the company did not appear to produce any tangible products, it boasted a lavish lobby adorned with brochures showcasing cutting-edge medical equipment. The brochures featured an array of sophisticated diagnostic tools, such

as electrocardiographs, computed tomography, ultrasound imaging, and magnetic resonance imaging, which were some of the most advanced diagnostic tools in Berlin.

Nathan always approached the collected evidence, purposefully discarding any preconceptions. He dedicated his life to analyzing counterintelligence details and found satisfaction in patiently awaiting the arrival of new evidence that would solve the puzzle. His passion lay in persistently pursuing the truth, a journey demanding both patience and determination. Although deciphering minor, seemingly unrelated inconsistencies might not captivate everyone, for him, solving these puzzles was an exhilarating endeavor.

Even before a request for consultation about Telemann Energietechnik reached his desk, Nathan couldn't ignore the lingering suspicion that Telemann Energietechnik might be a mere front, concealing its true purpose on behalf of an Eastern Bloc country. He recognized the name of the company principal as someone associated with the Stasi, the East German secret police. The fact that Telemann Energietechnik seemed to produce no products was a red flag. When an inquiry from San Jose surfaced, questioning the company's interest in FPGA technology, it raised further alarms. The mention of Vladimir Putin's involvement in the inquiry made the alarm blare

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like a fire engine siren.

The CIA assessed Soviet technology, recognizing their substantial advantage in certain domains like surface-to-air missiles and nuclear weapons. However, in areas like personal computers, semiconductors, computer hardware, and telecommunications technology, the United States outpaced Soviet advancements.

Nathan recognized the urgency of unraveling Telemann Energietechnik's true intentions, especially concerning their interest in FPGA technology. He understood the potential significance, given the Soviet military's technological gap in this particular field. While confiscation of embargoed technology proved effective in some cases, Nathan advocated for a proactive strategy to deter technology theft. He believed that taking an offensive stance would dissuade potential threats. If perpetrators perceived the possibility of retaliation for their actions, they might reconsider stealing technology. Urgent and careful action became crucial in his efforts to minimize the impending danger.

A DECEPTION GAME

November 1985, Berlin, Germany

A black Lincoln sedan pulled up to the curb outside the AEG Telefunken building, where psiBlox set up a mobile office. A tall, dark-haired man stepped out of the car and strode purposefully into the building. He introduced himself to Bobby Borlin, the psiBlox European technical support manager, as Nathan Roarke, Senior Operations Officer of the CIA.

Roarke explained he had been engaged by the FBI office in San Jose at the request of psiBlox's legal counsel. He was there to assist the company in its dealings with Telemann Energietechnik.

Radiating calmness and confidence, Roarke spoke

with the authority of someone accustomed to being in charge. He assured the psiBlox manager that he would do everything in his power to protect the company's interests.

Nathan possessed an uncanny talent for recruitment, his charisma serving as a powerful tool in his arsenal. With his striking good looks, eloquent speech, and warm, approachable demeanor, he could put anyone at ease.

As he prepared for this meeting, Nathan meticulously researched Maria's background, starting with her emigration and then delving into her academic achievements and work history. He was aware of her consistent excellence in all her pursuits. Her previous personal connection with Vladimir Putin, albeit in the distant past, heightened his interest significantly.

Now Nathan was ready to get Bobby's take on Maria.

"Do you trust her?" he asked, looking at Bobby with a penetrating stare.

Bobby nodded. "I trust her 100 percent. Maria's mind works like a high-performance engine—reliable under stress, firing on all cylinders when the pressure cooks. She's got the technical chops and the mental fortitude to handle anything you throw her way."

Nathan continued questioning, "Will she be able to work under pressure?"

"She's got ice in her veins when it matters. As for pressure... I've never seen Maria flinch under pressure. In my opinion, she flourishes under it. She keeps a cool head and gets the job done with no drama."

"What if unexpected problems arise? Will she be able to handle it?"

"Maria's a natural problem solver, Nathan. She can think fast on her feet and adapt to any situation."

Bobby leaned back, a nostalgic smile playing on his lips. "Let me tell you about Maria, Nathan. Some engineers get stressed when things go wrong. But not Maria. She's like a rock in a storm. Once, her computer froze while she was showing the FPGA tools during an important demo, she did not panic! Without missing a beat, Maria, in a move that would make MacGyver proud, used the heel of her shoe to hook the cord and unplug the computer. Then, she dropped her pen on the floor and used that moment to plug the computer back in. The computer started working again, and all the while she carried on with her presentation like nothing happened. Nobody even noticed there was a problem."

"What about keeping secrets? Will she brag about what I might ask her to do?"

"She's discreet, Nathan; she keeps her head down and gets the job done. As a startup, we trust her with a lot of proprietary information. She guards

this information fiercely and keeps it close to the chest."

Nathan's eyebrows shot up, scribbling something in his notebook, "So she is perfect?"

Bobby chuckled, "Well, no. She can be stubborn, Nathan. Doesn't like taking orders, even from me, her manager, sometimes. Stubborn, yes, but that's part of her fire. Maria fights for what she believes in, and when she aligns herself with a cause, she becomes an unstoppable force. I've seen it firsthand."

A slight smile played on Nathan's lips as Bobby described Maria's problem-solving skills. "Sounds like your Maria might be just the woman for the job. Okay, call her in."

When Maria entered the office, Nathan initiated the conversation with a few probing questions, his eyes locking onto Maria's with an intensity that suggested he was about to reveal something extraordinary.

"Can you keep a secret?" he inquired, his voice carrying an air of importance. It was a question that hinted at the covert world they were about to enter.

Leaning forward slightly, Nathan continued, "Can you live and work without seeking recognition?"

His words hung in the air, pregnant with the weight of their implications. Maria, her resolve unwavering, met his gaze with a confident nod.

"It won't be an issue," she assured him, her voice steady. In that moment, they both recognized they were embarking on a significant decision together.

"Maria, we need your help. I need you to act as my eyes and ears. Understanding Telemann Energietechnik's intentions is vital. We want you to meet with Putin. Tell him you will set up a meeting, go through the normal process, set up a mutual non-disclosure agreement, and tell him that you require deeper insights into the company and its strategies to persuade your management."

"Sir, I'd like to help.", Maria stammered, "I'm just wondering if I'm the right person for this job."

"You've got all the skills! You're familiar with Putin, knowledgeable about Germany, and well-versed in the technology. You're perfect."

"I'm terrified, Mr. Roarke. I am nervous. No kidding. I'm scared to death. I won't have a clue about what I'm doing. I will be in the center of the hornet's nest. I'm bound to blow my cover."

"There is no cover to blow. Do what you normally do. Set up a meeting with Telemann's technical people, do your general demo, and have them explain their system to you. Learn what you can, take your time, and we will investigate the company from our end as well. Act normally, like you would with any customer. Let things come your way. Naturally."

Maria still looked uncertain.

Nathan knew that when he asked his recruits to take a risk, they did so because of his leadership and confidence in the operation's success. His ability to inspire and instill confidence made a significant impact. As Nathan began his recruitment pitch, he grew accustomed to expecting the inevitable reaction. Whether it was said outright or remained unspoken, he could always sense the incredulity in their eyes. What he was proposing seemed like the stuff of fiction, the kind of mission that belonged in a Hollywood blockbuster rather than the real world. Yet Nathan had a way of convincing them that what he was asking was within their grasp, that his request was achievable.

Through years of experience, Nathan refined his capacity to persuade people to defy their instincts solely through the force of his personality and leadership. He understood that occasionally, the distinction between bravery and foolishness was subtle, and he confidently navigated this boundary. His recruits placed unwavering trust in him, and that trust was a currency more valuable than gold in their line of work.

Maria was no exception. He sensed that her history, having spent her youth in the Soviet Union and witnessed the darkness of the Soviet regime firsthand, would lead her to be willing to take part in a struggle against an evil enemy she escaped as a teenager. Her past had shaped her

into a person who would be a valuable asset in this undertaking.

"Remember that footsteps attract less attention than sneaking on tiptoes," Nathan stated calmly. "Don't want people to notice, then don't sneak around; do it in plain sight."

"So, just listen, pose the standard questions, and then respond with the standard answers," he instructed, his voice steady and unwavering. Nathan's words carried the weight of experience. He knew that sometimes the best way to gather information was to appear unremarkable, to follow the expected script, and not to raise any red flags. This strategy had proven successful in numerous missions.

"We need to know what they want FPGAs for," Nathan emphasized. He understood that the key to success lay in understanding the motivations of their adversaries. "Plus, we need a little bit of time to investigate on our end. Okay?" It was a question, but it carried the weight of a command.

Observing her hesitation, he continued, "Maria, my experience taught me two valuable lessons. Firstly, when facing a problem like ours, taking the initiative is crucial. Secondly, seizing the opportunity when it presents itself holds great importance."

"Okay," she finally said quietly, shifting in the chair.

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Nathan smiled reassuringly, "I believe you are more than capable based on what I've seen."

THE GAME BEGINS

November 1985, Berlin, Germany

The leaves on the trees in Berlin turned brilliant red, orange, and yellow. Crisp, clean air filled the city while the melodic chimes of church bells echoed throughout its streets. The weather varied from day to day; some days, it was cold enough to snow, and other days, it was warm enough to walk around with just a light jacket. On a clear day, the snow-capped peaks of the Teutoburg Forest were visible in the distance.

Maria paced back and forth in her hotel room, waiting for a phone call from Vladimir. Maria's silk blouse stuck to her back, and her breath came in pants as she kept pacing. She sensed warm air rush past her ears, raising the hair on her neck

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as her footsteps thudded on the wood floor. She checked that the phone was connected and had a ringtone for the tenth time. Still no call. She took a deep breath and tried to calm down. She knew she had no choice but to wait. Maria sat down on the couch and tried to distract herself with some TV. But she couldn't focus. She kept glancing at the phone, hoping to see that the call had finally come through. After what felt like an eternity, the phone rang. Maria jumped up and grabbed it. It was Vladimir. She took a deep breath.

"Vladimir, good news. My boss thought that medical applications might show the versatility of FPGAs. So, sounds like the next step is for me to connect with your friend Walter."

Vladimir controlled his excitement, "Excellent, thank you, Maria. I will tell Walter to get in touch with you."

A MEETING OF MINDS

November 1985, Berlin, Germany

Her phone rang again almost immediately; it was Walter.

"Thank you for getting in touch so quickly," said Maria. "We see great potential in integrating FPGAs into medical tool development, so my boss thought Telemann Energietechnik has a potential to be a strategic partner. Since we don't have a sales office in Germany, my boss suggested using our standard direct sales channel. Telemann Energietechnik and psiBlox need to sign a mutual non-disclosure agreement so both companies can speak freely, allowing us to schedule a technical meeting. Since I am already in Germany, I will be the psiBlox sales representative for this meeting."

In the technical meeting, we would discuss Telemann Energietechnik's needs. Then I would be able to recommend the appropriate FPGAs for the company's application. I can also give a presentation about the capabilities of FPGAs and the tools that will help you program them. The specifics of the deal would depend on the complexity of the application and the budget at your disposal."

Walter requested that Maria ask her office to mail them mutual non-disclosure forms. Once the paperwork was done, he expressed his enthusiasm for her visit with the Telemann Energietechnik technical team.

Now Maria was in Telemann Energietechnik's lobby, where she met Walter. Walter was a tall, well-built man with short, dark, slicked-back hair and blue eyes. He had a neatly trimmed mustache and a confident air about him. He was dressed in a tailored suit, a crisp white shirt, and a striped tie. His shoes were polished to a mirror shine. He had the air of a man who is used to being in front of people, and he spoke with the confidence of someone who knew what he was talking about.

They entered a conference room with three other people, and Walter took control by describing the Telemann Energietechnik's ultrasound machines. The key feature of these systems was the ability to quickly and easily change the settings of the ultrasound devices to accommodate different

patients and different imaging techniques. He said they hoped that FPGAs could be programmed to perform different functions.

Act normally, as you would with any customer, she kept repeating Nathan's admonition in her head. She licked the sweat off her lip. Her heart was beating so fast she thought it would jump out of her chest. Her stomach churned. Her mind was racing, searching for what to say. Sweat trickled down her back.

Act normally, girl, she said to herself. *Concentrate. Stick to the plan.* She tried to clear her mind by silently repeating her instructions. *Give the standard answers.* She tried to banish the notion that she was gambling with her life. Maria had to stop letting her thoughts run wild. Too much was at stake to let emotions get in the way.

"Yes," nodded Maria, "That is definitely possible." Maria turned on the projector and presented her standard slide deck on FPGA capabilities. She concluded her presentation with a few remarks to address FPGA usage in ultrasound devices.

"Ultrasound machines utilizing FPGAs would function significantly faster than conventional analog counterparts. This would allow for real-time imaging and more detailed images. Is power consumption important to you? FPGAs are more power efficient than the traditional analog circuits currently used in ultrasound systems. Consequently, they aid in prolonging the battery

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life of portable ultrasound devices."

Maria knew that learning about the power-consumption needs would give them one of the key pieces of information about the FPGA's intended use.

"Yes, yes," one of the engineers in the room interjected eagerly. "We are very interested in portable ultrasound devices. Power consumption is critical to us. Our aim is to replace analog circuits for image processing, such as noise reduction and contrast enhancement. Additionally, controlling the ultrasound beam is crucial, and as Walter already mentioned, we have to be able to quickly change settings based on a specific situation. Utilizing FPGAs for acquiring ultrasound data from transducers is another goal. This data will be processed and displayed on the screen. Basically, any time we move bits from one place to another, we want to use FPGAs."

Maria was impressed; she did not need to do any selling; this team already understood how FPGAs could improve their devices.

After some additional general discussion, the parties agreed they had a mutual interest and should meet again for a more in-depth technical meeting.

THE TRAP

November 1985, Berlin, Germany

The next day, Nathan Roarke, Maria, and Bobby Borlin made a plan to meet in Bäkepark. They decided it was safer to discuss Telemann Energietechnik in a park, without worrying about listening devices that might be installed in their hotel rooms. Bäkepark was a ten-minute ride on a bus from Maria's hotel room. She entered the park through a large gate and was immediately struck by the beauty of the trees. The maples were ablaze with reds and oranges; the oaks were turning yellow, and the birches were already fully golden. The trees in the park were old and majestic. Their gnarled trunks and outstretched branches created a mosaic of interwoven canopies that filtered the sunlight into

dappled patches of warmth, warming the cool and crisp air. The paths were lined with fallen leaves, forming a colorful carpet beneath her feet. Maria walked for a little while, and eventually came to a pond, where she sat down on a bench where they agreed to meet. She watched the ducks swimming in the pond, pleased that the park did not have a lot of people.

Soon, Nathan and Bobby joined her. Maria briefed them on what she had learned in the technical meeting, emphasizing Telemann Energietechnik's interest in low-power devices. Nathan shared the CIA's strong suspicion that Telemann Energietechnik was acting on behalf of the Soviet Union, most likely for military purposes. Nathan paced back and forth, his brow furrowed, deep in thought. Maria felt jittery and worried. After escaping the Soviet Union as a teenager, she did not want to aid the Soviets in obtaining powerful technology.

After a long pause, Nathan spoke. "We need to interrupt their supplies and their manufacturing process. How do we prevent the development of their systems? We can't."

Nathan continued to pace. He liked to pace when he contemplated options.

"If psiBlox refuses to sell FPGAs to Telemann Energietechnik, they will find another way to obtain them, and we may not even know about

it. We don't know how Telemann Energietechnik will use the FPGAs. What Telemann told you so far is pretty generic. Can you think of how we can guarantee that whatever they want their system to do, it will not work as expected? But in a way that they could not detect the problem. And we want to make sure that it only affects them, not any other user. We have to ensure that their systems won't work as designed. I am convinced that's where our focus should be. Maria, Bobby, can you brainstorm how we can possibly accomplish this?"

Bobby's eyes widened in panic as he raised his hands in protest. "Wait! Wait! Wait!" he stammered. "We need the CEO's approval, and the board meeting's okay. I can't be the only one making this decision."

THE SECRET PROJECT

November 1985, San Jose, USA

Bobby and Nathan were back in San Jose for an emergency board meeting. The board was composed of experienced engineers, entrepreneurs, and venture capitalists.

Nathan understood that he needed to take his time and build up to his proposal if he wanted the board to approve it. He started by establishing his credentials. He told the board that he had worked on classified projects for the U.S. government, and that he had a deep understanding of the Soviet Union's technological capabilities. He then pointed out that they were meeting at a time when the relationship between the United States and the Soviet Union was tense. Even though it

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was common knowledge, he wanted to set the backdrop for the information to follow.

"The Soviets are trying to obtain your FPGA technology. They are going to find a way to obtain it. The acquired technology could be utilized for developing new weapons or military systems, posing a direct threat to the United States and its allies. We aim to maintain control in this critical juncture. Determining the quantity of FPGAs they use, and controlling how successful they are using them is our goal."

Nathan then revealed his proposal: He wanted to challenge psiBlox to devise a way to make the system not work as designed for a specific user. He needed the board's approval to go ahead with this plan.

There was a long silence in the room.

"One of our biggest customers is the U.S. Department of Defense. How would they react if we sold FPGAs to the Russians?" asked one of the board members.

Nathan nodded. "I am glad you brought up the DOD. They are aware of this development and very much interested in seeing it happen. They support this project."

The room was silent.

"Let me repeat that the Soviets will find a way to obtain FPGAs one way or another. But we may not know which company is buying the technology

to pass it to them. We have an opportunity for controlled diversion. I believe we must take advantage of this situation." Nathan met the eyes of each board member, one by one. "I also want to remind you that this is a matter of national security, and nothing I share with you today can be repeated outside this room. It is important that psiBlox take every precaution to keep the project secret."

"Do we have enough horses to solve the problem?" asked one of the board members.

"Maria is sharp. If anyone can figure it out, she can," nodded Bobby.

"And Maria is not naive about the Soviet Union. She experienced socialism firsthand. I am confident she will give it all she can," added Nathan.

Nathan asked if the board had any other questions, and then he and Bobby left the room to allow the board members to discuss the matter privately and take a vote.

In the end, the board decided to approve the project. The board members understood that it was in the best national interest as well as supported by one of their largest customers. They felt they really did not have any choice but to approve the project.

Everyone agreed that the only people who would be aware of the project within psiBlox would

be Maria, Bobby, and the seven board members. Nathan had already vetted Maria and Bobby before getting them involved in the project. It would be up to the two of them to solve the technical challenge.

THE EUREKA MOMENT

November 1985, Berlin, Germany

As Nathan and Bobby departed to present their proposal to the board of directors, Maria delved into finding a solution to the challenge Nathan had posed. Immersing herself in the technical complexities calmed her nerves. Recognized for her ability to find solutions to even the most perplexing technical problems, Maria approached the conundrum with confidence. Despite the challenge being a bit different—needing to break something instead of fixing it—she remained certain she could solve it. Hours slipped away as various ideas crossed her mind and were

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discarded; she lost track of time and the world outside her windows.

Her phone rang. Startled, she realized she was already late for dinner with her friend Ana. Panicking slightly, she picked up the phone.

"I'm so sorry," Maria said. "My timing is off. I was engrossed in a problem, and I lost track of time."

As she hurried through the bustling streets of Berlin, Maria's mind was still entwined with the technical challenge she had been grappling with.

My timing is off, she thought. I don't like being late and making Ana wait for me. I need to stop dwelling on this for a little bit. Maybe I will have fresh ideas in the morning.

Ana was already there, sitting by the window with a knowing smile.

"I am sorry I am late," said Maria, leaning forward. "I hope you were not waiting too long."

"It's okay," Ana said. "I get how passionate you are about your work. But take a break; make your mind relax for a few hours."

Maria sat down.

"My... timing... is... off...," she repeated slowly. "Timing! Yes! I can't believe it! Being late today actually gave me an idea! I've been wrestling with a problem at work. It's been driving me crazy. And I am confident I just came up with the solution. The answer is to change the timing!"

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As they chatted and savored their meal, Maria's excitement grew. Not only had she found a way to tackle her technical problem, but she also marveled at the serendipity of how being late had sparked a new approach to the solution. She was bursting with desire to share this idea with Nathan and Bobby.

THE TIMING SOLUTION

November 1985, Berlin, Germany

The morning after Nathan and Bobby returned with the board approval, dawn revealed a sky painted in gradients of gray, as if even the heavens were trying to mirror the gloomy atmosphere in which Nathan, Bobby, and Maria parted several days before. Maria's spirits were undeterred by the overcast morning. She had time to think more about her timing idea, and she felt a surge of adrenalin that put a spark into her eyes.

They decided to meet in Tiergarten Zoo. The air was damp and held a slight chill, a reminder that winter's grasp was inching closer with each

passing day. Maria navigated the winding paths, looking for the elephant enclosure they chose as their meeting place. The trees, their once vibrant leaves now fading into shades of yellow, swayed with a melancholy grace in the breeze. The animals, usually active and energetic, seemed to mirror the subdued mood of the day. They were huddled in their enclosures, trying to stay warm, their movements slowed by the weight of the damp air. Finally, Maria saw a group of elephants gathered around a waterhole, drinking from the muddy water.

Nathan and Bobby appeared from another path with slow, dragging steps. Their faces wore expressions of concern so pronounced that they seemed to have absorbed the grayness of the sky outside.

Bobby looked up, his voice thick with concern, broke the silence. "While we were in San Jose, I was unable to speak with anyone. This project is a secret. But... I had an idea. What if we sold them defective chips? FPGAs that failed our internal testing?"

Maria considered his proposal. "Defective chips aren't necessarily dead ends, Bobby," she said, her gaze distant, as if recalling a memory. "Back at MMI, we had a similar challenge. We ended up selling flawed chips to DG. They wrote a program to map the defects to specific patterns they needed. Each chip, despite its flaws, became useful

and usable. They created custom workarounds for each chip, turning lemons into lemonade, so to speak."

Nathan nodded with understanding. "Given the Soviets' shoddy semiconductor production, they're probably already experts at workarounds dealing with their own bad chips. We cannot just give them our rejects."

Bobby, still glum, let out a dejected sigh. "Do you have any ideas, Maria?" his voice barely above a whisper.

Maria's eyes lit up, and she couldn't wait to share. "I do! I think I've cracked the problem and know how to solve it!"

Their glum expressions began to shift as curiosity replaced concern. "Really?" Bobby asked, a hint of hope creeping into his voice.

"I can introduce excessively long routes that will generate timing errors. A timing error occurs when a signal does not arrive at its destination in time to be processed by the next stage of logic. This can happen if the signal takes too long to travel through the long route or if the clock period is too short. In addition, I can modify the code to not report these errors. This means that the part will continue to function even though it is making errors."

Maria observed both Nathan and Bobby listening intently to her words, showing keen interest. She

continued her explanation.

"The timing errors will be marginal at room temperature, so the part will function normally. This is important because the problems will not be picked up during testing. However, when the part is heated, the timing errors will increase. This is because the heat will cause the logic to work more slowly. As a result, the part will start to miss more clock cycles. When a part misses a clock cycle, it does not have enough time to process all of the signals that are arriving at it. This can lead to errors in the logic, and the part will malfunction. It will allow the part to function in a hot environment for a short period of time. However, the part will eventually fail. These events are random, so I can't tell you when they will happen or how often, but I can assure you they will happen."

"How are you going to do that?" Nathan was trying to control his excitement.

"This is not difficult. I will change the placing route code and the timing analyzer."

"Okay, okay. But how do we make it so that the timing issue only affects Telemann Energietechnik?"

"We ship software with a dongle which acts as a physical key that unlocks the software for use. The software only works when it can read the dongle and the dongle tells us who the customer is. My

new logic will be invoked only if it recognizes this particular customer. If Telemann Energietechnik obtains other copies of the software from another source, it will still work how we want it to work. The special logic is specific to them."

She saw that both Bobby and Nathan were nodding their heads. "Brilliant. We have a plan."

"Go ahead and modify the code. You need to finish this code before we proceed. Godspeed, Maria."

THE DEAL IS SEALED

November 1985, Berlin, Germany

Maria was back in the Telemann Energietechnik development lab. She was there for the technical presentation Telemann Energietechnik was interested in seeing during their last meeting.

"Okay, let me show you how you would use psiTools to program FPGAs to do what you want them to do. We include this tool as part of our package."

Maria sat down in front of the hulking fourteen inch CRT monitor humming on the table set up in the conference room. She fished a five and a quarter inch floppy disk with psiTools and a

sample design file with a schematic from her bag. Her fingers flew across the keyboard, coaxing the computer monitor to life. She started running psiTools and loaded the design file. On the CRT's flickering screen, the sample design sprung to life, displaying a graphical representation of the sample design on the screen. The design appeared as a collection of boxes and lines, with the boxes symbolizing the logic components and the lines denoting the connections between them.

The screen also showed the routing table, a list of all the connections used in the design. Each connection in the routing table corresponded to a row, detailing the names of the two connected components, the type of connection, and the connection's length.

She clicked the "Place Route" button and selected two points on the screen to create a route. The two points represented the start and end points of the route. The psiTools drew a line between the two points.

"I've just created a new route," she explained, "and I also can modify existing ones."

She clicked on a route to select it and then moved it to a different location. Following that, she proceeded to click on another route and pressed the "Delete" key.

"And this is how easy it is to delete a route," she continued.

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After zooming in and out of the design to showcase a clear view of the routes, she demonstrated how to pan around the design to see different sections. Finally, she saved her updated design file and exited psiTools.

"It is an easy tool to use," she concluded.

For a few seconds, the room fell silent. The audience was stunned by the impressive demonstration. They had never seen anything like it before. The tool quickly and effortlessly placed routes in a design. It seemed to create complex designs with ease. After the initial silence, the audience erupted into applause, followed by everyone speaking at once, buzzing with excitement. Maria smiled. German audiences were typically stoic, not readily bursting into applause.

"Maria, this was a fantastic demo," said Walter. "We are eager to move ahead with the sale. Would you be interested in having us as a customer?"

"Thank you for meeting with me today," she said. "I'm so glad you could all witness the power of psiTools. This is just the beginning. I believe FPGAs will change the world. You would be the first company to use FPGAs in medical equipment, and this has the potential to show how versatile FPGAs are. I think our two companies are a good match. I will arrange for some engineering samples so that you can start your design work. psiBlox finance people will be in touch with you to go over the prices."

A MARGIN OF ERROR

November 1985, San Jose, USA

Maria spent the weekend in her San Jose office. She was making modifications to the psiTools when Bobby tapped her on the shoulder.

"Maria, how are things going? We need to deliver the development kit to Telemann Energietechnik on our regular schedule. We can't afford to raise any suspicion that this particular kit is different."

"Bobby, I was about to talk to you! I have completed the changes to psiTools. Let me break down for you what changes I made and how it works. Let's get Nathan in here so he is in the loop as well." Maria smiled excitedly.

Half an hour later, the three of them huddled in

front of Maria's desk.

"So, as you know, when a company buys the FPGA chips, they also buy a development kit. The initial design work is done using the dev kit."

"Ah, like a sandbox where developers could try different ideas to create their product before building their actual system?" asked Nathan.

Maria nodded her head. "Indeed! The development kit has everything needed to begin designing the logic for a new system. They would use the kit's psiTools software provided on a floppy disk to design FPGA chips and use a sample FPGA chip mounted on a provided development board. The development board is connected to the developer's computer with a programming cable using a serial port. The kit also includes a dongle that talks to the computer on a parallel port."

"What is a dongle? Why do they need that?" asked Nathan.

Maria smiled, "Okay, a dongle is very important. Glad you asked! A dongle tells us who is running the software. It is a special memory stick with a license key proving that the customer bought the rights to use the software. Without the dongle attached to the computer, psiTools won't run, making FPGA chip design impossible. And it serves as the key that triggers my modification! The logic I added only works when it detects a Telemann Energietechnik license key!"

"Oh! I see. This dongle is a linchpin to your entire idea!" Nathan said with a complete understanding of Maria's approach.

"Finally," Maria continued, "the kit includes a psiBlox manual and a reference design. The guide offers vital information: FPGA architecture, voltages, power requirements, and other pertinent details needed for developers to do their design work."

"Alright, so they have all they need in one kit, and we can identify when Telemann Energietechnik is using the toolkit. Then what?" asked Nathan.

"psiTools software plays a crucial role for FPGA designers. It serves as their trusty toolkit for crafting the inner workings of an FPGA chip. Imagine it as a blueprint builder that defines how the FPGA chip should operate. Once the blueprint is ready, psiTools takes charge, transforming the plan into the actual components inside the FPGA and seamlessly connecting everything together. This entire process is known as 'place and route.' And within this toolkit, there's a timekeeper called a timing analyzer, which is absolutely essential for ensuring that the design meets specific timing criteria."

Nathan, eager to understand more, asked, "What exactly are these timing criteria?"

"See, in hardware design, timing is super important. Every action must occur within a

predetermined timeframe. If an action stretches beyond that, it's considered an error, and you'll need to break it down into smaller parts. These timing criteria are essentially deadlines that dictate when an operation must conclude. Finishing before the deadline is acceptable, but going past that timeframe is a big no-no." Seeing Nathan still a bit uncertain, she decided to provide a non-technical analogy.

"Let me paint a picture for you. Imagine you're hosting a dinner party, and you've decided to cook a roast chicken along with some roasted vegetables as a side dish. You know that roasting the chicken takes a full hour, while the veggies need only 30 minutes. So, logically, you must start cooking the chicken at least an hour before your guests sit down to eat; otherwise, the chicken will be undercooked, and that's a recipe for disaster—literally, the chicken will be undercooked, and your guests will get sick. This same principle applies to timing requirements in hardware circuit design. In the world of circuits, all signals must arrive at their designated destinations precisely on time for the circuit to function correctly. Just like undercooked chicken can ruin a dinner, incorrect timing in a circuit can lead to severe consequences—the circuit just won't work as intended."

Nathan, still absorbing the information, asked, "Okay, but how do you actually break down these operations into smaller parts?"

Maria, determined to make things crystal clear, responded, "Alright, let's delve into it with an example. Imagine you have a complex task like comparing two 16-bit numbers. Normally, you'd do this by subtracting one number from the other. However, if this subtraction operation takes too long, designers can divide the task into two parts. First, they compare the upper half of the original number, and then they do the same for the lower half. The final result is derived from the outcomes of these smaller operations."

She continued, "Think of it as an assembly line, where different stations handle various tasks. In one station, someone inserts a screw, and in another, another person tightens that screw. Does that make sense now? The idea is to simplify complex tasks by breaking them down into smaller, manageable ones, each of which can be completed within the allotted time."

Nathan, now grasping the concept, replied slowly, "Yes, I think I've got the idea. Instead of one lengthy operation, you split the operation into two shorter ones, each fitting comfortably within the time limit."

"But here's the twist. Chip operations can slow down when the temperature gets hot," Maria continued.

"Oh, that makes things complicated! So how do people make it work?" Nathan inquired with curiosity.

"psiTools checks to make sure there's some extra time left after each operation, like a safety margin. If an operation finishes within that margin, it's all good. A prudent chip design ensures that all operations are completed with a 15% to 20% time margin, allowing for some operational slowdown without compromising overall functionality," clarified Maria.

"So this tool checks if there's a little extra time left," echoed Nathan.

"Right! If an operation goes over the required time, psiTools flags it as an error. psiTools also generates a report showing the delay for each operation, and by that, I mean how much of the allotted time each operation took and how close it is to the maximum allowed time."

"Okay, so that's how the designers can see where the problems might show up!" nodded Nathan.

"Correct! You got it! Now, here's where it gets interesting. My task is to tweak psiTools to make FPGA chips behave a bit unpredictably. But I couldn't make it too obvious, you know? So, I focused on timing errors that were slightly too long, adjusting psiTools not to report errors for those instances. For significantly slow timing, I allowed psiTools to report the errors."

"Sneaky! So, you made it act up just a little," said Nathan with approval.

"Exactly, and I mainly targeted additions and

subtractions because they're often used in critical logic decisions. Plus, they're more likely to cause timing errors. I also adjusted how these marginal operations are reported on the timing report. I reduced reported delays by 20%, making marginal operations appear to have acceptable margins and concealing the timing anomalies that should have been fixed. I made operations with only marginally acceptable timing seem okay when, in reality, they weren't. It helped hide what I was doing," concluded Maria.

"Clever, Maria. You made it not work correctly without making it look like you did," Nathan pronounced.

"Thanks! This task was a bit of a challenge, but I got it done. And don't forget about the temperature. As things heat up, chip operations slow down. What worked in the cool lab is more likely to have problems in the field when the temperature will fluctuate more," reminded Maria.

"I like it! So, they will have everything running in the lab, but the operation will get dicey when things get hot," chimed in Bobby, who had intently listened to the discussion. He was pleased with Maria's design. It was beautiful in its simplicity. This approach required only minor changes to the existing logic. "It's all about making sure everything appears to run smoothly, even when there are hidden problems."

"Okay, let's roll!" said Nathan.

THE DEVELOPMENT KIT

December 1985, Leningrad, USSR

With the arrival of the new boss, the atmosphere in the lab underwent a dramatic transformation. People began to work with a newfound sense of purpose, and cooperation replaced the toxic undercurrent of backstabbing that had plagued the place for far too long.

After the death of Vasiliy Ivanovich, Sasha desperately wanted to find a mentor who would not be a permanent deterrent to his every idea. He mustered the courage to approach his new boss, Viktor Borisovich.

Sasha looked at him earnestly and asked, "Viktor Borisovich, could you possibly consider being my mentor? I'm in dire need of a new scientific advisor."

Viktor Borisovich responded with a warm smile, "Of course, Sasha. I believe in your potential, and your ideas have great promise for wide applications. I'd be happy to be your advisor."

Sasha was thrilled. He threw himself into his work with renewed vigor. The following month turned out to be the happiest period in Sasha's life. True to his word, Viktor Borisovich navigated the bureaucratic labyrinth and secured the necessary resources for Sasha's project. He successfully pushed the technology pull request through layers of management, and soon he was able to provide Sasha with an FPGA development kit and an IBM personal computer to run the software necessary for programming the FPGAs. Sasha dove into his work with unparalleled dedication and a touch of obsession, making substantial progress on his prototype, utilizing the psiBlox development board.

Every evening, he eagerly anticipated the phone call from Viktor Borisovich, who would inquire, "So, Sasha, tell me about the progress you made today."

Sasha would then provide a brief but enthusiastic report on his day's accomplishments, to which Viktor Borisovich would offer words of

encouragement, saying, "Excellent, well done! But don't overexert yourself; make sure to get some rest."

These words of support not only fueled Sasha's sense of accomplishment but also filled him with gratitude toward his boss, who had not only endorsed his idea but remained deeply interested in his work.

The secrecy that shrouded all the activities related to this project gave Sasha a unique sense of importance. Conversations about his research were strictly forbidden outside the institute's walls, especially over the phone, as all calls were carefully and completely monitored and recorded. Meeting foreigners or dining at restaurants frequented by them was also off-limits. Sasha diligently recorded his work progress in special laboratory journals, which he had to submit to the First Department daily. Periodically, on an unpredictable schedule, the First Department conducted thorough searches of work areas, scrutinizing desks and drawers for unrecorded notes on pieces of paper. Any lapses in security were deemed grave offenses.

"This is top-secret work," Viktor Borisovich reminded Sasha. "We can't afford to let anyone know what we're doing."

Sasha grappled with the challenge of using a clandestine lexicon to safeguard his work. Certain words were strictly prohibited in

notes and manuscripts, necessitating their replacement with coded substitutes. "Soviet Navy" surreptitiously became "Department of Fishery," "FPGA" ingeniously transformed into a "widget," "sensors" were artfully concealed as "fishing bobbers," and "control system" was craftily disguised as a "fishing reel."

Sasha couldn't help but mutter under his breath, "It's difficult to think when I have to write such gibberish!"

Sasha's prototype frequently encountered timing errors, a natural part of the process. Undeterred by these challenges, he tirelessly reworked the logic to ensure it aligned with the stringent timing requirements. When faced with particularly challenging issues, Sasha had to send his prototype code to his contact at Telemann Energietechnik in Berlin. The Telemann Energietechnik developers faithfully recreated his working environment and sought assistance from psiBlox support, presenting his problems as if they were their own. In these formidable situations, the psiBlox support representative would offer invaluable suggestions, aiding Telemann Energietechnik, and thus Sasha, in overcoming obstacles and improving his design.

THE VBB-85 CONTROLLER

December 1987, Leningrad, USSR

Sasha was ready for a new demo, the second internal design review of his idea. After working long hours in the lab, he was anxious to share his progress and get feedback from his colleagues.

Sasha began his presentation by outlining the project's context: a request for a miniaturized controller. "We have a customer who expects the best," he explained. "They've challenged us with uncharted territories and sought solutions beyond our current expertise. Specifically, they've tasked us with creating something unprecedented—a miniaturized controller. Today, I'm here to unveil our response to this challenge."

In the room, anticipation filled the air. Young specialists diligently noted Sasha's every word. The experienced engineers in the front row listened attentively, preparing their questions and comments. Some faces bore smiles, while others betrayed hints of bewilderment. However, the head of the laboratory, Viktor Borisovich, nodded approvingly after each statement.

To set up his demonstration, Sasha connected the psiBlox development board to a temperature probe and an IBM PC. Sasha stood before his audience; he pointed at the table with the components in front of him.

"The controller before you measures just 110 mm by 160 mm. It is compact and efficient, and it can be used in a wide variety of applications," Sasha continued. "But for today's demonstration, I'm going to show you how it can be used to activate safety equipment when it detects a fire."

Sasha picked up a cigarette lighter and held it up for the audience to see. "First, I'm going to heat the temperature probe," he said. "This will simulate a fire."

He ignited the lighter; the flame danced as he moved the lighter closer to the probe. Then Sasha submerged the probe in the flame. The audience observed intently as the probe began to heat up.

"Now, take a close look as the controller takes action," Sasha said.

The LED light on the board began to flash slowly. As the temperature increased, it flashed faster and faster until it turned on steady. The audience viewed the demonstration with interest. They had never seen anything this small do the job of a minicomputer before.

"The controller detected the temperature increase and activated the slow LED light flashing. As the temperature rose, the LED light began flashing faster. When it reached the critical temperature, it became steadily turned on," Sasha explained. "In a real-world scenario, instead of turning on the steady light, it would trigger safety equipment like a fire suppression system."

Sasha held the lighter to the probe for a few more seconds, then, using an expansive gesture as if he were a magician on stage, he removed it with a flourish. The audience watched in anticipation as the LED light began flashing again. It flashed slower and slower until it turned off.

"The speed of flashing corresponds to the temperature," Sasha declared. "When the temperature returned to a safe level, the controller deactivated the safety equipment."

The audience erupted in spontaneous applause.

"Thank you," Sasha said with a gracious bow. "I'm optimistic about the results of this project, and I believe that this controller has the potential to revolutionize the way we approach safety."

"Before I conclude, let me show you some numbers." Sasha directed the audience's attention to the IBM PC, which was running psiTools. The software displayed real-time data, including temperature detection, safety measure activation, and the time when the temperature probe returned to normal levels.

"This report confirms that each timing path meets the necessary timing requirements," he stated proudly as he shared a comprehensive report listing every logic operation and its corresponding duration.

"Your progress is commendable, Sasha," Viktor Borisovich remarked, a pleased smile in his eyes. "The demonstration is quite impressive."

He surveyed the audience and raised his voice in a rallying cry. "Comrades! Com-rads! What have we just witnessed? Comrades, let me tell you, I've witnessed a miniature controller guiding protective sensors that automatically detected and suppressed fire." He paused for dramatic effect. "Yes, comrades, automatically! Here is an example of how Soviet hard work can dominate the world. This lab will continue to strive toward our shared dream of having the best technology in the world!"

Sasha nodded, his face reflecting a blend of relief and pride. "Thank you, Viktor Borisovich. I've dedicated considerable effort to this."

"Do you have any questions for the presenter?"

inquired the lab director. "No questions? Then allow me."

Viktor Borisovich leaned forward, adopting a serious tone. "I have some suggestions for improving your design for the production environment."

Sasha's eyebrows furrowed slightly as he leaned in, attentive. "Thank you, Viktor Borisovich. What do you suggest?"

Viktor Borisovich took a moment to organize his thoughts. "Well, you see, in standard electronics design, we typically allow for a 15% extra margin on every operation."

Sasha nodded thoughtfully. "I understand, Viktor Borisovich. So, you mean a safety buffer?"

Viktor Borisovich smiled, appreciating Sasha's quick grasp of the concept. "Precisely. Now, I've noticed that some of your operations meet timing but without that 15% margin."

Sasha's expression shifted to one of realization. "Ah, I see where you're going with this. I understand your point. You believe these areas require refinement?"

Viktor Borisovich nodded, his gaze unwavering. "Indeed, precisely so. This controller will be operating in a rather stressful environment, and we need to ensure it will continue functioning flawlessly without any issues."

Sasha offered a grateful smile. "I appreciate your

feedback, Viktor Borisovich."

Viktor Borisovich's stern facade softened, revealing his mentor's encouragement. "Good. That's the spirit. This is why we have these design reviews, so those of us with vast experience can spot areas that could be made even better."

Sasha's determination shone through in his response. "Your insights are invaluable, Viktor Borisovich. I'll definitely work on these changes. Tackling them might be challenging, but I am ready for it."

Viktor Borisovich's eyes gleamed with confidence as he spoke. "I have no doubt you'll figure them out, Sasha. Your dedication to this project is commendable."

As the design review came to a close, Sasha knew he owed a debt of thanks to the man who had supported and guided him throughout this journey. When the audience began to disperse, Sasha approached the lab director. "Viktor Borisovich," he began, his voice tinged with emotion.

Viktor Borisovich turned to Sasha, his expression curious. "Yes, Sasha? What's on your mind?"

With a heartfelt smile, Sasha made his request. "I'm so grateful for your guidance and support throughout this project. I couldn't have done it without you. I've been wondering if you would permit me to name the miniaturized controller

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after you? I would like to use your initials as its name. I'd like to call it the VBB-85 controller."

A warm smile spread across Viktor Borisovich's face. "Sasha, I'm honored by your request. It would be my pleasure to have this controller bear my initials. The VBB-85 controller it is."

Sasha's face lit up with gratitude, and he extended his hand to Viktor Borisovich. "Thank you, Viktor Borisovich. Your mentorship and support mean the world to me."

Viktor Borisovich shook Sasha's hand warmly. "You've done remarkable work, Sasha. I'm proud to be associated with this project. Let's continue to strive for excellence."

BACK TO THE LAB

December, Leningrad, 1987

Sasha's design review had been a success, but he understood that the real challenge lay ahead: improving the timing of the miniaturized controller. Viktor Borisovich's words sounded in his mind like a persistent echo: Standard practice demands a 15% safety margin on every operation.

Sasha knew that ensuring his miniaturized controller met the stringent requirements was not just a suggestion; it was a necessity. The controller would be operating in critical environments where reliability was paramount. Safety margins were not an extravagance; they were an acceptance criterion.

Sasha plunged into the work with his usual enthusiasm, but quickly found himself grappling

with a formidable challenge. Implementing the safety margins proved to be a complex task. He had to balance a number of competing factors, including the size and power consumption of the controller, the speed of the processor, and the complexity of the logic.

Sasha worked long hours, day after day, yet progress remained elusive. He experimented with various approaches, but the pace of advancement was glacial. Many of his attempts yielded little to no results. His work wasn't confined to the office; he brought his work home with him, not on paper but in his head. Often, he found himself lying in bed, wracking his brain, exploring countless avenues to tackle the day's challenges. Gradually, discouragement and frustration crept in.

During one of his nightly conversations with Viktor Borisovich, he admitted his dwindling reserve of ideas to reduce the timing of certain operations.

"Sasha, keep your chin up. Even the best engineers encounter perplexing challenges at times. Be willing to ask for help when you need it. Have you been reaching out to Telemann Energietechnik so they can get help from psiBlox?" suggested Victor Borisovich.

"No, not lately. I got help from them early on, but I have not asked for help recently. Thank you for reminding me to use them as a resource!" Sasha's spirits lifted. Victor Borisovich's suggestion

offered a glimmer of hope that he might discover a previously overlooked solution.

"Use every opportunity to learn something new and learn from your mistakes. With persistence and dedication, you can achieve anything. The important thing is to never give up on yourself and believe you can solve the problem. It is just a matter of trying and trying again. I speak from experience; I hit a wall and couldn't figure out how to proceed plenty of times!" Victor Borisovich smiled reassuringly.

The next day, Sasha reached out to Telemann Energietechnik. His contacts in Berlin understood the gravity of the situation and swiftly engaged psiBlox technical support. The psiBlox experts, experienced in the intricacies of FPGA design, delved into Sasha's work. Analyzing his logic, scrutinizing timing constraints, and meticulously reviewing his code, they identified potential solutions to Sasha's problems. Subsequently, psiBlox support engineers provided Telemann Energietechnik with several key suggestions for improving the controller's timing.

Their guidance proved crucial. Each interaction with the psiBlox support team felt like a lifeline, pulling Sasha closer to his goal. He worked relentlessly, implementing the suggested changes, running simulations, and fine-tuning his design. The process was painstaking, and at times, it seemed like the timing constraints were an elusive

mirage, forever just out of reach. But Sasha refused to yield. He remained resolute, propelled not only by a commitment to his project, but also by Viktor Borisovich's faith in him. He learned a lot in the process. As his experience increased, it became easier to resolve timing issues on his own. He continued to work on the design, and eventually his determination paid off. The controller's design met the stringent timing requirements with the coveted 15% safety margin on every operation.

Relief and exhilaration washed over Sasha. He had conquered a significant obstacle, taking a giant leap towards his dream of creating a world-class miniaturized controller.

As he shared the news with Viktor Borisovich, Viktor Borisovich offered his congratulations.

"Sasha, your persistence and commitment have paid off. You've met the challenge. This is a significant milestone for our project. Next, we will set up a demo for the customer who requested the feature. Please update the paper with the latest data. Let's get it published! And then, my friend, you are ready for your thesis defense."

CUSTOMER DEMO

December, Leningrad, 1988

Despite the heightened importance of the customer presentation compared to the internal one, Sasha remained remarkably composed. The internal demo had already earned him recognition and applause, instilling a sense of confidence in his ability for his forthcoming presentation. He felt well-prepared and capable of delivering his presentation effectively.

A short while before the critical meeting, Viktor Borisovich pulled Sasha aside, recognizing the need for some final guidance. He spoke with the authority of experience, ensuring Sasha was well-prepared for the protocol.

"Sasha, you must be attentive to the uniforms worn by the officers at the upcoming demo. It's important to address them correctly, to demonstrate respect for their rank and position," Viktor Borisovich began in his trademark no-nonsense tone.

Sasha leaned in, absorbing Viktor Borisovich's insights. "Please, go on, Viktor Borisovich."

Viktor Borisovich proceeded to provide a meticulous breakdown of the uniforms and ranks Sasha should be aware of during the presentation.

"Our most distinguished guest is Rear Admiral Klemov. His uniform will be a deep shade of blue, adorned with a single large star on his epaulets. When addressing him, refer to him as Comrade Admiral Klemov. He will be accompanied by several junior officers, each sporting a lighter blue uniform. A captain's rank is denoted by one small star on each epaulet, while a major boasts two small stars on each. Remember to address them by their ranks. In addition to the admiral, we usually have an Operations Officer, an Intelligence Officer, and a Communications Officer present during these demonstrations. They will also likely have a couple of non-military technical people along."

Sasha nodded attentively, appreciating the significance of these nuances. "Thank you, Viktor Borisovich, for guiding me through this protocol. I will ensure I address them appropriately."

"Remember, Sasha," Viktor Borisovich emphasized, "you must simplify complex technical concepts, make them clear and concise, and be ready to address any questions the admiral or his staff might pose. I will start by introducing you, and then the stage will be yours."

As Sasha entered the conference room, he found four naval officers in their starched uniforms already seated. Next to them, he saw two people in suits.

Viktor Borisovich began the proceedings with welcoming words for their esteemed guests and then shifted the spotlight onto Sasha.

"When we received your request for a miniaturized controller, we entrusted our most dedicated and brilliant developers with the task. Leading this endeavor is Sasha Rifkin. He will now demonstrate the prototype he has created."

Sasha began his presentation with a brief overview of the technical principles of his invention. His words flowed effortlessly as he showcased the functionality of his prototype. He repeated the demonstration he had given to the internal staff, illustrating how the controller responded to changes in temperature with flashing LED lights. He emphasized the remarkable compactness of the device, measuring just 110 mm by 160 mm, and underscored his expectation that the entire assembly, once housed in a casing, would weigh no more than a few kilograms.

One of the non-uniformed men interrupted Sasha to ask a question. The man was built like a fire hydrant, short and thick and totally bald. He asked, "What is the power consumption of this unit?"

"Eight watts," responded Sasha confidently, his mind racing with thoughts about the man asking the question, likely one of the technical experts Viktor Borisovich had mentioned earlier.

"Impressive!" the man responded. "What are the cooling requirements?"

"Due to its minimal power requirements, it generates very little heat," Sasha said thoughtfully. "However, a small fan could provide an extra layer of safety."

Though the visitors maintained stoic expressions, Sasha couldn't help but sense that his presentation had made a positive impact.

In just twenty minutes, the demo concluded, and both Viktor Borisovich and Sasha exited the room.

With the meeting adjourned, Rear Admiral Klemov turned to his staff and inquired, "What do you think?"

The technical expert chimed in, a note of excitement in his voice. "Our current controller guzzles 450 watts and relies on large fans for cooling. The power consumption of this unit is simply remarkable. Sasha suggested a small fan, but with just 8 watts of power, it may not need any

additional ventilation. This means we can design an incredibly compact controller."

Outside the room, Viktor Borisovich offered a reassuring pat on Sasha's shoulder, his expression one of satisfaction.

"This went rather well, Sasha," Viktor Borisovich remarked. "I believe this is precisely what they were seeking. We are well on our way to securing the support of the Soviet Navy for your invention."

THE FINAL HURDLE

December 1988, Leningrad, USSR

The demos had been resounding successes, but the thesis defense would be the ultimate test of Sasha's knowledge and expertise. Shortly after the customer demo, Sasha and Viktor Borisovich sat down to discuss the thesis defense.

Viktor Borisovich had an engaging personality, marked by the ability and desire to explain things while enjoying sharing his knowledge and experience. Usually, he did so with a grand sense of flare, which made him an excellent mentor whose advice felt natural and never preachy.

"Sasha," Viktor Borisovich began, his tone measured, "your next task is to complete your

thesis. Keep in mind, you'll be judged not only on your invention but also on the quality of your writing, visual aids, and your ability to present your work effectively. It's crucial to update your paper with the latest data and create exceptional graphical charts. Your presentation skills are excellent, so there's no need to worry there. But you must prepare to defend your work and be ready to handle tricky questions. Some panel members may even try to provoke you, and you must keep your composure and remain calm. Even if the questions are rude, answer them politely and with as much detail as possible. Thank them for each question, even if you disagree, and then present your argument. How you respond is part of the test. Remember, the role of the critical opponent is to challenge you. He may be harsh, but those are the rules. Do not take it personally."

Sasha nodded attentively. "I understand, Viktor Borisovich."

His mentor continued, offering a word of caution, "I must also warn you about potential non-technical challenges. Let's hope they don't appoint someone who views me as an adversary. If we're unlucky, and you get someone with a personal bias against me, their questions might be more unpleasant or difficult. Additionally, there might be biases based on your background. Some members of the scientific council may be prejudiced. This is a reality we must face. There's

not much we can do about it, so stay composed and focus on the technical aspects of the questions. Ignore any personal comments and simply smile as if you didn't hear or understand."

Sasha nodded once more with a determined look. "Understood."

Viktor Borisovich added an important detail, "When we apply to the scientific council to schedule your defense, they will select your official opponents, and you'll need to provide them with copies of your thesis. Hire a good typist, so typos do not affect your presentation."

"Oh, and one more thing," Viktor Borisovich added, "Once you've finished working on your thesis, you must write an autoreferat, a concise summary of your dissertation. It should be one or two pages. This summary needs to be delivered to both the Central Committee of the Communist Party and the Central Technical Library. When you do that, make sure to get a receipt from them. The receipt is proof that you submitted the autoreferat and thus are eligible to defend your thesis. Without that receipt, you won't be able to present your thesis during your defense."

Viktor Borisovich leaned in, offering a piece of practical advice. "I strongly recommend personally delivering your autoreferat to all the relevant parties, including the Central Committee, primarily due to timing constraints. While it's possible to send it by mail and wait for a

confirmation receipt, this process could take several months. If you opt for that route, your defense would be scheduled for the summer, not now. Keep in mind that the demand for a miniaturized controller may shift by then. Therefore, I advise against relying on the mail and suggest taking a trip to Moscow to handle this in person."

Sasha couldn't help but express his astonishment. "Are you saying they'll simply allow me to walk into the Central Committee of the Communist Party?"

Viktor Borisovich chuckled. "No, no, Sasha. You need to inform them in advance. Contact the Central Committee office to schedule a delivery time. When you arrive on the designated day, check in with the security guard at the front desk, and they'll direct you to the appropriate room. Hand over your papers to the staff member responsible and request a receipt."

"When you successfully defend your thesis, the thesis along with all opponent reviews, the transcript of questions and answers from the defense, and a letter of recommendation from me as your scientific advisor will need to be sent to the State Commission for Academic Degrees and Titles. But don't worry, the council secretary will take care of this paperwork," Viktor Borisovich concluded, his voice filled with a comforting blend of reassurance and pride.

Sasha's face broke into a happy smile, and he couldn't help but express his gratitude, his eyes reflecting a sense of relief. "Whew! I'm truly glad this paperwork won't be on my shoulders," he chuckled, his expression a mix of satisfaction and regard. "And Viktor Borisovich, I also noticed you said 'when,' not 'if'! I truly appreciate your confidence," he added.

The weeks leading up to Sasha's thesis defense were a whirlwind of preparations. Sasha hired a typist to painstakingly type out five pristine copies of his paper. The typist created the text, but the diagrams Sasha had to add manually by hand to each copy. This required his utmost attention, for a single mistake, an errant inkblot, or a lurking typo would result in a return trip to the typist for a complete page redo.

Sasha meticulously polished his thesis, crafted a concise yet comprehensive summary, and prepared himself mentally for the challenge ahead. Finally, the day to deliver the autoreferat arrived. Sasha embarked on a journey into the heart of Moscow with a mission to hand-deliver the document. He boarded a train, and after a long eight-hour journey, he arrived at Leningradsky Rail Terminal. Once he stepped onto Tverskaya Street, it took him twenty minutes to flag down a taxi. As he rode towards the city center, he was greeted by floodlights, flags, and banners. The banners burst into life, flapping in the wind,

resembling moths drawn to the bright lights. The red banners adorned many buildings and fluttered proudly over the wide avenues. They carried a unified message: "LENIN LIVED, LIVES, AND WILL LIVE FOREVER!"

Finally, Sasha's taxi reached the grand Central Committee Building. Instructing the driver to wait for him, Sasha ventured into the bureaucratic maze, determined to obtain that all-important receipt.

The quest took longer than anticipated, and Sasha couldn't shake the worry that the taxi driver might have given up on him. However, relief washed over him when he exited the building as the taxi was still waiting. The driver greeted him with a hint of jest. "I almost lost hope that I would ever see you again!"

Sasha chuckled nervously and thanked the driver for his patience. He settled into the backseat and breathed a sigh of relief. In his hand, he held a sheet of paper with the letterhead of the Central Committee of the Communist Party of the Soviet Union and a red stamp that said, "Received." The final hurdle had been cleared. Now, all that remained was the thesis defense itself.

THE THESIS DEFENSE

December 1988, Leningrad, USSR

The day of Sasha's thesis defense had finally arrived, and there he stood, a lone figure before a panel of academic luminaries, ready to present his work. He was allotted just twenty minutes to present his thesis that described the invention, a miniaturized controller called VBB-85. His presentation featured five charts displayed on stands, each showcasing a different facet of his invention. One chart depicted the layout of the psiBlox board, complete with temperature sensors. Three graphics illustrated how the LEDs responded to temperature changes and how the controller

reacted accordingly. And finally, a chart presented the detailed timing table generated by psiBlox tools.

Sasha closed his eyes momentarily and visualized himself delivering a flawless presentation. Then he took a deep breath and opened his eyes. He was ready.

He launched into his presentation, his voice clear and confident. He explained the purpose of the VBB-85 controller, its key features, and potential applications, using charts to illustrate his points.

Upon conclusion of his presentation, the chairman of the scientific council asked, "Are there any questions?"

Sasha stood before the council, ready to face their questions. His technical knowledge shone as he answered each query with precision. The critical opponent, in particular, probed Sasha about timing closure, and Sasha, without hesitation, recited the worst-case timing margins for all major operations from memory. His ability to describe the process for resolving timing issues left the opponent satisfied. After completing his explanation, he took a quick, grateful look at Viktor Borisovich and saw his mentor nod with a smile.

The critical opponent, undeterred, continued his line of inquiry. "Are you using the synchronous or asynchronous^[4] interface in your device?"

"Asynchronous," responded Sasha quickly.

The critical opponent pressed on, seeking further clarity. "How did you synchronize the data?"

Sasha's response came swift and concise. "I employed a double synchronizer^[5]," he stated.

The critical opponent acknowledged with a nod., "Good. Did you calculate the probability of a metastable state^[6]? Please explain to us what a metastable state is."

Sasha embarked on a clear explanation, breaking down the complex concept.

"When capturing asynchronous signals, there is a small probability that a signal may change its state precisely when the measurement is taken. During this state change, the signal's value becomes indeterminate. To mitigate the risk of obtaining invalid data, it's imperative to take multiple measurements. This way, if one measurement turns out to be invalid, it won't compromise the overall result. That's why I implemented a double synchronizer and collected multiple sample values from each probe. In my calculations, I determined the probability of encountering a metastable state to be so rare that it equates to once in a million years. Essentially, we can treat this probability as virtually non-existent."

The critical reviewer displayed clear satisfaction with Sasha's comprehensive response.

Once there were no more questions, the council

moved to a secret vote; the council members' decision to "approve" or "don't approve, needs additional work," hanging heavy in the air. Palpable tension filled the room. Sasha held his breath as ballots slipped into the box, each a silent judge of his fate. The clink of the closing lid seemed to reverberate through the room, sealing his future within. Sasha felt the tension coiling around him.

Then, without delay, the results were revealed. A voice, crisp and clear, shattered the silence and cut through the haze in Sasha's head: "Majority vote." It was done. Sasha's years of relentless work, of late nights and coffee-fueled mornings, of doubts and breakthroughs, had culminated in this moment. A wave of relief washed over him, so powerful it almost knocked him off his feet. Tears welled in his eyes, blurring the edges of the faces around him. The title of Ph.D. was his. He'd done it.

THE CELEBRATION

December 1988, Leningrad, USSR

A couple of weeks later, on New Year's Eve, Sasha hosted a jubilant banquet at a local restaurant, gathering everyone who had played a part in his defense.

Outside, a pristine blanket of snow enveloped the streets in a shimmering embrace. The snow fell softly all day, keeping the white covering on the ground and trees pristinely white. The air was crisp, but the wind was still, so it did not feel cold. Each flake glistened like a tiny diamond as it delicately clung to the trees and rooftops, transforming the ordinary into a scene from a fairytale. Nevsky Prospect was adorned with strings of twinkling lights, casting a warm

NEVSKY PROSPECT

and inviting glow upon the snowy landscape. The Neva River, with its icy surface, reflected the soft gray of the sky, mirroring the city's wintry mood. Graceful bridges spanned the river, their intricate ironwork adding elegance to the monochromatic scene.

Inside the restaurant, the mood was warm and inviting. The tables were decorated with fresh flowers. Sasha's guests were all dressed in their finest attire, and shared laughter and animated conversations. The mood was one of joy and excitement as everyone gathered to celebrate Sasha's success. The sound of joyous chatter echoed throughout the room. Sasha, the man of the hour, moved through the crowd with a radiant smile, expressing his gratitude to those who had played a part in his defense.

Then, Boris, with a glass held high and a gentle tap of a spoon, seized the moment and everyone's attention. "As Sasha's friend," he declared in a resounding voice, "I am compelled to kick off this joyous celebration with a toast."

The crowd hushed, and all eyes turned to him.

Boris continued, "To our dear Sasha, today, we celebrate your thesis defense, which is a bit like getting married to science. You have spent years getting to know science, inside and out, and now you are ready to commit to a lifelong journey together. Like a wedding, your thesis defense is a celebration of your love for science and your

commitment to your career. It is also a time for your friends, family, and colleagues to come together and support you on this important day.

"Of course, there are some key differences between a thesis defense and a wedding. For one, there is no need to wear a white dress or a tuxedo. And instead of exchanging vows, you, Sasha, answered questions from the council members, including your formidable critical opponent.

"But in many ways, a thesis defense is just as significant as a wedding ceremony. It is a day when you make a public commitment to your chosen field and the pursuit of knowledge."

"So, Sasha," Boris continued, raising his glass once more, "we raise our glasses to you on this special day. May your marriage to science be as successful as your thesis defense was, but not as short! I hope your career will be long and happy.

"Now, about gathering the paperwork for the State Commission for Academic Degrees and Titles. You can think of that experience as a kind of honeymoon. It's a time for you and science to spend some quality time together, getting to know each other even better.

"And just like any honeymoon, there will be some ups and downs. There will be moments when you want to pull your hair out, and there will be moments when you are so filled with joy that you can't believe how lucky you are. But through it all,

you will be learning more about science, and you will be growing closer to it. And in the end, that's what it's all about.

"So, Sasha, congratulations on your thesis defense and on your upcoming marriage to science. We wish you all the best on your honeymoon and on your lifelong journey together."

The room erupted in laughter and cheer as everyone clinked their glasses with Sasha, who laughed heartily, his face beaming with joy.

When the laughter subsided, Viktor Borisovich stepped forward to offer his own heartfelt toast. He raised his glass and spoke with pride. "Sasha, I am proud of you. This degree is a reward for persistence in finishing what you started, not more, not less. It is a testament to your perseverance. It's a milestone, not the final destination. This is just the beginning of your promising career. Let us all drink to that!"

When the clock struck twelve, a chorus of cheers and well-wishes erupted, and the room filled with the sound of joyous exclamations.

New Year's Eve had arrived in all its glory, a night of celebration, gratitude, and hope for the future.

NORMALCY RETURNS

1985-1999, San Jose, USA

Maria returned to her normal life at psiBlox. The dim glow of computer screens and the rhythmic tap of keyboards welcomed her back to the familiar hum of the psiBlox offices. It seemed a world away from Telemann Energietechnik. The daily grind, once mundane, now hummed with validation. Maria, the girl from Leningrad, was now a woman who had faced down a superpower, and the thrill of satisfaction thrummed through her veins. The Soviets, that symbol of fear from her childhood, had been outsmarted, a testament to the resilience of the human spirit.

Her memories of the encounter with Putin were a reminder that she had dared to use her ingenuity to safeguard her country's technology against the Soviets, who wanted to obtain FPGAs despite an embargo. She felt the weight of a secret she could not share. It was a double-edged sword, a quiet pride intertwined with the burden of unshared experiences.

One day, after the usual array of meetings and tasks, Maria found herself in her boss's office. Bobby Borlin looked up from his computer with a knowing smile. He was the only other person at psiBlox aware of Maria's clandestine activities, which added a layer of trust between them.

"The FPGAs," she said, her voice tight, "do we have any information about where they ended up?"

Bobby leaned back, fingers steepled in thought. "Your expertise played a crucial role. But we are likely never to know how it plays out."

Maria's frustration flared. "What are their intentions? Why did they want them? What are they building?"

Bobby sighed, his gaze briefly turning to the city skyline visible through the office window. "That's the nature of these things. The CIA is handling the aftermath, but they will never tell us."

Maria nodded, a bittersweet smile touched her lips. Some truths forever stayed shrouded in shadows. As the conversation unfolded, Maria found a

strange sense of closure settling within her. The unknowns were still there, lingering on the edges of her awareness, but she trusted Nathan Roarke to handle whatever came his way.

The world teemed with mysteries, some monumental, some nestled close to home. Perhaps it was time to turn her attention to another cipher, one that sat tucked away on a dusty shelf in her own living room—the little vase from the Soviet Union. Curiosity about its value had simmered within her, yearning for resolution. Maybe the answer held within the vase's intricate carvings would offer a satisfying closure, a small piece of the mosaic of her own past.

Decades of silent questions about the little vase from the Soviet Union finally had a chance to be answered as Maria attended the filming of *Antique's Roadshow* television series and brought the vase to be appraised. The shuffle of the line, the quiet whispers of the crowd, and the way the bright lights seemed to dissect every imperfection amplified her anxiety. After a nerve-wracking long wait, she reached the front of the line and placed the vase on the table, its smooth curves cool against her trembling clammy fingers.

The memory of the agent's sneer, "Did this vase come from the Hermitage Museum?" echoed in her mind, the memory as sharp as a blade. The auction lights gleamed, bathing the little vase in a halo of its potential worth.

The appraiser, a man with eyes like polished amber, lifted the vase with an almost reverent touch. He turned it slowly, his gaze tracing the intricate carvings as if reading a forgotten script. The murmur of the crowd faded into a distant hum, leaving only the soft clink of silver and the rustle of anticipation. Finally, after a pause that stretched like an eternity, his voice cut through the silence. "A decorative piece," he intoned, the silence stretching like a deflated balloon before he added, "fifteen dollars."

Maria swallowed the lump in her throat. "Fifteen dollars?" Maria echoed, the disbelief in her voice barely above a whisper. It felt like a slap in the face. But as she cradled the vase, its smooth curves etched with the memory of an encounter with the customs agent held more value than any price tag. The customs agent's sneer, her mother's defiant chin, the icy air thick with suspicion—these were the true treasures the vase contained. *No, this is no mere trinket, she thought, but a silent witness to a chapter I will always remember.*

Y2K DISRUPTION

2000, San Jose, USA

New Year's Eve in 1999 unfolded unlike any other. Maria and her colleagues, on the frontlines of technological innovation, braced for potential Y2K disruptions. As the clock ticked into the new millennium and no major Y2K issues materialized, they celebrated with immense relief. Public gatherings, media coverage, and even official statements from Governor Gray Davis emphasized the averted disaster and a collective sigh of comfort.

Meanwhile, in the Soviet Union, a political tsunami upstaged Y2K bug concerns. New Year's Eve had long been Russia's most celebrated family holiday. Families across the nation gathered with

friends and kin, huddled in front of television sets to witness the clock on the Kremlin tower strike midnight. Glasses of champagne were raised, and traditional festive meals were savored. In the minutes leading up to midnight, the nation's leader traditionally delivered a holiday speech.

Amidst the anticipation of millions gathered around their televisions, Boris Yeltsin, in the last year of his second term as Soviet President, appeared to make his traditional address to the nation. However, instead of the expected holiday message, he shockingly announced his resignation, transferring power to Vladimir Putin.

The next morning, as Maria entered the office, Bobby Borlin approached her with a purposeful stride, his eyes glinting with barely contained excitement.

"Did you catch the news about Russia? Yeltsin resigned! Your boyfriend is the President now! You could have been the First Lady!" He leaned in conspiratorially, dropping his voice to a whisper, his eyebrows raised in anticipation.

Her face scrunched up momentarily, as if she caught a whiff of rotting eggs. "Bobby! Not funny! Don't call that man my boyfriend," she said, shaking her head. "And don't joke about things like this again."

"Sorry, sorry," he said, taking a quick step back. "I didn't mean to offend you. It just... well, it was

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such a surprise! I'm dying to hear your take on this."

Her lips pressed into a thin line. "Looks like Yeltsin resigned early, catching rivals off guard and paving the way for his loyal soldier Putin to ascend to the Presidency."

She paused, running a hand through her hair. "But Yeltsin might be in for a surprise. Even as a kid, Putin has never been pliable. I doubt he'll be content being a puppet. I remember his Combat Sambo matches. He had a mean streak, a way of bending the rules to claim victory, leaving opponents bruised and broken."

She let out a sigh. "I can't shake off this uneasy feeling," she confessed, lost in thought. "I fear what the future holds ahead with him at the helm."

THE MYTH OF INVINCIBILITY

August 12 2000, Barents Sea, Arctic Ocean

Amidst the vast expanse of the Arctic Ocean, the stage was set for a dramatic display of military might—the naval exercise known as Summer-X. It was a bold endeavor, the first of its kind in over a decade, meticulously planned by the Russian Navy. With only three months as president, Vladimir Putin sought to assert the prowess of Russia's military might on a grand scale, a spectacle that would resonate far beyond the Russian boundaries.

At the heart of this spectacle was the Kursk, a nuclear-powered submarine that had earned a reputation for being nearly indestructible. Its

double hull and nine watertight compartments were a testament to Russian shipbuilding superiority.

Dimitri's breath hung heavy in the stifling air, sweat beading on his forehead despite the Kursk's icy hull around him. Something was wrong. The torpedo bay—usually a cool cavern of steel—felt like a furnace. A flicker of unease gnawed at Dimitri's gut as he maneuvered within the torpedo bay. Thirteen years ago, an engineer mentioned to him a whisper about the demonstration of the VBB-85 controller, the heart of the Kursk autonomous defense system. During the demonstration, the VBB-85 designer suggested using a fan to reduce a potential overheating under extreme pressure, but this fan was later deemed unnecessary. The memory, buried beneath layers of official pronouncements about Kursk's invincibility, now surfaced like a chilling premonition. He glanced at the control panel, the numbers blurring through a veil of unease. "Sir," he rasped, voice thick with panic, "temperature's climbing in tube three."

Captain Volkov, a mountain of a man with a smile that never quite reached his eyes, patted Dimitri's shoulder. "Easy, rookie. Kursk's a beast, remember? Built with safety in mind. If a torpedo overheats, it gets tossed overboard like a hot potato. Automatic, smooth as silk."

Dimitri swallowed, unconvinced. The air itself

crackled with tension, and the hum of the ship pulsed like a frantic heartbeat. "I think the air conditioner is busted. What if..."

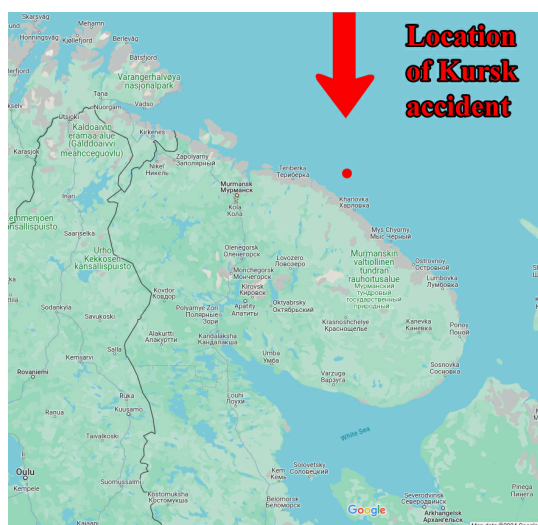
Volkov's smile dimmed. "No ifs, Dimitri. Soviet engineering leaves no room for doubt. Every fire, every leak, every hiccup—accounted for. Kursk's unsinkable. Remember that."

But all was not well in the cramped belly of the beast. Within the confined torpedo bay, the VBB-85 controller—the once-trusted sentinel—stood at the crossroads of destiny. A system that had withstood the test of time, a bulwark of reliability within the Russian Navy for thirteen years, now found itself ensnared in a fatal conundrum. Its intricate choreography of data acquisition, decision-making, and the delicate dance of temperature sensor control was disrupted by an insidious rise in temperature. With each incremental degree, the chip's once-flawless operation slowed, cascading into a symphony of timing errors that eroded its integrity. In the heart of the vessel that had embodied invulnerability, the very guardian of its fate faltered, unable to muster the requisite commands for suppressive action.

And so, on that fateful day in the vast and remote Barents Sea, as the Kursk participated in the grand naval symphony of Summer-X, the curtain fell on a narrative no one could have foreseen. Amidst the tension of anticipation, a detonation split the

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air, a cataclysmic crescendo that echoed across the ocean's surface. The Kursk, once considered unsinkable, met its demise in a blaze of tragedy, dispelling the myth of invincibility with an explosive punctuation mark.



BEYOND THE FINAL PAGE

Dear Reader,

Thank you for reading this book and sharing Maria's and Sasha's story. I hope you enjoyed it as much as I enjoyed writing it. Please share your thoughts in a review on Amazon, Goodreads, your favorite book blog, or social media platform! A few lines can help other readers discover this book. Thank you!

Short link for Goodreads review:
<https://bit.ly/NevskyProspect-GoodreadsReview>

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FOOTNOTE EXPLANATIONS

[1] - 100 rubles in 1968 would be worth \$4.20 in today's dollars

[2] - *SM-4 was a clone of PDP-11/40 minicomputer*

[3] - *100 pounds*

[4] - **Synchronous interface:** Here is an analogy to help understand synchronous interfaces. Imagine you are playing catch with a friend. You throw the ball to each other at regular intervals and have a rhythm when to expect the ball.

Asynchronous interface: Here is an analogy to help understand asynchronous interfaces. Imagine you are playing baseball. The batter does not know when the pitcher will throw the ball; the ball may arrive at an unexpected time.

[5] - **Double synchronizer:** A double synchronizer is used to synchronize signals arriving from different domains. The first synchronizer returns a result, yes or no. But on infrequent occasions, it will not have a result in time, so the result is "I don't know." The second synchronizer looks at the result of the first synchronizer a little later in time, and chances are good it will have a "yes" or "no" result by then. The chances of having the second "I don't know" later in time will be very low.

[6] - **Metastable state:** Here is an analogy to help understand the

metastable state. Imagine you have a seesaw with two people on it, one on each side. The seesaw is balanced, and both people are sitting comfortably. Now, imagine that both people try to stand up at the same time. The seesaw will start to move, but it will be difficult to predict which way it will go. It is possible that the seesaw will settle into a stable state with one person on top and the other person on the bottom. However, it is also possible that the seesaw will enter a metastable state, where it is temporarily balanced between the two stable states. In a balanced state, the seesaw will be very sensitive to minor disturbances. A slight breeze or a small push from one of the people could cause the seesaw to tip over in one direction or the other. So, if we give the seesaw a little time, it will likely move and settle into one of the non-balanced states.

AUTHOR'S DECLARATION

Nevsky Prospect is a work of fiction. The novel's events take place between 1965 and 2000, and the author used the historical backdrop of that period to create a realistic setting. The names, characters, and events portrayed in the story are the product of the author's imagination. Any resemblance to actual persons, living or dead, events or locales is entirely coincidental, with the exceptions mentioned below.

Public figures such as Vladimir Putin are faithfully rendered based on publicly available information. However, the author has taken some creative license to imagine what it would be like for the fictional character of Maria to know him personally.

Leningrad's First Central Research Institute does exist, but the character of Sasha Rifkin is imaginary. He is a composite of several former Soviet scientists the author interviewed for this

story. The same is true for the other personalities that worked in the fictionalized version of the institute.

Visitors to San Jose will search in vain for psiBlox Inc. as no such company exists. However, the FPGA (Field Programmable Gate Array) technology described in the novel is real. Several companies contributed to the development of this breakthrough technology in the 1980s. The author made great efforts to describe the technology as accurately as possible.

Telemann Energietechnik is a company that exists only in the author's imagination. It does not exist in the real world, and neither do the characters that were described as working there.

While the story in the novel is entirely fictional, the experiences of Soviet university students and scientists are based on the real-life experiences of many Soviet citizens in the 1970s and 1980s. The events and conditions for emigration from the Soviet Union were also based on actual experiences.

A trolleybus accident on Nevsky Prospect in Leningrad killed 10 people and injured 20 others on January 25, 1985, at around 10:00 AM. The author moved this accident to November to fit the story timeline.

The Kursk submarine explosion is an actual event. The submarine was considered one of the

most advanced in the world. It was reputedly unsinkable and had advanced safety equipment. Its sinking was a significant blow to the Russian navy. There are many conspiracy theories about what caused the Kursk to sink. This book adds one more theory to the mix.

ACKNOWLEDGMENT

S

This book wouldn't be here without the incredible individuals who lent their talents and time to help me write this book:

Mom, you gifted me the most precious present anyone could ask for—freedom. Your words, "the biggest gift I will give you is the chance for a better life," have resonated within me since I was young. I gave your line to Maria's mother to start her life in the USA. Thank you for being my champion, my rock, and the reason I'm here today.

Joshua Rosen, my technical consultant. Thank you for diligently ensuring my technical stuff was on point. Your industry insights, your patience and guidance were invaluable, and your brutal honesty always propelled me forward.

Irina and Ark, your insights into the Soviet Union were priceless. You generously shared your firsthand experiences, providing a window into

a world often shrouded in mystery. Your stories of resilience and the human spirit enriched the narrative and added invaluable depth to the book. Thank you for sharing your experiences with such vulnerability and authenticity.

Robert Perron, your editorial comments were invaluable. Thank you for fine-tuning this story. Your meticulous eye sculpted this narrative into its best version.

My beta readers, Kendra Bowker, Barbara R., and Andrew Christiansen, your keen eyes and insightful critiques were very helpful. Your willingness to provide honest feedback on pacing, character development, and plot holes helped me strengthen the manuscript significantly.

To each of you, I extend my deepest appreciation. Your contributions have woven themselves into the fabric of this book. Thank you for being my trusted advisors and helping me refine the story.

ABOUT THE AUTHOR

Born and raised in the heart of Leningrad, A. Kady embarked on an odyssey, immigrating to the United States as a young adult. Earning Bachelor's and Master's degrees in computer science from Boston University, the author enjoyed a dynamic career within the high-tech industry, navigating multifaceted software-engineering roles across several Massachusetts-based technology companies.

Driven by a passion for both writing and storytelling, A. Kady's unique perspective drew upon the nuanced experiences of the Cold War era in Soviet Russia. This intimate understanding of the historical and cultural backdrop intertwined with the ever-evolving world of technology resulted in the creation of this captivating novel, a tapestry woven from imagination, memories, and in-depth interviews with former Soviet scientists.

Within these pages, Maria and Sasha come alive as deep and complex characters, their lives echoing the versatile experiences that shaped the author's

own journey.

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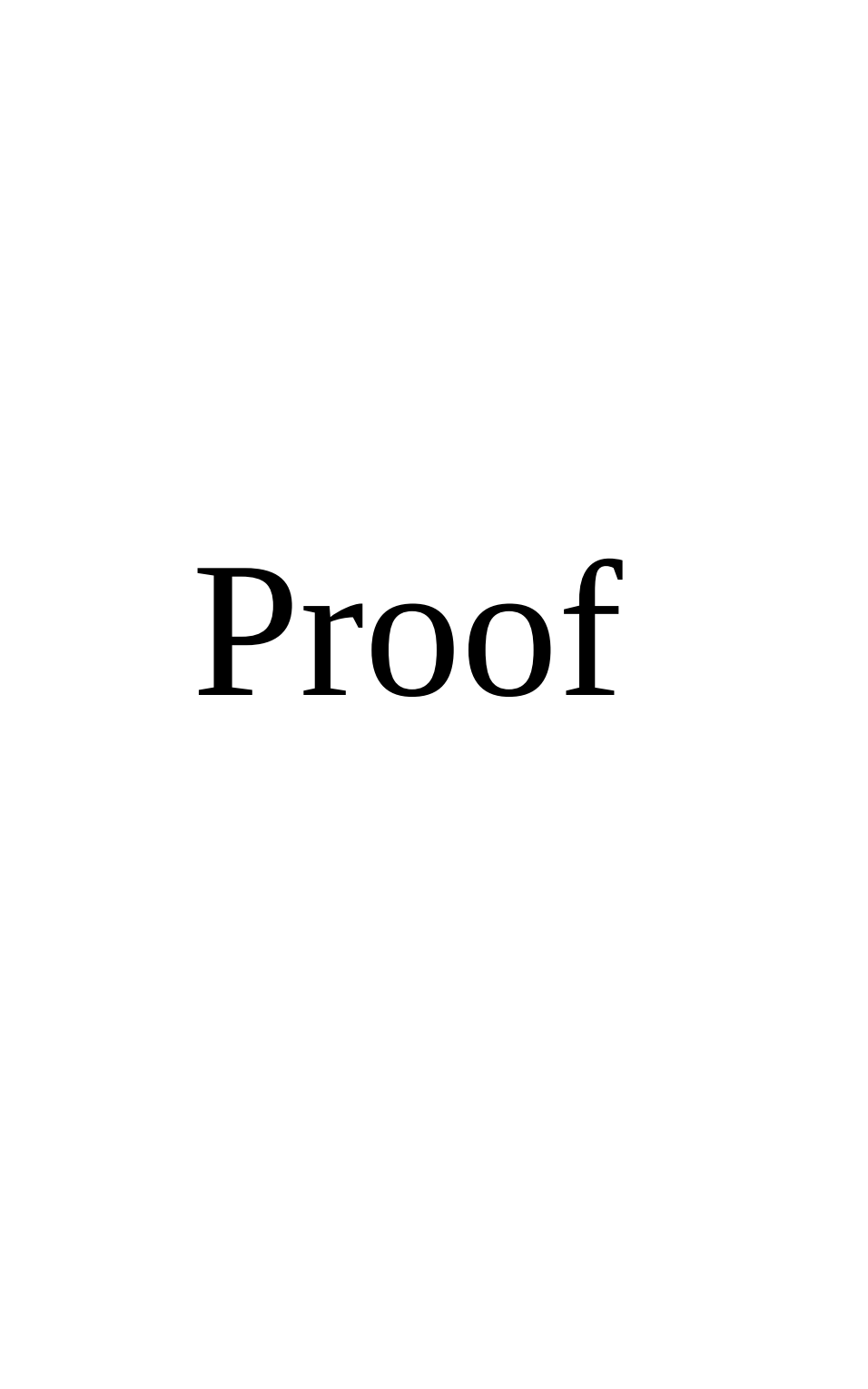
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