Adam Gincel

Professor Engling

CS 334

27 November 2015

Accepting Unfamiliar Information -

How Drawing Circles Helped us Create Modern Computer Science

Both *Flatland: A Romance of many Dimensions* and *Sphereland: A Fantasy About Curved Spaces and an Expanding Universe* deal with individuals making discoveries that go against the grain of their societies. They learn about subjects which get them cast away from their prevailing academic communities for their absurdity, though their ideas are later proven to be correct. *Flatland* ends with its main character, A. Square, imprisoned for his blasphemous views, and *Sphereland* ends with A. Square’s grandson releasing a rejected book and living out the rest of his days in mediocrity. This sort of thing happens all of the time in real life. Scientists are rejected for having ideas or creating theories that go against existing, accepted science. In other cases, scientists and mathematicians may have accepted ideas, but be rejected for other reasons. This is the unfortunate case of Alan Turing, the father of modern computer science and an accomplished mathematician. While his work was greatly appreciated and acknowledged by the scientific community, he was persecuted for homosexuality and eventually committed suicide by poisoning himself. While he was alive, his ideas and research lead to the creation of modern computer science, particularly with regards to algorithms and artificial intelligence. Some of his most groundbreaking work was most likely met with skepticism, just as A. Square’s radical ideas were also met with skepticism and doubt. Automata Theory, the study of abstract machines and automata created in the early-to-mid 20th century and used as the basis for modern computing, was groundbreaking and revolutionary for its time. From Deterministic Finite Automata to the Turing machine, scientists like Warren McCulloch, Walter Pitts, and Turing himself created a brand new branch of science: Computer Science. Unlike the circles of *Flatland,* which used their positions of power to suppress revolutionary information, the circles we draw when demonstrating the state diagrams of DFAs, NFAs, PDAs, or Turing machines are used to further our understanding of new science.

*Flatland* explores the topics of racism, classism, censorship, and fear of the unknown, making it a fantastic story to talk about from all kinds of different angles. A history class could use the story to make easy comparisons to old European class hierarchies, where Priests were on top. Math classes can use it to discuss the geometry it uses throughout. Its connection to computer science is much less apparent, and I would argue the only reason it can even be considered relevant to computer science is because of its focus on logical thinking, and the idea that the answers are out there, waiting for someone to discover them. These ideas are what the founders of automata theory and computer science were relying on when doing the groundbreaking work they did. Had Turing and the scientists before him been suppressed like A. Square and the people of Flatland, the modern world may never have developed to the state it is in today.

Despite being about shapes and math, both *Flatland* and *Sphereland* are both really books about humanity. The shapes that live in the worlds of Flatland, in addition to the beings that exist in other dimensions, all have very human flaws, tendencies, and dreams. The books are examples of the marriage between humanity and science, and exemplify that while sometimes human problems can get in the way of scientific progress, they can also be the primary motivator for learning more about the world around us. From Greek philosophers to computer scientists of the 21st century, people have been motivated throughout history to learn more about the universe, taking the problem on from moral, ethical, and logical angles. Computer scientists continue this proud trend, performing some of the most impressive feats of engineering yet seen by the world in an incredibly small amount of time, relatively speaking.

Through virtue of having explored these worlds by reading these books, this assignment has already managed to bring humanity back to this class in a unique way. In addition, this assignment has been the most memorable essay I have had to write in a while, simply because of its requirements. As a computer scientist, I find it necessary to push limits when they are given to me, to see at what point a test subject will break. For this reason I have, scandalously, elected to use a font size of 12.5 (pt. 12 +/-), as well as line spacing of 2.56 (not triple+). Not only have these changes made this essay much less straining on the eyes and a lighter read, but they have also given me the option to push boundaries I had never considered pushing. This is analogous to my time in both CS135 and CS334, where the unique and interesting logical problems I was presented with always stood out in my mind from some of the other, more inane tasks I have had to do before. These memories will stay with me and continue to motivate me as I continue through college, and I would argue that you have introduced more humanity into my academic career than some of my actual humanities classes. Thank you, Professor Engling.

PS: In the end, though, I have to say that, above all else, this essay has prepared me to be quite good at yoga – my initial proposal that *Flatland* and *Sphereland* are both intrinsically related to this class because they all involve drawing circles is *quite a stretch* if I do say so myself.