Dear Mom,

No one actually knows what "computer science" means except to say that the people with computer science skills can probably fix your technology issues. What it actually refers to is a field of study involving information processing through computers (*ISO/IEC 2382:2015, Information technology – Vocabulary)*. Computer science is a helpful branch of science because it utilizes technology to processing things more efficiently. Therefore, most other scientific fields can benefit from having an understanding of computer science.

Even within the field of computer science, it's hard to tell the difference between specific areas of study. For example, software engineering and information technology deal with very similar process. Software engineering is interesting in applying computer science processes to create software. However, software development is more than just designing it, but also testing that the software operates optimally, implementing, and then maintaining it *(ISO/IEC 2382:2015, Information technology -- Vocabulary) (ISO/IEC/IEEE 24748-5 Systems and software engineering--Life cycle management--Part 5: Software development planning, 3.16).* Information technology is similar in that it deals with technology that gets information, processes, stores, and distributes it. In general, information technology has a bigger scope, so it deals with the resources and technology and how they interact, more than a singular process or piece of software. *(ISO/IEC 19770-1:2017 Information technology -- IT asset management -- Part 1: IT asset management systems--Requirements, 3.24).*

Within computer science, there are many different fields, but the three I find most interesting are artificial intelligence, networking, and cryptography. Artificial intelligence concerns developing systems that mimic human intelligence, like learning. Although I do not understand how the leap from basic algorithms to artificial intelligence is made, it is through the application of computer science and machine learning. AI technology is based on computer science and taking a series of inputs to react with human-like reasoning.

Networking is the interaction of systems and devices. This field deals with making connections and disseminating data effectively, and it relies on the basics of computer science to understand how a piece of technology functions individually to how it can be connected to other devices and how that can change or adapt its functionality. (http://aihorizon.com/essays/basiccs/general/cs_areas.html) I have actually looked at some graph theory problems in mathematics that are related to creating a network and optimizing the flow of data.

Cryptography is the most fascinating field of computer science to me, probably because it utilizes more theory and mathematics than some other branches. At its base, cryptography is the study of methods for securing information, data, and networks. Information security is the more broad topic where computer science is heavily involved: understanding how computer networks and database systems operate is important in analyzing weaknesses or insecure points.

Personally, I find cryptography the most interesting specialized application of computer science because it more heavily involves mathematics and logical analysis. I am studying mathematics because it is challenging, difficult, and highly analytic. Solving problems and puzzles has always

been satisfying to me, but creating problems and methods to solve them is not only enjoyable, but highly applicable to many areas of life. The applications that I have found span from finances to art to computer science. Cryptography is an application of mathematics in a challenging field to increase computer and system security.

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