Computer Systems Analysts

Significant Points

- Employment is expected to increase much faster than average.

- Excellent job prospects are expected as organizations continue to adopt increasingly sophisticated technologies.

- Employers generally prefer applicants who have at least a bachelor's degree; relevant work experience also is very important.

Nature of the Work

Nearly all organizations rely on computer and information technology (IT) to conduct business and operate efficiently. *Computer systems analysts* use IT tools to help enterprises of all sizes achieve their goals. They may design and develop new computer systems by choosing and configuring hardware and software, or they may devise ways to apply existing systems' resources to additional tasks.

Most systems analysts work with specific types of computer systems—for example, business, accounting, and financial systems or scientific and engineering systems—that vary with the kind of organization. Analysts who specialize in helping an organization select the proper system hardware and software are often called *system architects* or *system designers*. Analysts who specialize in developing and fine-tuning systems often have the more general title of *systems analysts*.

To begin an assignment, systems analysts consult with an organization's managers and users to define the goals of the system and then design a system to meet those goals. They specify the inputs that the system will access, decide how the inputs will be processed, and format the output to meet users' needs. Analysts use techniques such as structured analysis, data modeling, information engineering, mathematical model building, sampling, and a variety of accounting principles to ensure their plans are efficient and complete. They also may prepare cost-benefit and return-on-investment analyses to help management decide whether implementing the proposed technology would be financially feasible.

When a system is approved, systems analysts oversee the implementation of the required hardware and software components. They coordinate tests and observe the initial use of the system to ensure that it performs as planned. They prepare specifications, flow charts, and process diagrams for computer programmers to follow; then they work with programmers to "debug," or eliminate errors, from the system. Systems analysts who do more in-depth testing may be called *software quality assurance analysts*. In addition to running tests, these workers diagnose problems, recommend solutions, and determine whether program requirements have been met. After the system has been implemented, tested, and debugged, computer systems analysts may train its users and write instruction manuals.

In some organizations, *programmer-analysts* design and update the software that runs a computer. They also create custom applications tailored to their organization's tasks. Be-cause they are responsible for both programming and systems analysis, these workers must be proficient in both areas. (A separate section on computer software engineers and computer programmers appears elsewhere in the *Handbook*.) As this dual proficiency becomes more common, analysts are increasingly working with databases, object-oriented programming languages, client–server applications, and multimedia and Internet technology.

One challenge created by expanding computer use is the need for different computer systems to communicate with each other. Many systems analysts are involved with "networking," connecting all the computers within an organization or across organizations, as when setting up e-commerce networks to facilitate business between companies.

Work environment. Computer systems analysts work in offices or laboratories in comfortable surroundings. Many work about 40 hours a week, but some work more than 50 hours a week. Some analysts telecommute, using computers to work from remote locations.

Injuries in this occupation are uncommon, but computer systems analysts, like other workers who spend long periods typing on a computer, are susceptible to eyestrain, back discomfort, and hand and wrist problems such as carpal tunnel syndrome.
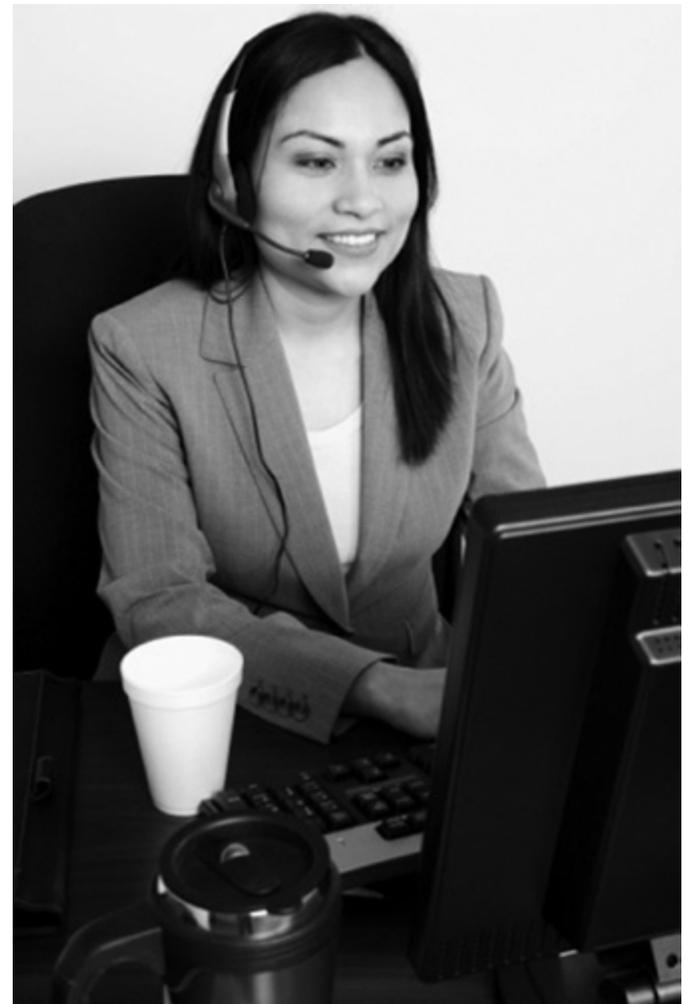
Computer systems analysts use information technology to help organizations operate more effectively.

Projections data from the National Employment Matrix

Occupational Title	SOC Code	Employment, 2008	Projected Employment, 2018	Change, 2008-2018	
				Number	Percent
Computer systems analysts..	15-1051	532,200	640,300	108,100	20

(NOTE) Data in this table are rounded. See the discussion of the employment projections table in the *Handbook* introductory chapter on *Occupational Information Included in the Handbook.*

Training, Other Qualifications, and Advancement

Training requirements for computer systems analysts vary depending on the job, but many employers prefer applicants who have a bachelor's degree. Relevant work experience also is very important. Advancement opportunities are good for those with the necessary skills and experience.

Education and training. When hiring computer systems analysts, employers usually prefer applicants who have at least a bachelor's degree. For more technically complex jobs, people with graduate degrees are preferred. For jobs in a technical or scientific environment, employers often seek applicants who have at least a bachelor's degree in a technical field, such as computer science, information science, applied mathematics, engineering, or the physical sciences. For jobs in a business environment, employers often seek applicants with at least a bachelor's degree in a business-related field such as management information systems (MIS). Increasingly, employers are seeking individuals who have a master's degree in business administration (MBA) with a concentration in information systems.

Despite the preference for technical degrees, however, people who have degrees in other areas may find employment as systems analysts if they also have technical skills. Courses in computer science or related subjects combined with practical experience can qualify people for some jobs in the occupation.

Employers generally look for people with expertise relevant to the job. For example, systems analysts who wish to work for a bank may need some expertise in finance, and systems analysts who wish to work for a hospital may need some knowledge of health management. Furthermore, business enterprises generally prefer individuals with information technology, business, and accounting skills and frequently assist employees in obtaining these skills.

Technological advances come so rapidly in the computer field that continuous study is necessary to remain competitive. Employers, hardware and software vendors, colleges and universities, and private training institutions offer continuing education to help workers attain the latest skills. Additional training may come from professional development seminars offered by professional computing societies.

Other qualifications. Employers usually look for people who have broad knowledge and experience related to computer systems and technologies, strong problem-solving and analytical skills, and the ability to think logically. In addition, the ability to concentrate and pay close attention to detail is important because computer systems analysts often deal with many tasks simultaneously. Although these workers sometimes work independently, they frequently work in teams on large projects. Therefore, they must have good interpersonal skills and be able to communicate effectively with computer personnel, users, and other staff who may have no technical background.

Advancement. With experience, systems analysts may be promoted to senior or lead analyst. Those who possess leadership ability and good business skills also can become computer and information systems managers or can advance into executive positions such as chief information officer. Those with work experience and considerable expertise in a particular subject or application may find lucrative opportunities as independent consultants, or they may choose to start their own computer consulting firms.

Employment

Computer systems analysts held about 532,200 jobs in 2008. Although they are employed in many industries, 24 percent of these workers were in the computer systems design and related services industry. Computer systems analysts also were employed by governments; insurance companies; financial institutions; and business management firms. About 30,300 computer systems analysts were self-employed in 2008.

Job Outlook

Employment is expected to grow much faster than the average for all occupations, and job prospects should be excellent.

Employment change. Employment of computer systems analysts is expected to grow by 20 percent from 2008 to 2018, which is much faster than the average for all occupations. Demand for these workers will increase as organizations continue to adopt and integrate increasingly sophisticated technologies and as the need for information security grows.

As information technology becomes an increasingly important aspect of the business environment, the demand for computer networking, Internet, and intranet functions will drive demand for computer systems analysts. The increasing adoption of the wireless Internet, known as WiFi, and of personal mobile computers has created a need for new systems that can integrate these technologies into existing networks. Explosive growth in these areas is expected to fuel demand for analysts who are knowledgeable about systems development and integration. In addition, as sensitive data continues to be transmitted and stored electronically, the need for information security specialists is expected to grow rapidly. Furthermore, the healthcare industry is expected to increase its use of information technology and will demand the services of this occupation. The adoption of e-prescribing, electronic health records, and other IT platforms will drive this trend, creating a large number of new jobs.

As with other information technology jobs, employment growth may be tempered somewhat by offshoring. Firms may look to cut costs by shifting operations to foreign countries with lower prevailing wages and highly skilled workers. However, due to the high level of expertise that is required, as well as the frequent need to be near the job site, systems analysts are less likely to be offshored than other IT occupations.

Job prospects. Job prospects should be excellent. Job openings will occur as a result of strong job growth and from the need to replace workers who move into other occupations or who leave the labor force.

Earnings

Median annual wages of wage and salary computer systems analysts were $75,500 in May 2008. The middle 50 percent earned between $58,460 and $95,810 a year. The lowest 10 percent earned less than $45,390, and the highest 10 percent earned more than $118,440. Median annual wages in the industries employing the largest numbers of computer systems analysts in May 2008 were:

Professional and commercial equipment
   and supplies merchant wholesalers $89,670
Computer systems design and related services 78,680
Data processing, hosting, and related services.............78,010
Management of companies and enterprises 76,070
Insurance carriers 74,610

Related Occupations

Other workers who use computers extensively and who use logic and creativity to solve business and technical problems include:

Actuaries
Computer and information systems managers
Computer network, systems, and database administrators
Computer software engineers and computer programmers
Engineers
Management analysts
Mathematicians
Operations research analysts
Statisticians

Sources of Additional Information

Further information about computer careers is available from:
➤ Association for Computing Machinery (ACM), 2 Penn Plaza, Suite 701, New York, NY 10121-0701. Internet: **http://computingcareers.acm.org/**

➤ Institute of Electrical and Electronics Engineers Computer Society, Headquarters Office, 2001 L St. NW, Suite 700 Washington, DC 20036-4910. Internet: **http://www.computer.org**

➤ National Workforce Center for Emerging Technologies, 3000 Landerholm Circle SE, Bellevue, WA 98007. Internet: **http://www.nwcet.org**

➤ University of Washington Computer Science and Engineering Department, AC101 Paul G. Allen Center, Box 352350, 185 Stevens Way, Seattle, WA 98195-2350. Internet: **http://www.cs.washington.edu/WhyCSE**

➤ National Center for Women and Information Technology, University of Colorado, Campus Box 322 UCB, Boulder, CO 80309-0322. Internet: **http://www.ncwit.org**

The Occupational Information Network (O*NET) provides information on a wide range of occupational characteristics. Links to O*NET appear at the end of the Internet version of this occupational statement, accessible at **http://www.bls.gov/ooh/ocos287.htm**