

Assignment #1

What is Computer Science, and why do you want to major in it (along with vocabulary & binary)?

Part 1: (Answers are from the Textbook)

What is computer science?

Computer science is fundamentally about computational problem solving.

What is an operating system?

An operating system is software that has the job of managing the hardware resources of a given computer and providing a particular user interface.

What is Moore's Law?

Moore's Law states that the number of transistors that can be placed on a single silicon chip doubles roughly every two years.

What is an algorithm?

An algorithm is a finite number of clearly described, unambiguous "doable" steps that can be systematically followed to produce a desired result for given input in a finite amount of time.

Name and describe the steps involved in computational problem solving?

In order to solve a problem computationally, two things are needed: a representation that captures all the relevant aspects of the problem, and an algorithm that solves the problem by use of the representation.

Describe semantics versus syntax.

The syntax of a language is a set of characters and the acceptable sequences of those characters. The semantics of a language is the meaning associated with each syntactically correct sequence of characters.

Part 2:

When determining in what I wanted to do for my future career, I decided that I wanted to become an engineer. After researching countless types of engineering careers by using the internet as my resource, I found myself being more interested towards the concept of being a software engineer. Then when it came down to choosing colleges during my senior year in high school, I only applied to certain colleges and universities that offered computer science and software engineering majors. As the May 1st deadline came near, I decided on Oregon State University that offers a major in computer science. In hopes of becoming some type of software engineer when I graduate college, I believe majoring in computer science at Oregon State University is my first step into getting there. But I am also open to other opportunities there are

in society than just being a software engineer- being more aware of the other options that I can do with a future computer science based degree. The concepts of computer science and software engineering is what I am interested in, and is what I want to do for my future career. I am here at Oregon State University to learn more about the subject matter and receive further help with what I want to do as I graduate from college.

The main reason I decided to focus my studies in software engineering with majoring in computer science at Oregon State University, is because of my keen skills in mathematics, problem solving, and creativity, along with an interest in computers in general. I graduated high school with exceptional experiences in my math classes and I highly enjoy solving problems and puzzles as a pastime. Also known for my wonderful creativity among my friends and family, these skills of mine have proven to me to become an engineer. Honestly, I also wanted to be an engineer because being a strong-minded, independent woman myself, I wanted to make a difference in a male-dominant field- putting my skills and knowledge to the test. When choosing a type of engineering, I thought about how technology and computers has constantly amazed me. I have debated between computer engineering and software engineering, but then learning how computer engineering is more hardware and electrical, I decided the electrical component of computers is not what I really wanted to deal with. Software engineering seemed more skilled base, which reflected more of my internal self and what intrigued me the most. With quite of bit of personal reflection in order to decide what I want to do and major in for my future career, is what lead me into my decision of majoring in computer science at Oregon State University.

I have researched the areas of artificial intelligence and robotics, database and information retrieval, human-computer communication, operating systems, and software methodology and engineering in computer science, which helped me become more aware of a handful of areas that majoring in computer science can offer me [1]. "Artificial intelligence and robotics specialists design computers and machines that act similar to humans with as little human involvement as possible [2]," which seems to require thinking outside the box along with applying actual human behavior into a computer. The area of artificial intelligence and robotics interests me, but the designing of actual robots seems to require a mechanical feature to it, whereas programming robots is a detail that seems worth pursuing as a potential career choice. Based on the information I have read on the area of database and information retrieval, the aspect of mostly just dealing "with the organization of information and algorithms [3]" does not seem that interesting as a career style. The organizational part though is a requirement seems tolerable, but it just does not appear to be that exciting to me. Human-computer communication is an area that mainly illustrates its purpose for people directly, where "both social and technological components [4]" are truly combined in the field. This area would really demonstrate a change one is working for in society, which I do respect with this line of work. The area of operating systems with computer science seems to require a lot of programming, where it is based on a program that manages all of the other applications of a computer [5]. With my very little knowledge and experience in general programming, I am unsure what my current opinions are in this area, but I will take it into consideration. Lastly, software methodology and engineering looks to be more like my initial plan on what I am planning on doing with my computer science based degree. Software methodology and engineering focuses on the "design and production of large software systems [6]." The area includes particular aspects that I picture myself doing as a career choice with its designing, creativity, limits of communicating, and much more, which is what I am leaning towards to for my future. Going through all this research is what I plan on to

continually doing along with my education, in order for me to become more aware of what is out there for a person like me studying in computer science.

Even though I am not entirely sure what I want to do with my computer science based degree, I know I want to truly demonstrate some of my greatest skills into my work. Presenting and using my full potential as a person is what I believe in, and is what I want to continue on upholding for as long as I live.

Bibliography:

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Part 3: (Help from the Textbook, Lectures, and the Internet)

Convert the following numbers from binary to decimal: 1011, 1100, 11110, 101

$$1011 = 11$$

$$1100 = 12$$

$$11110 = 30$$

$$101 = 5$$

Convert the following numbers from decimal to binary: 31, 20, 1000, 12

$$31 = 11111$$

$$20 = 10100$$

$$1000 = 1111101000$$

$$12 = 1100$$

How many numbers can be represented in 16 bits?

$$2^{16} = \underline{65536 \text{ numbers}}$$

In a signed system, what is the range of positive and negative numbers that can be represented in 16 bits?

-32768 to 32767

In an unsigned system, what is the range of positive numbers that can be represented in 16 bits?

0 to 65535