The Computing Profession

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:≡	WHAT'S COVERED

Computers are powerful tools that, when used correctly, can add value to a business or organization. Nevertheless, computers can also open the door to very fulfilling, and rewarding, careers. As businesses grow and enter the global economy, the need for highly-skilled computing professionals in the United States is at an all-time high. Furthermore, the problems facing the world will, in large part, rely on computing for solutions. In this tutorial, we will discuss the computing profession, and the specific career pathways that fall into this profession.

Our discussion will break down as follows:

1. The Computing Profession: Occupational Outlook

According to the U.S. Bureau of Labor, computing occupations are estimated to grow rapidly over the next few decades. The job market displays a large demand for computing professionals with the requisite skills. In fact, the U.S. Bureau of Labor predicts that nearly three out of four new science or engineering jobs are going to be in computing, and that over 144,000 new software developer jobs will be created by 2022.

2. Computing Career Clusters

With more and more career opportunities, the time is just right to begin pursuit of a career in computing. Due to the size of the computer industry and the number of career opportunities, anybody interested in a computing career should explore the specific **career clusters** related to information technology. A career cluster is a collection of industries and jobs that are all connected based on skills. Each cluster is further broken down into pathways that represent the education and training required for a specific career within a cluster. Computing careers are housed within the Information Technology career cluster. The I.T. cluster breaks down into four pathways: Information and Support Services, Interactive Media, Network Systems, and Programming and Software Development. Most of the careers within the computing industry will fall into one of these pathways. Listed below is a list of the careers that fall into each pathway, along with the roles for each profession.

📄	TERM TO KNOW

Career Cluster
    A collection of industries and jobs all connected based on skills.

2a. Computer Programmer

Programmers spend their time writing computer code in a programming language. In the case of systems development, programmers generally attempt to fulfill the design specifications given to them by a systems analyst. Many different styles of programming exist: a programmer may work alone for long stretches of time or may work in a team with other programmers. A programmer needs to be able to understand complex processes and also the intricacies of one or more programming languages. Generally, a programmer is very proficient in mathematics, as mathematical concepts underlie most programming code.

2b. Computer Engineer

Computer engineers design the computing devices that we use every day. There are many types of computer engineers, and they work on a variety of different types of devices and systems. Some of the more prominent engineering jobs are as follows:

- **Hardware engineer**: A hardware engineer designs hardware components, such as microprocessors.
- **Software engineer**: Software engineers do not actually design devices; instead, they create new programming languages and operating systems, working at the lowest levels of the hardware to develop new kinds of software to run on the hardware.
- **Systems engineer**: A systems engineer takes the components designed by other engineers and makes them all work together. For example, to build a computer, the motherboard, processor, memory, and hard disk all have to work together. A systems engineer has experience with many different types of hardware and software and knows how to integrate them to create new functionality.
- **Network engineer**: A network engineer's job is to understand the networking requirements of an organization and then design a communications system to meet those needs, using the networking hardware and software available.
- **Security engineer**: A security engineer is in charge of setting information-security policies for an organization, and then overseeing the implementation of those policies. This person may have one or more people reporting to him or her, as part of the information-security team.

2c. Systems Analyst

The role of the systems analyst is to straddle the divide between identifying business needs, and imagining a new or redesigned computer-based system to fulfill those needs. This individual will work with a person, team, or department with business requirements, and will identify the specific details of a system that needs to be built. A systems analyst generally is not the one who does the actual development of the information system. The design document created by the systems analyst provides the detail needed to create the system, and is then handed off to a programmer (or team of programmers) to do the actual creation of the system. In some cases, however, a systems analyst may go ahead and create the system that he or she designed.

2d. Computer Operator

A computer operator is the person who keeps the large computers running. This person's job is to oversee the mainframe computers and data centers in organizations. Some of the operator's duties include keeping the operating systems up to date, ensuring available memory and disk storage, and overseeing the physical environment of the computer. Since mainframe computers increasingly have been replaced with servers, storage management systems, and other platforms, a computer operator's job has grown broader, and includes working with these specialized systems.

2e. Database Administrator

A database administrator (DBA) is the person who manages the databases for an organization. This person creates and maintains databases that are used as part of applications or the data warehouse. The DBA also consults with systems analysts and programmers on projects that require access to, or the creation of, databases.

2f. System Administrator

A computer system administrator is responsible for the installation, configuration, and support of a business's local area network (LAN), wide area network (WAN), Internet systems, or a specified portion of a network system. The system administrator may also monitor the network to ensure data and application availability to users. Additional responsibilities may include: performing necessary maintenance to support network availability or monitoring, and testing website performance to ensure websites operate correctly and without interruption.

📋 SUMMARY

The computing profession is expected to experience an overwhelming increase in career opportunities, as businesses and organizations increase their reliance on information technology to maintain competitive advantage in the global economy. In this tutorial, we took a look at the **computing profession**, and the **careers** contained within the computing profession.

Source: Derived from Chapter 9 of "Information Systems for Business and Beyond" by David T. Bourgeois. Some sections removed for brevity.
https://www.saylor.org/site/textbooks/Information%20Systems%20for%20Business%20and%20Beyond/Textbook.html

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