Why I have chosen a Career in the Computer Science Field

Evolution: I did something like this for my Sophomore Speakout, a speech written for the class. It didn't go too well. But I'll try it again, with these two scholarship essays. I need to finish both by Monday, which means a good, working draft should be finished by tonight. Godspeed!

Draft 1: History (time: lots of procrastination, but mostly in two hours)

Hello, World!

It all began with two books, just after I had fell out of my car craze. I don't remember the books' titles. I just know that they were less than five dollars, over a decade old, and probably at least 500 pages each. One was about HTML and the other about Java.

As a twelve year-old, this was all very foreign and exciting to me. Java sounded like a more friendly name, but I didn't understand any of the language. So I looked at the HTML one, which seemed more legible. My dad showed me how to use the language on my Windows Vista laptop by typing it into Notepad and running it in Google Chrome. It was fascinating and very quick. I stuck with HTML in 2013 for the last year before HTML5 became the working standard. Around that time, I lightly fiddled around with Java and C++, with the intention of making working applets for my websites, but I never figured out how to use applets until much later, when applets were actually disabled as a potential security hole, in favor of JavaScript.

I made quite a few websites. I remember the earliest ones mostly played around with fonts and colors, and were especially messy because I didn't know about CSS or JavaScript at the time. (Once I had used a few hundred spaces to try to center text, before learning that this did not work on differently-sized monitors and that there was the HTML `align` attribute; only a few months later did I realize that the align attribute was deprecated in favor of CSS's text-align property.) But perhaps the first presentable application was that for my PLTW (Project Lead the Way) class, as a final presentation in eighth grade, when I made a website [1]. While I probably bored the class with my technical description of the site's workings, it was the first time I had ever made something that felt presentable enough to show to people outside other than my siblings. And the most amazing part was that I had complete control: it was all made from scratch.

While there was somewhat of a hiatus in my programming during my freshman year of high school to keep up with the daily demands of school and sports, I resumed again in the summer. My mom persuaded me to take the Fundamentals of C programming course at Columbia University's Program for High School Students, which has been my only formal programming class. The course, along with my current AP Computer Science Principles class, have taught me most of what I know about how computers work, fundamentally and at the memory level.

In sophomore year, I worked with some of our school's robotic's team programmers to create the Programming Club at our school. While it only lasted that year due to scheduling issues, it was the first time I worked together with my peers on programming, and, following the example of my peers, made JavaScript the language of choice for my studies.

After sophomore year, my programming experience has roughly been broken up into two, distinct categories: large web projects, either personal or by commission; and competitions. My friend and I created a website called RingTune [2] at our first hackathon, LIHacks 2016, winning the Most Entrepreneurial Award. At the MoMath Hackathon in 2017, I went with two friends and created five educational math projects, all of which won prizes. And at StuyHacks 2017, I teamed up with two students from NYC to create the Fruit Sensei game [4] that won Best Game. Most recently, I've spent time preparing for the Lockheed Martin Code Quest in April, practicing logical problems with five of my friends.

The second category includes websites. Lots and lots of them. A major project the summer of 2015 was a website proposal for our local bowling center [5]. While the bowling center did not respond to my website proposal, it did prompt them to redo their decade-old website. More recently, I've worked on a web-app for our local Safe Rides program [6]. And I've created a personal website [7] and blog [8], the latter of which may be my most advanced project to date.

[1]: http://programath.co.nf
[2]: http://jonathanlam.tech/ringtune-website
[3]: https://github.com/Poobaloofa/howitfeelstochew5gum
[4]: http://fruitsensei.tech
[5]: http://jonathanlam.tech/nutmegbowl
[6]: https://www.saferideser9.org
[7]: http://jonathanlam.tech
[8]: http://eis.jonathanlam.tech

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Draft 2: More history, more storytelling (time:)

My computer science career has been more of a journey than anything else. I've only taken one programming class and one computer science class, but the heart of my experience lies in the experiments, the *science* of computer science. I thought it would be most appropriate to relate the experience in stories of specific applications I've written.

I remember the first time I showed off a program I had written to others. It was my final project in PLTW class in eighth grade. I had written a basic calculator, equation grapher, and literal equation solver, and I discussed in layman's terms the code behind it. HTML, CSS, JavaScript. While I might have bored my classmates, it was perhaps the first time I realized my programming had the potential to presentably solve real-world problems.

I remember having some free time in my programming class and attempting to solve some questions from Project Euler. I was stuck on the tenth problem, which asked for the sum of the primes under two million. My algorithm made sense to me. Frustrated, I left the program running for four hours, after which it provided me the correct answer. I looked at the solutions in the forum and discovered that my trial division algorithm was in fact very inefficient. I updated my algorithm and was rewarded with the correct answer within a few seconds. Then, for fun, I condensed it into a cryptic 100 characters of JavaScript: `for(j=2,s=0;j<2e6;s+=(()=>{for(i=2;i*i<=j;)if(!(j%i++))return 0;return 1})()?j:0,j++);console.log(s)`. Since then, I've had a lot more fun with Project Euler and a similar site, Code Wars.

I remember beginning to write my first blog. I had become very frustrated in my English class because I could not keep up in class discussions. My teacher told me to practice, and I decided I needed a platform. I thought it would be a fun idea to use blog posts because it seemed an easy way to order my work chronologically and share my writing for feedback. Now I'm almost 200 blog posts in after two years, and my language is forever changed for the better.

I remember our bowling center's old website. The basic format had not been updated since 1999. Everyone agreed it was hideous. I wrote a website that I believe was much more presentable and shared the link with the contact email on the old website. Interestingly, they did not respond to my email, but replaced their website that same summer. I don't know if I prompted the change, or if it was a coincidence that they decided to update their website the same year.

I remember going to my first hackathon in Long Island with one of my friends. We teamed up with two Long Islanders to create a website called RingTune that generated melodic tunes using simple machine learning with Markov chains, winning the Most Entrepreneurial Award and drones. And I remember the second hackathon, this time with two of my friends, when we worked on five educational, mathematical displays at the Museum of Mathematics and won prizes in all three categories. And I remember the most recent hackathon at StuyHacks, in which I paired up with New Yorkers to create the Best Game, Fruit Sensei. The latter was especially interesting in that we harnessed the processing and sensor capabilities of an average smartphone as a sensitive controller, which could be a cheap replacement to expensive training equipment.

I remember that on the night of junior prom, I was at home. Programming. And now I jest that I had much more excitement creating my Agar.io videogame imitation than my classmates awkwardly dancing at prom. I also didn't have $150 nor a date, so this made programming even more appealing. My classmates all enjoyed the videogame.

I remember a weekend when I had a high fever, it was rainy, and I had only some math homework to complete. Perfect conditions for programming. My friend had interested me in the art of fractals, so I decided to make some of my own. I went Wikipedia-surfing and discovered the formulas for the Mendelbrot and Julia Sets, as well as a very interesting method of drawing the Koch snowflake using the Thue-Morse Series, a series of boolean values. As expected, many of them were exceedingly fascinating.

I remember being messaged by our class president just after summer break began about an opportunity to help out the class council's new Safe Rides program. I was ecstatic, and worked furiously over the summer to write a program that would keep track of the weekly volunteers, organize a system for easily requesting safe rides and volunteering to fulfill them, and log all of the timestamps of locations to keep people safe. While the Safe Rides program is not yet fully functional and the web-app is still in beta, I'm still very excited about the potential the app has to save lives.

And now, I'm training with some of my classmates for the Lockheed Martin Code Quest. Unlike a regular hackathon, the Code Quest only involves solving math problems in a short time, with only one shared computer per team.

[CONCLUSION]

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Hello, World!
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My journey into the world of computer science all began with two books, just after I fell out of my obsession with cars. I only remember that one was about HTML and the other was about Java, and that I was hooked instantly. Here are some other highlights of that journey.

I remember the first time I presented a program of mine in PLTW class. I wrote a website with a simple calculator, equation grapher, and equation solver, and I discussed the logic behind it. While I might have bored my classmates, it was the first time I realized my programming had the potential to solve real-world problems.

I remember attempting to solve Project Euler questions in my free time. I was stuck on the tenth problem, which asked for the sum of the primes under two million. Frustrated with my slow algorithm, I left the program running for four hours to produce the (correct) result. I looked at the solutions in the forum and discovered multiple inefficient steps in my algorithm. I updated it and was rewarded with the correct answer within a few seconds. Then, for fun, I condensed it into a cryptic 100 characters of JavaScript, even shorter than its 102-character question:

```
for(j=2,s=0;j<2e6;s+=(()=>{for(i=2;i*i<=j;)if(!(j%i++))return 0;return 1})()?j:0,j++);console.log(s)
```

I remember beginning to write my first blog. I became frustrated in my English class because I could not quickly synthesize arguments in class discussions. My teacher told me to practice, and I thought a blog would be an appropriate way to organize writing chronologically and to share my writing for feedback. Now, two years and almost 200 blog posts later, my language is forever changed for the better.

I remember looking at our bowling center's 1999-styled website in 2015. Everyone agreed it was outdated. I wrote a more modern version, and shared the link with the alley's webmaster. They did not respond to my email, but replaced their website that same summer. I don't know if I prompted the change, or if it was a coincidence that they decided to update their website the same year.

I remember going with a friend to LIHacks and creating RingTune, which generated melodic tunes using Markov chains, winning the Most Entrepreneurial Award. I remember working on educational, mathematical displays at the MoMath hackathon. And I remember creating the Best Game of StuyHacks, Fruit Sensei. We harnessed the capabilities of an average smartphone as a cheap replacement to expensive gaming or training equipment.

I remember programming on the night of junior prom. Now I jest that I had a cheaper, more engaging experience creating my Agar.io videogame imitation than my classmates had awkwardly dancing at prom. My classmates all enjoyed the game.

I remember having a high fever on a rainy weekend. My friend had interested me in the art of fractals, so I decided to make some. I went Wikipedia-surfing and discovered the Mendelbrot and Julia Set formulas, as well as the Thue-Morse Series for generating the Koch curve. The fractals were exceedingly mesmerizing.

I remember being asked by our class president to write an app for the new Safe Rides service. I was ecstatic, and worked over the summer to write a program that would keep track of volunteers, create a system to request and fulfill rides, and log the timestamps. While the service is still not fully functional and my web-app is still in beta, I'm extremely excited about the potential the app has to save lives.

Since I was little, I've wondered how people built *things*— cars, architecture, software. I wondered how people moved on from whimsical, school-level projects to the level of professionalism required for the real world. But from this journey, I realize that I too can pragmatically solve the problems and needs of myself and the community around me with software. I've made applications to generate music, to convenience Safe Rides, to help my own writing. And with the future of advanced machine learning and computing power, I want to be a part of the technology solutions that come next.

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Word Count: 699 words (excluding headers, title, and word count text)