

STUDY GUIDE

INTRODUCTION TO COMPUTER SCIENCE

Defining Computer Science

Computer science is the study of the nature of computation: it looks at abstract computational problems, standardized solutions to those problems, and ways to make those solutions more efficient.

Think of a computer as a car. The way that most people use computers (sending emails, browsing websites, creating documents) is like sitting in the driver's seat of a car. **Computer scientists** are like car mechanics; they study what's "under the hood" of a computer:

- Fundamentals of data structures
- Programming languages
- Algorithms
- Interactions between a database, a server, and an operating system

Why Study Computer Science?

Even if you won't be working directly with computer science concepts, there are two important reasons to learn about the field:

- It makes you a more well-rounded software engineer.
- The principles of computer science are stable: they remain true even as programming languages and hardware change.
- Understanding how computers work on a fundamental level will help you appreciate what you do.
- It can help you navigate technical job interviews.

Job Interviews and Computer Science

Computer science questions are popular in interviews for a number of reasons:

- They show that you know and care about the world of programming.
- They let interviewers see how you approach problems.
- They give interviewers a sense of what you would be like to work with.

Below are some CS questions you might encounter in a job interview. This part of the interview is called *whiteboarding*, because you'll be expected to draw out your approach to a problem on a whiteboard:

- How do you find the length of a singly linked list?
- How would you traverse a binary tree without using recursion?
- How is a merge sort algorithm implemented?
- How is bubble sort implemented?
- How would you generate the Fibonacci sequence using recursion?