

# Computing Science 10

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## SECTION 1

[What most schools don't teach.](#)

**Identify and describe the nature, approaches and areas of interest of computer science.**

*Define and describe computer science with consideration of:*

The main goal of the discipline of Computer science or computing science (abbreviated CS or CompSci) is the scientific and practical approach to computation and its applications.

A computer scientist specializes in the theory of computation and the design of computational systems.

Its subfields can be divided into a variety of theoretical and practical disciplines. Some fields are highly abstract, whilst fields such as computer graphics emphasize real-world visual applications.

***Hal Abelson – Prof of CSE at MIT***

***“[Computer science] is not really about computers -- and it's not about computers in the same sense that physics is not really about particle accelerators, and biology is not about microscopes and Petri dishes...and geometry isn't really about using surveying instruments. Now the reason that we think computer science is about computers is pretty much the same reason that the Egyptians thought geometry was about surveying instruments: when some field is just getting started and you don't really understand it very well, it's very easy to confuse the essence of what you're doing with the tools that you use.”***

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*Describe the general areas of interest of computer science including:*

### **The theory of computation**

In theoretical computer science and mathematics, the theory of computation is the branch that deals with whether and how efficiently problems can be solved on a model of computation, using an algorithm.

### **Algorithms and data structures**

In computer science, a data structure is a particular way of storing and organizing data in a computer so that it can be used efficiently

In mathematics and computer science, an algorithm is a step-by-step procedure for calculations. Algorithms are used for calculation, data processing, and automated reasoning.

*They go hand in hand because an algorithm is processing the information in a data structure.*

### **Programming methodology and languages**

An artificial language used to write instructions that can be translated into machine language and then executed by a computer.

*Machine language is also known as binary, think 1's and 0's.*

### **Computer elements and architecture**

In computer science and engineering, computer architecture is the art that specifies the relations and parts of a computer system.

Computer architects use computers to design new computers

### **Human-machine and machine-machine interfacing**

The parts of the machine that handles the Human-machine interaction.

*Think mice, keypads and touchscreens as they are parts we can see and touch.*

Machine-Machine Interface is where the machine interacts directly with another machine.

*Think wireless networks, printing, and phones as remote controls.*

### **Automata**

The study of mathematical objects called abstract machines or automata and the computational problems that can be solved using them.

### **Artificial intelligence**

The technology and branch of computer science that studies and develops intelligent machines and software.

The central problems (or goals) of AI research include reasoning, knowledge, planning, learning, communication, perception and the ability to move and manipulate objects.

### **Visual and auditory rendering**

General development of information technology applications - is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data.

*Compare and contrast computer science, computer engineering and information technology*

### **Theoretical vs. Applied**

*Theoretical( Programming Language Theory, Algorithms and Data Structures, Theory of Computing)*

The fundamental question underlying computer science is, "What can be (efficiently) automated?"

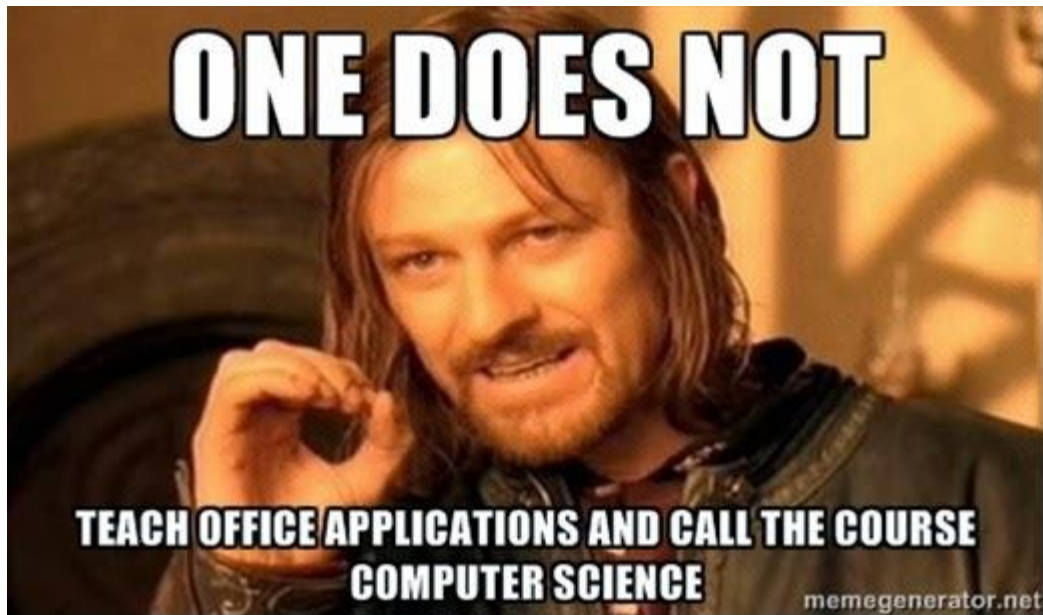
*Applied (AI, Computer Architecture, Computer Security, Software Engineering.)*

This branch of computer science aims to or is required to synthesise goal-orientated processes such as problem-solving.

The design and deployment of computers and computer systems is generally considered the province of disciplines other than computer science.

Computer science is considered by some to have a much closer relationship with mathematics than many scientific disciplines, with some observers saying that computing is a mathematical science.

*Describe some of the misconceptions associated with computer science*



### **Synonymous with programming**

Computer science is often mistakenly synonymous with programming that is reliant on solitary individuals for the bulk of its advances

Programming is only one aspect of computer science and it often involves large teams of programmers to design and build commercial software.

For example, computer games company BioWare (a division of Electronic Arts) is headquartered in Edmonton, Alberta. BioWare has four studios

located in Edmonton, Montreal, Austin, and Virginia. BioWare employs about 800 people yet only releases one or two games a year.

### **Relatively little real-world contact**

### **Learning of various computer applications**

Some people believe computer science is the learning of various computer applications, such as Word or PowerPoint.

*Learning how to use these types of application software fall under Information Technology; or Information Processing.*

## **Assignment – Careers**

Make a presentation looking at the areas of computer science

Select one of the careers from here: <http://bit.ly/160amzk>

You do not need to cover everything, but your presentation should answer the majority of the questions below.

You must also add at least 3 relevant pictures to make your presentation engaging and informative.

Your presentation should include a link to the Career Summary Page.

*Job Title*

*Describe the job in one or two sentences*

*What are the working conditions like?*

*What are the base and potential earnings? (annual salary)*

*What kind of education or training is needed?*

*What is the typical career path? (Start as a sales person, move to manager etc.)*

*What are some related jobs?*

*Your Likes/Dislikes:*

*Describe a day in the life working in that field*

*Save the document using the naming convention: Lastname\_Firstname\_Careers*