(4000 -> 5402)

I love the game of chess. The rules are quite basic, yet they give rise to endless possibilities for outcomes after each move. Furthermore, because there is no chance involved, you are the master of your own fate. Math and computer science have these same properties. Both of these subjects have a framework in which logic is key, and once one learns it they are capable of anything, such as proving (or disproving) an influential theorem or building an app to fulfill someone’s needs. Another draw for me that results from the logical nature of both math and computer science is their intrinsic beauty. I love when I can make use of two seemingly-unrelated concepts to complete a proof in math or when I find an elegant way to optimize an algorithm in computer science.

My interest in math was first piqued in freshman-year geometry class, in which I was first introduced to the concepts of proofs and derivations. This kind of thinking gave me a deeper understanding of the mathematical concepts, and I loved it. One great result of the changed focus of this geometry class was its lack of a real textbook. Instead of reading nightly from a textbook, my homework consisted of deriving and proving all theorems that we would use. Being able to derive complex ideas towards the end of the course based on all of my previous work was immensely rewarding.

At this point, the field of math in which I am most interested is number theory. I am still relatively new to it; I first studied it last summer when I took a course on introductory number theory at Harvard. I was astounded at how the hardest problems could be understood by a middle schooler, yet their solutions could evade me for hours. The aspect of number theory that to me places it above the rest of math is how it examines the most basic elements of math (such as integers and primes) that constitute the rest of it. As a result, I am excited when I learn something in number theory because I know that I will be able to apply it in an enormous set of scenarios.

In contrast with math, computer science is a subject in which I have been highly motivated for a long time. Towards the end of elementary school, I started to learn more about the mechanics of computers because I loved building things. In 6th grade, I decided to learn how to program. I learned mainly through introductory books (such as *Game Programming with C++*) and the internet because there were no available classes at my school in computer science. I expanded my abilities mainly through small projects such as simple games.

Finally, I became interested in algorithms and more complex ideas in computing in high school. In the summer of freshman year, I interned at Rice University’s robotics labs, where I wrote facial recognition software for the Microsoft Kinect. This project was invaluable to my development. I learned how to read documentation and figure out how to use new libraries (which I later learned was essential for any complex project) and, more importantly, became interested in machine learning. Later on, I took another course at Harvard in data science, in which I learned the principles of machine learning. One of my secondary interests is economics (a field which conveniently generates a lot of data), so for my final project I used logistic regressions to predict GDP growth based on a variety of economic factors. This project was important because I learned how to scrape data, an essential skill in data science. At the end of my junior year, I had the opportunity to do a final project for AP Computer Science, so I naturally chose to do something with machine learning. I wanted to produce something with real world applications, so I built a neural network to detect linguistic differences in fake and real news articles in the hopes of being able to predict whether a news article was fake or real. My project was more successful than I imagined, averaging around 75% accuracy. Because of the success of the project, I was recently recruited to join a Silicon-Valley startup working on the same issue. I am hopeful that my work will finally produce a widespread positive impact.

Currently, I am debugging an app that I wrote for my school with some friends for keeping logs of community service hours. Although the code is not complicated, it has been somewhat challenging working with others (especially if they’re teenagers that at times would rather be hanging out or playing Xbox), and I have learned to stick to schedules and work around others’ commitments. I am excited about the project because it will hopefully increase community service participation.

Although all of these endeavors take up a lot of time, I enjoy them. I have found that participating in school drama productions is a great way to relieve stress because I get to pretend to be someone else entirely. Choir is also quite soothing because I concentrate solely on the music.

I plan to take up some job involving computer science (hopefully with machine learning and data science). However, I wish to pursue a joint math and computer science major because of my great intellectual interest in math as well as the fact that studying math has in the past allowed me to be a better programmer through enabling a greater understanding of complicated algorithms. I look forward to pursuing these two interests in university and beyond!

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