WHAT CAN I DO WITH A MAJOR IN … COMPUTER ENGINEERING/SCIENCE

OCCUPATIONAL SUMMARY:
Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. Apply principles and techniques of computer science, engineering, and mathematical analysis.

EMPLOYMENT REQUIREMENTS: Considerable Job Preparation Needed
A bachelor's degree is the minimum formal education required. However, many employers also require graduate school and some require a Ph.D., M.D., or J.D. (law degree).

EMPLOYERS & SUGGESTED STRATEGY:
Please ask your Career Advisor (CDF) for identifying employers or additional resources for your occupation of choice.

Any large organization including: Banks, retail chains, manufacturers, universities, and government agencies - Computer companies and vendors - Contract and temporary employers - Management consulting firms - Research laboratories - Software and computer companies

Suggested Strategy: Gain relevant experience through internships or co-ops. Develop an attention to detail and a flair for creativity. Learn to work well with a team, to meet deadlines, and to communicate effectively with technical and non-technical colleagues. Supplement computer degree with courses in business, science, or engineering. Stay current on programming languages. Earn a master's degree for upper level positions. Seek the Certified Computing Professional designation by completing a series of exams and experiential requirements.

A DAY IN THE LIFE:
Computer engineers coordinate the construction, maintenance, and future growth of a company's computer systems. They work with all departments, discovering each one's computer needs, then make suggestions about what technical direction the company should proceed in. While this occupation sounds quite organized and logical, most computer engineers enter the profession at companies who have already made uncertain steps into the technical world. Faced with uncertain budget restrictions, presented with old or misapplied systems, and expected to know the nuances of each department's needs, systems analysts must rapidly become experts in the company's and each department's functions and learn how to use second-best systems to satisfy their needs. "Getting people to tell you up front all the things they want to do is like pulling teeth," wrote one engineer. Flexibility, strong interpersonal skills, and a friendly disposition are highly valued traits in this industry. The bottom line is performance, and those without strong technical skills find themselves quickly outpaced by the expertise their job demands. Over 30% of systems analysts did not intend to become full-time systems analysts: In smaller companies, the position develops as an ancillary responsibility for the most technically savvy of the current employees. As the company realizes the benefits of a full-time computer representative, that position becomes permanent and exclusive. "I was hired as a researcher," noted one analyst, "and now all I use is my screwdriver." Many who have fallen into the profession point to continuing education as an attractive part of the job. Others find themselves hamstrung by decisions others have made before them and the technical limitations of the systems they inherit. The high level of satisfaction these high-tech tinkerers feel might be related to the creative thinking and problem solving aspects of their job. For those who can make the most of limited resources and listen carefully for the distinction between what people want and what people need from their computer systems, computer engineering is an excellent profession.

PAYING YOUR DUES:
All computer engineers must be good with details and know how to approach structural problems logically. But practical experience is the most important credential. Technology changes rapidly in this field, so continuous study and learning are part of a professional's life. Certain certifications are gaining credence in the field, such as the Certified Systems Professional (CSP) credential and the Certified Quality Analyst (CQA) designation, but none are required.
**Tasks**

- Modify existing software to correct errors, to adapt it to new hardware or to upgrade interfaces and improve performance.
- Design and develop software systems, using scientific analysis and mathematical models to predict and measure outcome and consequences of design.
- Consult with engineering staff to evaluate interface between hardware and software, develop specifications and performance requirements and resolve customer problems.
- Analyze information to determine, recommend and plan installation of a new system or modification of an existing system.
- Develop and direct software system testing and validation procedures.
- Direct software programming and development of documentation.

**Knowledge**

- **Computers and Electronics** — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.
- **Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
- **English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
- **Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

**Skills**

- **Complex Problem Solving** — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- **Technology Design** — Generating or adapting equipment and technology to serve user needs.
- **Troubleshooting** — Determining causes of operating errors and deciding what to do about it.
- **Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- **Active Learning** — Understanding the implications of new information for current and future problem-solving and decision-making.
- **Programming** — Writing computer programs for various purposes.
- **Systems Analysis** — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.
- **Mathematics** — Using mathematics to solve problems

**Abilities**

- **Deductive Reasoning** — The ability to apply general rules to specific problems to produce answers that make sense.
- **Inductive Reasoning** — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

**STATE & NATIONAL WAGES (2007):**

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**STATE & NATIONAL EMPLOYMENT TRENDS:**

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**INFORMATIONAL WEBSITES:**

- [online.onetcenter.org/](http://online.onetcenter.org/)
- [www.acinet.org/](http://www.acinet.org/)
- [www.princetonreview.com](http://www.princetonreview.com)