# One

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The clock above baggage claim at Toronto's Pearson Airport read 21:45 as Vitalik Buterin, six years old, played with a rubber ducky. A gift from the Lufthansa flight attendant on the long journey from Moscow, it would become one of his favorite bath toys in the years ahead. As the towheaded, blue-eyed boy looked around this new place, he thought about recently celebrating his birthday with his parents and grandparents in Kolomna, the ancient Russian city southeast of Moscow where the Moskva and Oka rivers meet. A few days later, when he was told they were going to Canada, he asked if it was for a week or a month. No, *zaya*, it's for good, he was told. Vladimir Putin would soon be president in Russia, and his parents were seeking better opportunities – as well as some adventure – abroad. There are few bigger

changes in a life than moving across an ocean, and like anyone, the skinny six-year-old felt afraid of the unknown he now faced.

He carried fond, but few, memories of Russia with him. He remembered living with his grandparents while his mom and dad were busy with their careers, and as they worked out the details of an amicable divorce. His mother's parents had an apartment in Kolomna as well as a dacha where his grandmother tended a vegetable garden. The nearby forest was his favorite place to play. He remembered it being cold. One time in daycare, he wandered away from the other children who sat in a ring on the rug. His teacher came to collect him and reprimanded him for leaving the circle. In the way of a small child he thought, wait, isn't it normal for me to want to wander around?

While Vitalik had no way of knowing it then, very few things in his life would ever be normal. Now in his first moments in North America, waiting for the luggage to arrive, he only knew that the next stop on his journey would be his dad's apartment. It was a Friday in February, 2000. They took an elevator up to the Toronto apartment to meet his dad's girlfriend. Vitalik thought, again with the innocent rubric of a child, *Oh cool, there's a new person in my life*.

While brand new, Toronto would be where Vitalik grew up and attended school, became obsessed with *World of Warcraft*, and discovered a thing called Bitcoin, a new type of digital money that would propel him on a journey that only a handful of people can claim to have made.

He would change the world.

Before any of that, though, it was time for bed, with his new rubber ducky tucked under his arm.

Vitaly Dmitriyevich "Vitalik" Buterin was born in Kolomna on January 31, 1994, to Dmitry and Natalia Buterin.

His father grew up in Grozny, Chechnya, in southern Russia near the border with Afghanistan. He could read by the time he was three and a half and discovered early that he loved to play with electronics. With the limited materials he could get his hands on he built radios with blinking lights and messed around with sound. His parents had no clue as to what he was doing, and resources were tight in the Soviet era, so

keeping his hobby alive was challenging. But then Dmitry got a programmable calculator with 100 bytes of memory and taught himself the machine code to make it work. It was his first computer and he was in love.

But it's a problem for a budding computer scientist if you can't get your hands on any actual computers, and that was the case for the most part in Grozny in the 1980s. "I dreamed of them because in school we didn't have access," Dmitry said. Only in his last few years in Grozny did his class go to a local government office where they were allowed to work with the hulking behemoths of the late 1950s, the ones that take up an entire room. "Russia was way behind in technology," he said, "but I was extremely excited to play with this and learn as much as I could." The lack of hardware was so acute that when Dmitry won a local Software Olympiad, the work wasn't done on a computer. He wrote algorithms to solve the programming challenges with pen and paper, which the judges scored by hand.

Growing up amidst communism didn't sit well with him. He hated the brainwashing and the way that young kids were made to go into the Young Pioneers, a Boy Scout–like group, to prepare them to become party members when they were older. "By the time you're a teenager you realize nobody really believes in this, everybody's pretending and it's corrupt and just a bunch of bullshit," he said.

We were sitting at Dmitry's kitchen table as he told me his life story. He'd just been to the gym and we'd gone to get lunch at an enormous grocery store and deli in the basement of his building in a tony part of downtown Toronto. You can see Vitalik inherited his nose from his father. Dmitry keeps his salt and pepper hair short; he is in good shape and has a tattoo across his left bicep. He wore an Ethereum T-shirt with a turtle and dolphin as part of the green and blue logo. He'd picked up a healthy lunch of salmon and steamed vegetables. As he spoke, he collected any crumbs that fell before him on the table in a tissue. By the end of our conversation he'd amassed a small pile of them next to his plate.

It was odd to think that this man, who was basically my age, had a son who had gone on to such prominence. I sat there thinking, my sons are good at *Minecraft*.

Still, Dmitry knew that all routes to power went through the Communist Party, such as the connections that would help ensure that

you could get into the university of your choice. When a teacher advised him to make nice with the Communists so that they couldn't block him from attending the Moscow Institute of Electronic Engineering, he reluctantly went along.

By 1989, Dmitry was 17 and had moved to Moscow to start his first year studying computer science. Two things that he could never have foreseen, however, almost blew him off course: the Soviet Union collapsed in 1991 and war broke out in Chechnya three years later. It amounted to a double gut punch to his parents, who lost all their savings as Mikhail Gorbachev stepped down and Boris Yeltsin took charge of the rapidly changing country. Then war broke out, and his family was forced to flee Grozny. They sold their apartment for peanuts, their financial ruin sealed in only a matter of a few years. In college in Moscow, Dmitry couldn't count on help from his family. "We had to find some opportunities to feed ourselves," he said.

Along with a few friends, they devised a plan to buy Russian souvenirs like Matryoshka nesting dolls and anything cheap that sported the sickle and hammer or other USSR symbols. Then they'd make a few trips over the summer to Prague by train and then bus to sell their wares to people who would in turn sell them to Western tourists. The money they made helped them get by for the rest of the year. But perhaps Dmitry's biggest coup at the time came back to his disdain for communism.

Like all members of the Young Communist League he'd been issued an identification badge. This was the precursor to the official party membership badge that would come with adulthood. But in the immediate aftermath of the USSR's fall, an item of this order had become a hot item. He sold his in Prague for five dollars, an enormous sum at the time, considering his monthly student stipend amounted to only a few dollars. *Spasiba, tovarich!*

But not everything at the Moscow Institute of Electronic Engineering involved scraping by, nations falling apart, and war-torn homelands. He met a girl, Natalia Chistyakova, and fell in love.

Founded at nearly the same time as Moscow, Kolomna is still a wild and beautiful city. It has a fortress and all the churches you'd expect, and when Natalia was a girl she'd race to get her homework done so she could run outside and play until her mother had to yell for her to come

home. Her father worked in the military design bureau, her mom in a technical institute. As a six-year-old she spent many days with her mom at the lab, where – like in Grozny 1,800 miles to the south – there were rooms full of computers, each one weighing more than a Chevy.

"Some of my earliest recollections from my childhood are spending time in this lab and printing and using the punch cards and the tape," she said. These were mainframes that ate stacks of specifically ordered cards with holes punched in them to create a program. Her mom wrote code in Algol and Cobol, staples of the mid-1970s that are still in use today at some of Wall Street's biggest banks. For fun, Natalia would enter random commands to see what the computer would spit out. "We'd print large portraits of Lenin, that was a big amusement for the children," she said.

She went on to attend the Moscow Institute of Electronic Engineering, where she first saw Dmitry, whom she calls Dima, amid a group of about 25 people in the gym. They dated throughout university and were married in 1993, when they were both 21 years old. Vitalik was born a year later, and the young family moved into a dorm dedicated to students who were married or had children. Ask Natalia what Vitalik was like as a baby and she'll laugh in the way only a mother can about her child. "We had our hands full, let's put it this way," she said. As a newborn "he was waking up every 45 seconds." By the time he was one or two "he was very stubborn and always knew what he wanted to do," she said. From early on, Vitalik had a sharp memory for what he was taught, remembering the letters of the alphabet or numbers with little effort. He engaged with things so in one sense he was an easy child because she could put a book in his hands and he'd lock in and occupy himself. "I remember the first time he saw a computer, he was fully attached to it. All he wanted to do was bang on the keyboard. He would spend days doing that, just hours," she said.

Back at university, Dmitry worked full time while still a student to support the family, first as a software engineer at a local bank and then for Arthur Andersen as a computer systems consultant in the Moscow office. After graduation, they moved into an apartment in Moscow and Natalia's parents came to help. Natalia got a job as a finance manager at Heinz. "You know, catsup," she said.

In the late 1990s the political atmosphere in Russia was changing, as was their marriage. By early 1998, they had separated. "We were really

young, we didn't know what we were doing, so that marriage only lasted a few years," Dmitry said. Natalia had set her sights on moving to Canada, where her plan was to earn a degree at a Canadian school to help her get a good job and settle down in the new country. She attended the University of Alberta for two years while Vitalik lived with her parents in Kolomna.

When Vitalik wasn't running through the forest, stick in hand, or searching out bugs, his grandfather taught him math. He loved Legos and drawing. By the time he was five he was multiplying and dividing three-digit numbers in his head. His parents gave him their old IBM laptop from their university days, which came loaded with Microsoft Office. Excel quickly became his favorite toy, where he learned to draw shapes in the cells and Dmitry taught him to work simple formulas. It was his first exposure to a computer language.

Dmitry left Arthur Andersen in 1997 to help found an enterprise software firm called Columbus with a few former colleagues. They partnered with a Dutch firm to localize the software for the Russian market. But by 1999 the political winds were blowing in a bad direction. "It was clear where Russia was going," Dmitry said. When he saw Putin rise in prominence, he said to himself, "Really? KGB? I don't think anything good can come from this." Russia had defaulted on its debt the year before and Dima knew it was time to get out.

By now, it wasn't hard for Natalia to convince Dmitry that he should move to Canada too. At least that way, the family could be close to each other and it would be less disruptive for Vitalik. Natalia came back to Russia to finalize the move for Vitalik, stuff like taking him to the hospital for tests required by Canadian immigration. He walked around the waiting room in Moscow adding and subtracting three-digit numbers out loud. This was one of the first times that Natalia thought her son wasn't just smart, there was something more to him.

"I remember, vividly, Vitalik running around and calling out the numbers, like 200 by 300 and 25 by 350 and so on and so forth, and he'd come up with all the answers," she said. "He was only five at the time, and I remember the people sitting there and everyone was looking at him going '*awww*' and rolling their eyes in amazement."

As winter turned to spring in 2000, Vitalik now had two new additions to his life to deal with: his new home in the unfamiliar and sprawling city of Toronto, and Maia, his dad's girlfriend. He moved into their apartment and slowly began acclimating to both.

Maia and Dmitry had met while working together at Arthur Andersen. "It was August 7, 1995," Maia said. "I have a weird memory for dates." They moved in together in 1998 after Dmitry separated from Natalia and the talk soon turned to leaving Russia. Maia's mother had emigrated to Canada in 1991 with her 13-year-old brother and she'd been to Montreal and Ottawa many times. When Natalia moved to Edmonton to attend school, all the pieces were in place. Maia had founded Columbus along with Dmitry: all they had to do now was sell the business.

Yet Canada was very different from Russia, and Maia had a precocious six-year-old in her life now. She had to find ways to win him over. She found it fun to introduce him to all sorts of new things, like hamburgers. Vitalik had never had a hamburger in Kolomna. They had a game where they would wrestle and after Vitalik beat her a few times, he said, "You are like a conquered moose." Her nickname was born. From then on, Vitalik called Maia *losik*, which roughly translates from Russian as "little moose."

His creativity and playfulness with language was starting to emerge. When they visited friends in Rochester, Vitalik was given a stuffed dog. He named it *Rastopyry*, which doesn't translate exactly from the Russian but was understood by Maia and Dmitry to mean that the dog's legs were spread. "It was a completely made-up name, but in our family we still use a lot of words that Vitalik created," Maia said. "Vitalik is quirky and very unusual and bright and totally creative."

Vitalik's favorite stuffed animal at the time was a rabbit he'd brought with him from Russia. He'd fallen in love with the creatures and by the time he was seven he'd written a 17-page document called "The Encyclopedia of Bunnies." It contained jokes and pictures drawn in Excel and scientific assessments, such as a periodic table of various bunny qualities.

From the section titled "Bunnies speed":

> *On Oct. 19, 2001, 6:07 p.m., the bunnies run 3745.284 million km/sec. Probably on New Year 2002, they will run 0.77 light-years per second.*

Two graphs measure the speed progression. If you are wondering, from the section titled "First time bunnies will be seen," the answer is:

> *Never! By the year 4000, they will run 1048576.59053 light-years per second.*

Another section details "Bunnies computers" and answers such questions as "What number system do bunnies computers use?" and "What programs are there?" Then there is this exploration of gender differences in his favorite subject:

> *How many man and women bunnies are there?*
> *There are: 8 men.*
> *There is only 1 woman.*
> *That is the cat.*

Dmitry joked that this was Vitalik's first white paper. "The Encyclopedia of Bunnies" convinced him that his son wasn't just bright, he was off-the-charts smart.

But one thing that never came easily to Vitalik was feeling confident around people outside his family. While still in Kolomna it had been challenging to keep him in daycare, which had worried Dima. He knew his son needed social acclimation. While Vitalik routinely aced his multiplication tests, making friends proved much trickier.

"When people praised me for being some kind of unique math genius, that made me feel isolated," Vitalik said. "I definitely wished I could be more like other people, in both the good and bad ways." While he had people at school he considered friends, who he'd hang out with at recess and lunch, going beyond that sort of forced congeniality eluded him. "I knew that other people had friends where they would even hang out after school and do all those things, and I just never figured out how to get into that."

His mom could see that he felt lonely and like an outsider in elementary school. She helped get him moved into a gifted class in third grade, but then worried that being with other really bright children – who may not have had their own social skills under control – wouldn't help Vitalik get the kind of peer interaction he needed. But she also

knew there was a public Vitalik who struggled to make connections and a private Vitalik, the one who loved to draw, who wrote "The Encyclopedia of Bunnies," and who made numbers out of his Legos because math was in his blood. On the computer, he began drawing using the Logo programming language. And it was here too that he first displayed an almost complete lack of interest in material things and possessions that has followed him throughout his life. "He never asked for anything to be purchased for him," Natalia said. "When we'd go to the store, he was really indifferent to that stuff." Buying gifts for him at Christmas and his birthday is difficult to this day because he always says he doesn't want anything.

Yet soon even the gifted class became tedious for Vitalik, and he grew bored. His mom tried introducing piano lessons and tennis, but nothing really clicked. He did look forward to the weekly math classes he took from a local Russian professor. He loved the chance to stretch his brain, and continued with the classes through his senior year of high school.

And then, middle school – Cummer Valley Middle School, to be precise. Like every other human being, Vitalik found himself lost in a confusing, pedantic circus. Canadian elementary schools feature a lot of playtime compared with class time, but that ratio changes in middle school and Vitalik was in for a hard and boring few years. His dad understood his son's innate affinity for computers from the beginning, so he resisted pushing programming on him. He let him find his own way for the most part, with a suggestion here or a nudge there. He bought Vitalik a book on the Allegro graphic programming language and enrolled him in weekend programming courses. Vitalik read extracurricular science books in his spare time. The truth was, though, that Dmitry and Maia and Natalia all knew Vitalik would end up drowning in the tepid sea of Toronto's public high school system. Even if he stood far above all the other 700 students at Cummer Valley, his vast potential would hardly be scratched.

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The Abelard School was founded in 1997 by a group of ambitious Toronto teachers who wanted to put already smart students to the test. There are 5 students per teacher, the class size doesn't go above 10, and

by graduation Abelard students will have read Sophocles, Oscar Wilde, Zora Neale Hurston, Twain, Seamus Heaney, Shakespeare, the Bible, T.S. Eliot, and many other literary luminaries. Latin is required in the first year; many students continue on with it through graduation. *The Iliad* is taught in Greek. The curriculum is integrated across subjects, with students encouraged to take from chemistry to add to Latin to mix with physics to complement English. The 50 kids who typically make up the student body aren't allowed to use laptops in class; they're encouraged to develop direct interactions with their peers rather than perfect their ability to google. Abelard was about as far away from Cummer Valley Middle School as one could get, and exactly what Natalia knew Vitalik needed.

He entered Abelard in 2008 as a shy, quiet 14-year-old. He carried a book under his arm, either a programming language he was learning or an academic text, which he'd read at lunch. In the beginning, at least, he had no idea how this new school would change his life.

"In the public school system you always focus on the bottom 10 percent, you never get to focus on the top 1 percent," said Asim Sayed, who taught Vitalik math, physics, chemistry, and calculus at Abelard. Kids like Vitalik "tend to get lost," he said. Vitalik soon came to realize he was among peers who shared his love of learning and his work ethic, and that his teachers wanted to hear from him and challenge his beliefs. Mr. Sayed was among his favorite teachers, along with a science teacher, Mr. Maharaj, who passed away in 2018. The holistic approach to subject matter appealed to Vitalik, as did learning new and ancient languages. In 10th grade Vitalik was already burning through calculus – a subject most students didn't get to until senior year. And it wasn't just that he knew how to solve differential equations: Vitalik solved them in ways unlike anyone else.

"He had an algorithmic approach where the whole thing was step by step," Mr. Sayed said. Whereas other students would arrive at the answer using the easiest way they could, Vitalik did it his way. "Whenever I used to mark his math tests, I'm not joking, his tests became my answer sheets because his answers were way more descriptive and in detail than the answers I had written."

It wasn't just math; Vitalik excelled in all his subjects. Michelle Lefolii, one of the teachers who founded Abelard, taught Vitalik English. "He wrote a brilliant essay on formal experimentation in *Moby Dick* in grade

12 that I still use with my students to show them what a good grade 12 essay focused on literary analysis looks like," she said.

Titled "The Nature and Purpose of Formal Experimentation in *Moby Dick*," the essay, which was printed in the 2011–2012 Abelard literary journal, could easily be from the latest issue of the *New York Review of Books*. He began it this way: "Reading Herman Melville's *Moby Dick*, it becomes clear that it is not merely a novel; it is sometimes a novel, sometimes a play, sometimes a sermon, sometimes a textbook, and sometimes a true encyclopedia, encircling the subject of whaling from every side, whether scientific, technical, historical, or cultural." (He knew about encyclopedias by then, didn't he?)

The ability that would propel him into the limelight once he found the Bitcoin world was becoming clear at Abelard: he was a damn good writer.

"His writing always stood out because it was remarkably logical and always beautifully structured, but at the same time not academically stiff," Ms. Lefolii said. With the support of Abelard and the students around him, Vitalik began to grow into himself. "He also just had a lot of fun, in everything, in his class discussions, in his writing," she said. "He always had a great sense of humor."

He wrote short stories too, one of which – "On Christmas Presents and Friendship" – was published in the school's literary journal. In it four friends are exchanging Christmas gifts in a sort of secret Santa fashion. There are echoes of Vitalik's personality throughout the story, such as when his character Ulrich disdains the pursuit of materialism: "How could such trivial things arouse such euphoric happiness, when there was so much more to life than mindless consumerism, more than just money." But he also seemed to enjoy taking diametric sides to the issue, as Ulrich also daydreams of being independently wealthy to the point where he is living off the interest from his fortune and not the fortune itself. By the end of the story, however, Vitalik makes clear that the assumptions each friend has made about the others are off base, that we can't truly know anyone as we know ourselves.

This part of Vitalik's biography might seem incidental, but I find it really illuminating. I think Vitalik is more of a writer than a computer programmer. I mean that as no slight to his coding chops, mind you. He is obviously gifted, to have been able to bring along so many brilliant

programmers to make his projects successful. But his ease with fiction and narrative essay is somewhat far afield for many computer scientists. And then there's his affinity for foreign languages. He's a storyteller – and had to be, in many cases, to sell the world on his idea of what Ethereum could be. Paper and pen may be a refuge for him; sometimes in person he can shut down or become terse, such as when conflict arises. He's definitely a writer in that regard, as I recognize the same traits in myself.

Abelard allowed Vitalik to feed his love of language. He already spoke Russian and English, and now he studied French, Latin, and Greek. Brian Blair was Vitalik's teacher for political science and philosophy as well as Latin and Greek. In philosophy, Mr. Blair said he often wanted to give Vitalik more than 100 percent on his tests because he went so far beyond what you'd expect from a high school student. In his 27 years of teaching, Mr. Blair said Vitalik stands alone.

"I've seen a lot of very strong students, but one of the great things about him was that he utilized all the resources the school had, almost like nobody else," he said. In Greek, Vitalik read Thucydides with Mr. Blair, something he hasn't done with any other student. The Greek historian and general wrote *The History of the Peloponnesian War*, and while Mr. Blair often read Herodotus with advanced students, he avoids Thucydides because it's just too hard for most students who only have two years of Greek under their belt. "It was challenging for him, you could see the wheels turning," Mr. Blair said. "It wasn't like the hot knife through butter, which it was almost all the rest of the time."

Freed in this secure environment, Vitalik began to emerge from the shell of social anxiety that had worried his parents just a few years before. "Abelard played a big huge role in his life, that's where he found his own peers," said Mr. Sayed. He trusted Vitalik enough that during chemistry class, he'd let Vitalik sit in the back of the class, programming on his laptop. He always did the chemistry homework, and even with his attention elsewhere, Vitalik earned a 99 percent in the class. He was no longer the shy and awkward kid who'd started at Abelard, but had become one of the more popular kids in the school. He mentored other students and freely gave his time to help whoever needed it. "As a teacher, you see these kids and you know, these are the people who are going to change the world in a positive sense," Mr. Sayed said. "He was one of them."

Mr. Blair made a point that his other teachers repeated – Vitalik was never cocky or a smart-ass. "There was a real humility to him, despite his incredible abilities, and that's really unusual in a high school kid," Mr. Blair said.

Outside of class, Vitalik started entering math and computer programming competitions. These were contests like the Canadian Computer Competition and the National Olympiad for Informatics, where students, either individually or in teams, are given several hours to solve math or programming problems. Vitalik soon made a name for himself. In 2010, he placed in the Metro Division for Toronto in the University of Waterloo's Canadian Computer Competition with his partner, Zachary Devine. The next year, he made the honor roll of the Canadian Open Mathematics Challenge and placed third in the CASCON High School Computer Programming Competition. In 2012, he was selected as one of four students to represent Canada at the International Olympiad in Informatics in Italy.

At Abelard, he won just about every award there is to win. There was the Alexander Award for junior accomplishment in 2009, then the Archimedes Award for excellence in classics his sophomore year. As a junior he earned the Villon Award for excellence in French language and literature; as a senior he took home the Turing Award for excellence in computer science and computational mathematics and the Governor General's Award for the school's top graduating student. At graduation, as Vitalik was called up on stage time and again to collect his accolades, Mr. Sayed happened to be the teacher handing out awards. He gave Vitalik a good-natured hard time and said that the next time he called him up he should bring his backpack on stage since he was being overloaded with medals. The next time Vitalik was called, he brought his knapsack with him.

Vitalik's presence is still felt at Abelard. In a montage of student portraits that hangs on the wall in the main office, a young-looking Vitalik smiles from the very middle of the arrangement, as though at the heart of the kids who have passed through its halls. In 2018, he donated $500,000 to the school, no strings attached. The school is using the money in part to create a scholarship for students who excel across all subject matters, as Vitalik did.

If one document, one piece of evidence, from that time in his life sums up his varied and transformational time at the school, a good bet would be his yearbook entry. It's by turns funny and academic and geeky. In his senior picture, he stares out of the frame with almost no expression on his face – certainly not a smile – his light blue eyes set in a steady gaze, a brush of acne across his cheeks. He is listed as Vitalik – Professor X – Buterin, a nod to his love of science fiction and the charismatic leader of the X-Men.

He lists his superpower as invisibility, "with all the reasonable corequisites as described by Ancient Greek mythology, as well as a passive aura that constantly either adds hydrogen to the universe or decreases entropy."

The yearbook allowed students to describe their future prospects, which Vitalik listed as "computer programmer." The yearbook staff then had their say: "Steve Jobs 2.0 . . . Now with hair!"