

What is the difference: computer science, information systems, information technology?

Computer Science

The work of computer scientists falls into three categories: designing and implementing software; devising new ways to use computers; and developing effective ways to solve computing problems.

- **Career Path 1: Designing and implementing software.** This refers to the work of software development which has grown to include aspects of web development, interface design, security issues, mobile computing, etc. The majority of computer science graduates follow this career path. While a bachelor's degree is sufficient for entry into this kind of career, many software professionals return to school to obtain a terminal master's degree. (Rarely is a doctorate involved.) Career opportunities occur in a wide variety of settings including large or small software companies, large or small computer services companies, and large organizations of all kinds (industry, government, banking, healthcare, etc.).
- **Career Path 2: Devising new ways to use computers.** This refers to innovation in the application of computer technology. A career path in this area can involve advanced graduate work, followed by a position in a research university or industrial research and development laboratory; it can involve entrepreneurial activity such as was evident during the dot-com boom of the 1990s; or it can involve a combination of the two.
- **Career Path 3: Developing effective ways to solve computing problems.** This refers to the application or development of computer science theory and knowledge of algorithms to ensure the best possible solutions for computationally intensive problems. As a practical matter, a career path in the development of new computer science theory typically requires graduate work to the Ph.D. level, followed by a position in a research university or an industrial research and development laboratory.

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Information Systems

Information systems (IS) are concerned with the information that computer systems can provide to aid a company or organization in defining and achieving its goals. It is also concerned with the processes that an enterprise can implement and improve using information technology. IS professionals must understand both technical and organizational factors, and must be able to help an organization determine how information and technology-enabled business processes can provide a foundation for superior organizational performance. They serve as a bridge between the technical and management communities within an organization.

Modern IS programs focus on the broader role of IT-enabled information utilization and business processes in a wide range of enterprises, while still maintaining their close association with business. What information does the enterprise need? How is that information generated? Is it delivered to the people who need it? Is it presented to them in ways that permits them to use it readily? Is the organization structured to be able to use technology effectively? Are the business processes of the organization well designed? Do they use the opportunities created by information technology fully? Does the organization fully use the communication and collaboration capabilities of information technologies? Is the organization capable of adapting quickly enough to changing external circumstances? These are the important issues that various types of enterprises increasingly rely on IS people to address. IS people are concerned with the relationship between information systems and the organizations that they serve, extending from theory and principles to application and development. Many IS professionals are also involved in systems deployment and configuration and training users. IT specialists often tailor application technologies (especially databases) to the needs of the enterprise, and they often develop systems that utilize other software products to suit their organizations' needs for information.

A majority of IS programs are located in business schools; however, they may have different names such as management information systems, computer information systems, or business information systems. All IS degrees combine business and computing topics, but the emphasis between technical and organizational issues varies among programs. For example, programs differ substantially in the amount of programming required.

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Information Technology

Information technology (IT) is a label that has two meanings. In common usage, the term "information technology" is often used to refer to all of computing. As a name of an undergraduate degree program, it refers to the preparation of students to meet the computer technology needs of business, government, healthcare, schools, and other kinds of organizations.

IT professionals possess the right combination of knowledge and practical, hands-on expertise to take care of both an organization's information technology infrastructure and the people who use it. They assume responsibility for selecting hardware and software products appropriate for an organization. They integrate those products with organizational needs and infrastructure, and install, customize and maintain those applications, thereby providing a secure and effective environment that supports the activities of the organization's computer users. In IT, programming often involves writing short programs that typically connect existing components (scripting). Planning and managing an organization's IT infrastructure is a difficult and complex job that requires a solid foundation in applied computing as well as management and people skills. Those in the IT discipline require special skills – in understanding, for example, how networked systems are composed and structured, and what their strengths and weaknesses are. There are important software systems concerns such as reliability, security, usability, and effectiveness and efficiency for their intended purpose; all of these concerns are vital. These topics are difficult and intellectually demanding.

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