

## **A Parable on Space Flight**

There once was a school (of thought) on an island in the middle of Texas, where all of its students were taught to use a pencil in a most unusual way, at least from our point of view. The kids were neither especially gifted nor severely lacking in their intellectual capabilities and all of them had ready use of every part of their body. They had two legs, two arms, two thumbs, eight fingers, ten toes and their minds worked in the more-or-less average fashion.

But still there was something most unusual about this school because, as part of the curriculum, each of the students was required to pick up a pencil in the following way: the student must first push the pencil against a wall, table or some other vertically flat surface, and then using only his/her fingers he/she should then slide a finger (or fingers) underneath the pencil, guiding the pencil up the side of the vertically flat surface until the top of the object (such as a table) had been reached or, in the case of a wall, until the pencil had reached at least waistline, at which point the pencil would then roll back into the palm of the hand under the proper inclination and be grabbed in a fist.

You can imagine how tedious it must have been to make calculations in mathematics with such a method! But over time, the students developed techniques for dealing with this inefficient requirement of their school's curriculum. For example, if a calculation were written down inaccurately on a piece of paper and the student wanted to erase part of it, then instead of opening his/her fist and dropping the pencil on the floor, only to repeat the aforementioned process with the eraser in the proper position for erasing some errant pencil marks, a student would drop the pencil on the desk and turn it

180°; then he/she would scoot it with the fingers to the edge of the desk and catch it in the palm just as the pencil rolled off the table.

Even though there was great chance for error with such a technique – for example the pencil could roll off the table unevenly, causing it *not* to land directly in the palm of the receiving hand, and thus fall back to the floor – those that were skilled in this manner could perform the calculations they needed in their math and science classes. However, those that did not develop this technique received bad grades on their math and science assignments, either because they got so frustrated with the tedious process of erasing or because they performed the calculations correctly though they left crossed-out remnants of their work, making it look sloppy. But for the latter group, there was an even heavier penalty because if they had not scratched out all of their incorrect work, which heretically showed their thought process along the way of solving the problem, then they were given an even worse grade on the assignment. So those that did not bother with the tedium of erasing for cosmetic purposes had to completely blot out the existence of any incorrect deductions on a page that contained the ultimately correct one, or else they would fail their classes.

This is how things worked at the Janesen School Center (JSC) until one day it had been realized that some of the students were using this new device called a computer to make their calculations for their math and science assignments. A social hierarchy began developing among the students of this school: there were the pencil-pushers, who had held on to the old traditions of either doing manual acrobatics, or scratching out incorrect deductions, for the sake of making a calculation, and then there were the key-pushers, who were able to make their calculations by pushing the proper keys in proper sequence

on their computer keyboards. There were of course no cursors, guided by a mouse, on any of these computers because they were barred from the town for security purposes.

So as not to make it unfair to those that did not have or know how to operate a computer, the school administration decided that every child was to be given his own personal mobile computer, with which he could make the necessary calculations in lightning speed compared to the old days of tedious pencil-pushing. This however, did not end the divisions that had developed between the pencil-pushers and the key-pushers. Even though they were now using the same tools, the key-pushers would not share their techniques with the pencil-pushers, so that they could also do the calculations necessary for the math and science assignments.

Over time though, the pencil-pushers developed their own techniques for performing the necessary calculations to do their assignments. And these methods were very different from those of the pencil-pushers because, having been tied to pencil and paper for a longer period of time before the switch to the computer, the pencil-pushers were able to develop an abstract framework that still harkened back to their recent pencil-pushing roots so that they could first understand the problem and then go about calculating its answer.

The key-pushers though had very different techniques. Instead of having an abstract understanding of the problem before going to a computer to calculate it, the key-pushers had developed an *intuition* to perform their calculations; of course their key-pushing predecessors had passed this down through the years. Such a thought process of course did not affect their grades because incorrect intermediate deductions are immaterial, as long as the final answer is correct.

But since the pencil-pushers had switched to using computers relatively recently, they were in no more danger of exposing their incorrect intermediate deductions because these could be erased by simply pressing the 'delete' button on the computer keyboard at will – thus no more punishment for not fumbling with the cosmetic eraser.

One day, there was a contest at the school to see who could do a particular calculation the fastest. It was the fastest of the pencil-pushers against the fastest of the key-pushers and the younger brother of a student at the Kollege School Center (KSC) found the problem, which is on a neighboring island across a big body of water called the Fair Way. But no one at JSC knew how to do the problem, and from what they had heard from the kid who brought the problem, no one at KSC knew the answer either. The contest was to start during recess on the first Monday after the problem had been announced; it would only continue during recess, though the contestants were allowed to think about the problem, but not explicitly calculate its answer, during the intervening times.

The contest first lasted a day, and then two days, and then a whole week, and then another week, until finally before anyone had realized it, the school year had almost come to a close. And then something happened on the last weekend before school ended for the year. It was a truly noteworthy day and thus has the weekend been called 'Memorial Day Weekend' since then.

The Memorial Event in fact was an earthquake that shook the foundation of the islands in the Fair Way to their very cores. One of the consequences of this event was a land bridge that was revealed between the island on which JSC resided and a vast expanse of land, which had never been imagined by anyone on that little island in Texas.

And not too much time passed before a little kid crossed that land bridge one day and came to the schoolyard of the JSC where the calculation contest had now entered its second year.

As usual, there were many kids gathered around each of the elected representatives of the pencil-pushers and the key-pushers as they thought or expounded with their colleagues about how they might answer the seemingly impossible problem before them. So this curious little kid, who had crossed the land bridge, noticed a crowd in the schoolyard, and his curiosity took him even further to see exactly what was at the focus of this crowd's attention.

He was almost disappointed to the point of hysterical laughter though when he noticed that the focus of the crowd was on two kids solving a problem he had done in kindergarten. Even more hysterical was the fact that one of the kids was only using a computer to perform the calculation, while the other would go back and forth between using his own computer and using a pencil that he would grip in the most laboriously stupid process the little kid had yet witnessed – but he was young, so much more stupidity had yet to be witnessed.

Nevertheless, while controlling his urges to break out laughing, the little kid realized that the girl who was using the pencil and the computer seemed a lot more close to the answer than the boy who was using only his own computer. Whereas the boy and his colleagues would discuss other problems that had nearly nothing to do with the one before the two contestants (though they shared some words in common), the girl and her colleagues had found a principled way to look at the problem, by which the little kid was sure that they would eventually arrive at the correct answer.

But the little kid did not want to spoil the apparent excitement of the contest for everyone, so he kept his peace and decided that he would return the next day for some more laughs to himself and to see how things progressed – it was all very intriguing for him, after all. So the next day, the boy watched the contest during recess, and came every day for the rest of that week. Each time he watched the ‘contest’ he thought it more and more amusing, until one day it occurred to him what was meant by the expression, ‘like a one-legged man in an ass-kicking contest’ – and he laughed again, to himself of course.

Weeks and even months had gone by and the little kid amused himself by watching the ‘one-legged ass-kicking contest’, until one day the winds changed dramatically and the girl’s pencil went gone with the wind to a spot right in front of the little kid’s foot. Being a courteous person, the little kid picked up the pencil in the usual way (to any one of us, i.e. by clutching it between the fingers and the thumb) and gave it to the girl, who at this point was standing next to a table, which was the closest large object to the little kid. She wasn’t looking at the little kid when he picked up the pencil, so she was shocked to hear the sound of him putting down the pencil on the desk while she was still looking in the opposite direction, waiting for him to push the pencil to the table and then, if he were especially chivalrous, finally up the table for her to use again.

But they who had just witnessed that little boy’s actions could not believe what they had just seen. How was it possible to be able to use the pencil so readily? How could that little kid bypass the need to *push* the pencil in that all-too-familiar and laborious fashion? How did he lift it so fast?

Having placed the pencil on a piece of paper used by the girl, the little kid noticed something on the piece of paper and *picked up the pencil again between his fingers and*

*his thumb*. No one could believe it! And then to compound the stupefaction that set in on the awestruck kids in the schoolyard, the little kid rotated the pencil between his fingers and thumb only to have the eraser firmly in his control for the purpose of erasing – and erase he did! For he noticed the error in the girl’s deductions that was causing her not to reach the final answer, and so he pointed it out to her telling her that there was a slight error in her calculations, though she was on the right track and should continue (for he really was about to burst out with the final answer, and how to get it at this point!).

Within a week, victory went to the pencil-pushers. Even though they received a similar amount of time’s worth of insight from the little kid, the key-pushers were not able to figure out the final answer because their intuition had failed them and their errors were untraceable for the pencil-grabbing *wunderkind* to identify, since the key-pushers relied on inherited legacy rather than critical thought.

And, as time went on, though shocked at first, the pencil-pushers began to adapt and become pencil-grabbers, as that little kid had showed them on that day when the winds had changed so suddenly. Over time, the pencil-pushers spent more and more time going to visit that expansive land that existed across the land bridge, while the key-pushers remained at JSC continuing to do their math and science assignments as they and their predecessors had done for years. Even though their island had become a peninsula since the great earthquake, the key-pushers remained in their familiar part of it, so that they still believed the Fair Way separated them from the other islands, it also did for KSC.

And as these winds continued to blow in the fashion they had since that pencil flew off the table onto the ground in front of that little kid, the weather changed so

drastically one day that the land that surrounded the body of water known as the Fair Way had been covered by the rising water on the other side that had come from the greater body of water known as the Right Way. When the waters of the Right Way flowed into the waters of the Fair Way, the greater body of water came to be called the Only Way.

Furthermore, the change of winds and ensuing shifts of large bodies of water caused all of the schools of the islands to be washed away. Luckily for all of the island students, it was during a school trip to see the strange pencil-grabbers who had been revealed to them on that windy day by that little kid.