

# CAREERS IN COMPUTER SCIENCE



Computer science is a broad field encompassing bioinformatics, cryptography, computer theory, and artificial intelligence in which computer scientists manage the entire development life cycle (theory, design, testing and application) for software systems. While extensive coding experience is a core element of the field, it's one among many. Computer scientists work on problems from the tangible (developing secure, intuitively-designed apps that can run on various devices) to the abstract (figuring out which problems computers can actually solve and the level of complexity of the algorithm to solve them).

In the “hard skills” sections, we have listed some of the most widely used coding languages for each role, but technologies frequently change and these languages may evolve. As a CS professional, it will be your job to follow the latest trends, technologies and languages in your field.



*Be aware that job titles may overlap. For example, some organizations don't see a delineation between a software engineer and a software developer and use these terms interchangeably.*

## *Roles in Computer Science*

### **SOFTWARE ENGINEER**

*Create digital tools to develop software*

Software engineers oversee the entire software development lifecycle. SE's utilize engineering principles to conduct the research, design, development, testing, implementation and maintenance of software programs and the systems that utilize them. They should understand IT architecture, cloud-based systems, and wide-scale data stores. SE's often work on a larger scale than software developers, so they should be systematic thinkers rather than creatives.

**Hard skills required:** JavaScript, Java, Python, SQL, C#, C++



## SOFTWARE DEVELOPER

*Creative force behind programs and applications*

Software developers take the tools that software engineers create to develop apps and programs. It may seem obvious, but it bears stating that they focus on the “development” portion of the life cycle, and may not touch on things like testing and implementation. They usually don’t have the theoretical background and engineering principles that drive a software engineer, but they may have more creative leeway in how they code to achieve the desired output.

**Hard skills required:** Python, ASP.NET, JavaScript, Java, C#

## WEB DEVELOPER

*Build sites to amplify visitors through Search Engine Optimization (SEO)*

Web developers create the appearance of websites and guarantee that websites function how they’re supposed to. They ensure that web pages are optimized to work across a variety of interfaces and browsers. They must have the communication skills and creativity needed to ensure a website meets its users’ needs.

**There are two primary types of Web Developers:**

### Front End Web Developer

Front-end web developers build the appearance of the site, developing a theme that incorporates structure, image, and content. For this field, it is helpful to have a background in design fundamentals and design software.

**Hard skills required:** HTML, CSS, JavaScript, React, Adobe Creative Suite (PhotoShop, InDesign, Illustrator), Sketch, WordPress

### Back End Web Developer

Back-end web developers ensure that websites function as they should, often managing a company’s database, users, performance, and security issues. They should be critical thinkers as they will often be debugging systems and strategically optimizing a website to prevent crashes.

**Hard skills required:** PHP, Python, Java, Node.js, Ruby, ASP.NET, SQL, MySQL, Oracle

## HARDWARE ENGINEER

*Design and build physical parts of computers for seamless operation*

Hardware engineers create physical items like circuit boards, processors, mobile devices and network equipment. They also design equipment that utilizes processors and related elements, including medical devices, vehicle components and appliances. In addition, they may be heavily involved with research, testing, and analysis phases of product development.

**Hard skills required:** Verilog, C, C++, field-programmable gate array, engineering design, board design