

Infinite Infinities.

Tom Jackson was working as a computer tech in September 1996. Tom had tried his hand at various jobs throughout his forty-seven-year-old life, but until the past decade, he had yet to find a job that captured his attention and kept it. Tom had tried a succession of manual labor jobs, from masonry to carpentry to farming, and while each was interesting, he lost interest once he had learned all there was to learn. Repetition seemed to Tom like the very worst way for him to live. When he stumbled onto computers, he loved them. Tom loved the nebulous nature of the work, and he learned quickly that the computer would tell him how to fix the problem or issue if he learned to listen to what the computer was telling him.

There were many times that Tom walked into a business or home and was told, "I've tried everything, and I can't fix the problem." One time, Tom got a phone call from a man whose flight simulator wasn't working correctly. Tom asked him to explain the problem, and the man explained that the plane would crash every time he tried to land it. Tom explained that it would cost him thirty-five dollars to come to the man's house and thirty-five dollars per hour. So, the initial hour would cost seventy dollars and then thirty-five dollars per hour after that. The man agreed, and Tom drove to the man's home for their appointment. The man had a newer computer, and Tom had him do an actual take-off and landing so Tom could see the issue for himself. After the plane crashed, Tom laughed, reached over, and pushed the Turbo button on the computer to turn it off. He then asked the client to try the flight simulator software again, and the plane landed without crashing.

Tom quickly explained why the Turbo button had caused the issue.

"Are you really going to charge me \$70 for pushing a button?" the client asked incredulously.

Tom answered, "Yes. Yes, I am, but you have the rest of the hour to ask me anything you want."

And with that, they finished the hour, Tom got paid, and they smiled as they shook hands. Tom smiled as he drove home in his Audi because he knew he understood computers.

Tom had built servers that he used to host business email accounts. He had phoned a large telephone company, as the company had begun rolling out a new technology to businesses called Frame Relay. Tom had subscribed for an account because of the business email accounts he hosted, and he needed a faster, more reliable service. However, the telephone company's technician sent out to install the Frame Relay couldn't make the router work. After several hours, Tom asked if he could try his hand, and the technician answered in a relieved voice, "Yes, please." Tom hunted through the script he found on the router and asked the technician to call his company's tech support, which the man did, and then handed the phone to Tom. Tom and the tech talked, and Tom pointed out that the subnet mask was incorrect, and the tech he was talking to agreed. Tom rewrote the script, saved it, reloaded the router, and traffic began moving.

The next day, Tom received a phone call from the company asking him if he'd like to work for them as a technical contractor. After negotiating the terms of his employment and an hourly rate of eighty-five dollars per hour, Tom agreed to start working for them. His first job was at a local computer repair company, and Tom drove there. Upon arriving, Tom logged into the router, found nearly the same subnet error, and fixed that. He also found that the LAN was plugged into a misconfigured ethernet port, and he reconfigured that port.

When Tom arrived home later that afternoon, he wanted to run a software program he had stumbled across called Fractals. Fractals were like magic to him, and the imagery produced was astonishing. At first, Tom didn't understand how fractals were created and barely understood any better after reading up on them. He read this: "A Fractal is a type of mathematical shape that

is infinitely complex.” Scratching his head, Tom continued, “A Fractal is a pattern that repeats itself for as long as you run the program, and every part of the Fractal, regardless of how zoomed in or zoomed out you are, looks exactly like the original image.” Tom scrolled through the different images to watch the beauty of each fractal recreating itself in countless ways. By clicking on each different fractal, he could activate the computer code and watch them infinitely create images of themselves. Tom had a suspicion that fractals mimicked nature in some way, but the more Tom thought about there being a connection, the more confused he became. Tom closed the fractal program and went to make dinner.

As time went by, and as Tom was bombarded by more complex computer software programs, router security, and local area network installations, configuration, and troubleshooting, fractals fell into the very back of his mind. Tom’s career would soon absorb him in a constant learning cycle that left little time for anything else.

Tom understood computers and computer networks, leading him to work for a famous lawyer on the most significant lawsuit filed for the largest oil spill ever in Alaska. Tom installed the network of computers the paralegals would need, wrote the database they would use, and installed the server and security necessary. The work was grueling, and Tom often worked from early morning until late at night. Tom loved North Beach and occasionally walked from his workplace to downtown San Francisco for lunch to enjoy the ambiance.

After he finished that contract, he got several phone calls from clients who had hired other techs to fix issues, and despite having paid, their issue was not fixed. Tom offered the following assurance to those clients: they wouldn't have to pay him if he couldn't fix the problem. Tom found that his contract was a little naïve, and some clients tried to exploit his naivete. Tom began adding computer code onto every server he worked on that would lock it after thirty days

with the following message- “Please pay Tom to unlock this server.” His phone number was also added, and only one customer ever needed to phone him because their server got locked.

Tom got paid and reactivated the server.

Tom’s years as a computer tech began adding up, and he laughed at times, telling a client that there wasn’t much he didn’t know about computers. After nearly three decades in the industry, the hardware and software had changed almost completely, and there was now very specialized equipment deployed within the networks he worked on, and Tom let others deal with it. Tom had made good money in his years as a network tech, and his investments had paid off well. Not all of them, of course, but mainly his home investments had done exceptionally well. Tom was working less and less, and he began enjoying hiking and, later, fishing. One day, for no apparent reason, Tom remembered fractals; this time, he understood them better. He had seen the repeated patterns on ice and snow, pine cones, broccoli, bobcats, and many other things repeat themselves so many times that he stopped counting. Fractals helped Tom understand what he first saw as the apparent chaos of nature and the universe around him. Tom finally understood the relationship between computer code and nature’s code. Tom was quietly very pleased with himself for this new understanding and insight.

Tom was resting one day at home and sitting in his comfy chair. Tom had been an avid follower of the Hubble telescope, and its photographs were sometimes bizarre but always unique. He began following the Hubble satellite and, several years later, the James Webb satellite and their astonishing images. Many tidbits of information flowed through the dissemination of the pictures from both cameras, including the date of the Big Bang theory. Tom was startled by some of the knowledge he was learning. He had learned about light years earlier, but some of the distances that the images were from Hubble and, later, from James Webb were

incomprehensible to Tom. Tom had learned, in Grammar School, that the Universe was infinite, and he thought he knew what infinity was. But then he realized that the endless universe he knew and thought he understood was growing, and his mind became one colossal question. The question his mind became was how could infinity grow.

As if that wasn't enough, Tom had learned of Black Holes which existed in the Universe, which sucked anything that got too close to it into itself. First, Tom read of a great mathematician who calculated that once the energy of a thing was sucked into a Black Hole, that energy ceased to be. Later, however, another mathematician challenged that calculation and proved mathematically that energy could never cease to be. The two men worked together, and their subsequent findings were that the first man, a highly regarded mathematician, was indeed wrong. These were things that Tom heard, and while not understanding what he was listening to or reading, he still noted and remembered them.

More years passed, and more science and math came to be known and understood, and then one day, Tom listened to a mind-blowing discussion that seemed to attach fractals with the Universe. In the very learned forum, Tom heard that scientists believed that inside each Black Hole, infinity existed. Inside the infinity of each Black Hole, entire universes and galaxies existed, including even more Black Holes.

Tom checked and found that the number of Black Holes in the Universe is 40 quintillions, with some 100 million Black Holes existing in our galaxy. Some of those Black Holes are supermassive, and others are not. Again, Tom remembered watching fractals reproducing exponentially without any reason to stop. Tom remembered Newton's law of motion from grammar school, stating, "A body in motion tends to stay in motion."

Tom's mind began to ache from trying to understand what he could only partially understand. He began to try and slow down the incoming onslaught of information, and as he did so, he looked up the definition of infinity. He found this: "Infinity does not do anything; it just is. Infinity is not a real number; it is an idea. An idea of something without an end. Infinity cannot be measured." Reading that was consoling to Tom because he could then extrapolate that when scientists said that "...infinity was growing," they were now correcting what they initially believed: that our Universe was infinite. That belief was currently being updated to say that our Universe was only a tiny part of infinity. And just as fractals could reproduce forever, so could infinity.

As Tom sat, he was trying to understand better what he had learned, which was proving difficult. He kept having an idea that he hoped would satisfy him, and the idea was that he had always thought in terms of a singular universe. One universe that was, in fact, three dimensions, and it was infinite in all directions. Tom could grasp that concept, though his grip was slipping. Now, he was learning that not only was the universe infinite but also infinite on the inside and in every direction. Tom had never considered that. Now, he was left with the inconceivable thought that everywhere was infinite. Yet, how does the universe grow? Tom tried to tame his thinking back to a pine cone falling from a tree and landing in a spot where it could grow. That pine cone would then grow until it became a tree, eventually producing pine cones, and then they would fall, thus creating an endless cycle of growth.

Several years earlier, Tom had read of dark matter and energy. Tom understood that dark energy creates the space that allows the universe to expand. Dark matter is responsible for nurturing dark energy, giving rise to stars and everything we know about today. And gravity, which holds the galaxies and everything within them from flying apart, is another byproduct of Dark Matter.

According to Tom's memory, dark matter is the building block of everything. Dark energy and dark matter account for nearly ninety-five percent of the universe, leaving only five percent of the universe composed of ordinary matter, such as stars, planets, and people. To Tom's knowledge, neither dark energy nor dark matter has ever been proven to exist, yet something takes up nearly ninety-five percent of the infinite space in the universe. As a layperson dabbling in understanding the learned writings of scientists, Tom was merely trying to understand something he was sure he would never fully understand.

Tom's head was beginning to ache, and he decided to stop thinking about all of this for today.

With a new day now before him, he stands drinking his coffee. Perhaps he is still mentally tired from yesterday, or maybe he now understands that there is no understanding the what, how, when, and why of the Universe. For Tom, the questions he has been trying to find answers to seem to rival the questions people trying to understand God and religion come up against. The ultimate question always seems to be, can it be proved? But when delving into questions about God and the Universe, only some things can be proved, and even then, those answers are often updated. Do we take science as proof and decide to believe that, and do we take the Bible as proof and believe that?

Tom remembered that scientists constantly ask people to have faith in them, and, in almost verbatim sentences, religion asks the same of its people.

The End.

Written by Peter Skeels © December 27th, 2022