**COMPUTER ENGINEERING IS FOR ME**

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**INTRODUCTION: I AM VERY INDECISIVE**

Throughout high school and into college, I have been coerced into numerous activities in which I have been asked to state where I see myself in five, ten, or twenty years and develop a plan to become that person. It is immensely difficult for me, as a first-year college student, to predict even the simplest characteristics of my ideal future, let alone determine how to get to that point. At this time in my life, I have a set of general goals based on my current interests, namely math and philosophy. However, while I do not believe these overarching goals will change, I must acknowledge the possibility that they will. I think that I want to live on the West Coast of the United States, but I may find myself pulled to a completely different area of the world due to factors I may not even know exist yet. I cannot expect to have a clear path laid out for the rest of my life when my brain has not even finished developing [1]. The most effective approach to deciding what type of engineering I will pursue has been to find the area that does not force me to commit prematurely to a highly specific area of study or career. Using information collected from much research, as well as sources at the 2017 First Year Career Conference, I have arrived at the conclusion that computer engineering is indisputably the best fit for me. Computer engineering incorporates my current interests of math and philosophy while offering a considerable number of paths I can follow after graduation, in terms of specialization of skills, specific line of work, and geographic area for doing so.

**IF YOU DIDN’T THINK I WAS A NERD BEFORE…**

My favorite subject in school is, and always has been, math. I have been quoted as saying that my TI-84 graphing calculator is the only thing I can trust in this world. And I am only somewhat ashamed to say that, as I write this, I am awaiting the arrival of a book on mathematical proof techniques, which I ordered to further develop my understanding of conceptually-based math. Math appeals to me because it is its own universe, separate from the rest of the world and containing its own set of laws. If there is no tool to accurately model a problem, mathematicians can simply create a new concept through sheer will, provided no paradoxes result from doing so. My interest at this point should be observed with a degree of skepticism, as the most advanced math I have had formal instruction in is Calculus III. But amidst discussions of modeling and manipulating three-dimensional surfaces, I have been exposed to the language and techniques used in higher mathematics, and have enjoyed every second of it. I will take courses in applied math regardless of my engineering major, but I am especially interested in the more theoretical side of mathematics. I want to work towards a career in which I apply advanced theoretical concepts of mathematics to try to solve meaningful real-world problems, such as the P versus NP problem [2]. Many branches of math are heavily applied in computer science and engineering, including discrete math, probability theory, and linear algebra [3]. Given this symbiotic relationship between mathematics and computer science, it follows that a degree in computer engineering will give me the most opportunities to incorporate advanced, theoretical math in a job setting on a daily basis.

In contrast to my long-standing interest in mathematics, my interest in philosophy has bloomed only recently. It was through sheer luck that I stumbled upon an online dual-enrollment course in philosophy offered through the University of New Orleans during the summer of 2016 [4]. At the time, I was challenging myself to explore areas of study outside of math and the hard sciences, as I had little experience in the humanities and social sciences aside from economics and history. I enrolled in the course and was at once met with a level of rigor equivalent to any physics or chemistry class I have ever taken. My class of fifteen was assigned weekly readings from renowned philosophers ranging from Plato to Jean-Paul Sartre to Peter Singer. We interpreted the readings and analyzed their legitimacy in a weekly Skype conference. By the end of the course, I felt much more capable of using critical thinking to deconstruct problems in which there are no obvious solutions. This has proven to be especially useful in resolving issues among my five suitemates at Pitt, which unsurprisingly pertain to the state of our shared bathroom a majority of the time.

Though computer engineering and philosophy are on opposite ends of the spectrum of areas of study, the development of artificial intelligence has served as a platform for the two fields to interact. There are many relevant questions to be debated as artificial intelligence is brought to the forefront of our everyday lives. The promising future of the field tests the limits of ethics to the point where it can no longer be regarded as pure theory. As the capabilities of modern computation approach that of the human mind, computer scientists and engineers will be forced to answer questions regarding how exactly to distinguish one from the other, as well as the potential danger of overdeveloping artificial intelligence, as outlined repeatedly by Elon Musk of Tesla [5]**.** Though many engineers at Pitt are required to take an ethics course, a strong supplement in moral philosophy would be especially useful in equipping any computer engineer with the critical thinking skills necessary to analyze these difficult issues [6]. That areas of computer engineering can extend to encompass unrelated subjects, such as philosophy, speaks to its flexibility in line of work, therefore granting me many possible career paths to pursue after graduation.

**MY EXPERIENCE WITH COMPUTER ENGINEERING (IF YOU WANT TO CALL IT THAT)**

I was involved in many science and technology extracurricular activities in high school ranging from designing a device to assist visually-impaired Pennsylvanians, to learning about the physics of timekeeping for a lengthy exam. But no extracurricular represented engineering as well as the Animatronics project in my school’s chapter of Technology Student Association (TSA)**.** For the project, teams create a functional animatronic capable of multiple degrees of motion that is intended to serve as a crude teaching tool for a concept determined by each team [7]. I joined the project with three of my close friends during our sophomore year. We had little experience with the programming necessary to make a project of this scale work, and only one of us had any experience with the circuitry and electrical components necessary for each function. We essentially assembled a mess of copper, taped on some Arduino microcontrollers, and labeled it an animatronic penny. The project was a learning process, and many hours were spent fervently debugging issues that should have been simple fixes. Our final project was underwhelming — the grace with which it walked was analogous to a fish flopping on land — but the experience of combining software with hardware to create a (kind of) functional animatronic proved valuable for my interests in engineering. It was subtly done, but the project was an exercise in computer engineering. The real test was not the aesthetics of the animatronic, or the complexity of its functions, but the fluidity of interactions between hardware and software.

As rudimentary as it was, the integration of hardware components with software to create the animatronic captivated me. I was interested in both areas, spending as much time learning the basics of circuits and electrical interaction as I did programming on the Arduino platform. I considered careers in electrical engineering and computer science, but committing to either major felt unsatisfying because I would lack the opportunities to work on projects similar to the animatronic. As I reflect on my experiences with the animatronics project, the viability of computer engineering as a career path becomes exceedingly evident. Pursuing computer engineering allows me to explore both subjects, with the ultimate goal being to conceptually integrate both into one tool for problem-solving.

**THE LIFE OF A COMPUTER ENGINEER**

Though I have been interested in pursuing computer engineering for some time, I lacked knowledge about the actual nature of a career in the field beyond a surface-level Google search. The information provided by Chris Butor at the First Year Career Conference was invaluable in persuading me to commit to computer engineering as a major. Though Mr. Butor majored in computer engineering at Pitt, his current position at the simulation company ANSYS is as a software developer [8]. This does not seem typical of a computer engineer, whose job descriptions usually revolve more around hardware [9]. Mr. Butor attributed his working in software to the software elective classes that he took at Pitt, as well as to his rotations with ANSYS through Pitt’s co-op program [8]. His personalized path to a career in software development and analysis further demonstrates the manner in which the program is catered to the specific interests of the individual. From his perspective, a degree in computer engineering is highly versatile in an applied setting. He believes that majoring in computer engineering, as opposed to computer science, has made him “a more informed software developer, because [he] has an understanding of the hardware that the software is running on” [8]. In jobs classified as electrical engineering, the converse is true.

Mr. Butor’s remarks prompted me to do research of my own on computer engineering, to establish general characteristics of the field. Regarding salary, I subscribe to the findings of a study conducted by economists at Princeton University: that an annual income of $75,000 is the value at which well-being due to finances is at a maximum. [10]. I did not enter the Swanson School of Engineering because of the high salary prospects for engineers. However, a goal for my future career is to earn at this amount to compensate for costs of living, because I know that I want to have the experience of living and working in a city. The median salary for computer engineering well exceeds this figure, at over $115,000, meaning expected income will not be a deciding factor between subdisciplines within the field [9]. I will be a competitive applicant for jobs at this salary level immediately upon graduation, as companies typically only require a bachelor’s degree in computer engineering for employment [9]. A strong global market for professionals in computing and information sciences means there are no limits to the locations in which I can work as a computer engineer; in the United States, the ten states with the most jobs in computer engineering are dispersed throughout the country [12]. I want to reach a position that has a high degree of job security, for obvious reasons. While demand for computer engineers is expected to grow more slowly than other engineering disciplines, at just a 3% increase by 2024, jobs in computer engineering are projected to be inelastic because they are resistant to outsourcing [9]. Through my research, I have found considerable evidence to confirm the information that Mr. Butor communicated; even if I was not interested in the field, the salary prospects, geographically diverse demand, and job security of computer engineering would make it a practical career choice.

**CONCLUSION**

I have always had trouble making decisions without perfect information about the situation. When I was deciding on the universities to which I would apply for admission, I could not reconcile the low acceptance rates at many schools with my profile as an applicant. It was a very difficult situation to assess; my credentials fit the profile of accepted students at these universities, but I could not be certain that the respective admissions committees would agree. I spent an unfathomable amount of time trying to create a suite of universities that would maximize chances for admissions. This time could have been spent in much more productive ways, such as applying for scholarships.

I have no such hesitation when it comes to deciding the field of engineering I will enter. While I still am not entirely sure of where I want my career in engineering to lead, the breadth of options in computer engineering ensures that I will not have to figure that out at this moment; this is evident in computer engineering’s shared applications with other disciplines, such as theoretical mathematics and philosophy. The demand for computer engineers is such that when I enter the job market, it will be under favorable circumstances in terms of salary, security, and regional options. I plan to declare to enter the computer engineering program at Pitt at the end of this school year. From that point, I will become involved with Pitt’s engineering co-op program to get real-world experience in the field of computer engineering while I am still in school. When I do graduate, I will possess the qualifications necessary to have the entire field of computer engineering open for me to explore. From there, I will finally be able to figure out what exactly it is that I want to do with my life.

**SOURCES**

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