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Abstraction

Abstraction is defined as the act of considering something as a general quality or characteristic, apart from concrete abilities, specific objects, or actual instances by the Merriam-Webster dictionary. In computer science, it is almost the same idea, as abstraction is defined as the process by which data and programs are defined with a representation similar in form to its meaning, while hiding away the implementation details. In computer science, abstraction tries to reduce and factor out details so that the programmer can focus on few concepts a time.

Abstraction is a concept that has a goal to make a task simpler. In computer science, programs and codes are normally very complex, but can be successfully written through the use of abstraction. Therefore, abstraction is a fundamental and core skill needed in computer science, and other disciplines such as mathematics. In the field of computer science, it is important to have a fundamental understanding of mathematics and having the ability to solve complex math (particularly word) problems. If you have that ability, then you have the basic abstraction skills to become a computer scientist and think like one.

Once you have the basic idea of abstraction, it is important to start thinking at multiple levels of abstraction, because things only get more complex, and you need to be able to master that complexity. Abstraction is essential in the formation of appropriate models, designs and implementations that will carry on its purpose. Abstract thinking branches to good manipulation and reasoning for the analysis of abstract models.

Abstraction is very common in art and design. For example, many artists start their artwork by drawing lines, very simple lines. From there, they are able to turn those lines into very complex art. In design, there are maps that are simplified. On maps, the lines are usually drawn pretty straight and concise. However, if you were to travel through that line, you will find it is not that straight. The map is designed in such a way to simplify the visuals of it without being misleading.

Abstraction in computer science branches out into "control abstraction" and "data abstraction." Control abstraction is based on the design of the code to make it simple and easier. In control abstraction, to make things simpler, there are subprograms and control flows. Subprograms are accessible by writing functions, and you must write as many to simplify the task. For example, if you are given a program that makes you open a file, dynamically allocate memory, and check if a word exists in the file, then you must write at least three functions in order to make use of the fundamental skill of abstraction. Without subprograms, then your program will be a mess to the eyes and harder to compile. On the other hand, data abstraction is the utilization of data types.