ACE
Spreading the light

LIFE AS A COMPUTER SCIENCE ENGINEER

WORK SKILLS, INTEREST & COMPETENCIES

INTRODUCTION

A computer engineer is hired to create and develop computer systems. Computer engineers are often involved in all aspects of the computer development process, including both the creation of hardware, the selection of software and connecting computers on a large company circuit. Computer engineers often have an academic background in computer science, information science, mathematics or engineering.

C O M P U T E R

Computer Science Fundamentals

Far too much **emphasis** on specific **programming languages**, and specific "**technologies**" is a mistake. Whatever the future holds, you will be well served by knowing the basic theory of computer sciences. Learn data-structures and algorithms. If you don't have a favorite **data-structure**, and an algorithm that you find beautiful, then your computer science education is incomplete.

If, after seeing an algorithm, your first thought is not about the complexity of the algorithm (O(n), O(log n), etc.), then you need to hit your books again. If you've only learned Java and C#, and you don't really understand pointers, heaps, stacks, you will sooner or later be at a disadvantage.

Understand the basics. And while you're at it, also learn mathematics and statistics.

WORK SKILLS REQUIRED

Since the computer engineering field is quite broad, the required technical skills listed in the job postings you come across will vary, depending on whether the job is more hardware or software focused, and which industry the employer belongs to. Typically, you will need to have the following:

- an understanding of the particular computer hardware architecture you will be working with;
- experience designing, coding and testing software;
- familiarity with software test procedures or scripts;
- experience building your own PC systems;
- understanding of different operating systems, including Windows and Linux, and how certain types of software will work with them;
- experience with device drivers;
- understanding of networking and security;
- understanding of the (sometimes specialized) software that is typically used in a particular industry;
- knowledge of programming languages such as C++ and other object-oriented languages.

Fields Employing Computer Engineers

Computer engineers are likely to find work in a variety of fields, including (but not limited to):

- telecommunications;
- manufacturing;
- transportation;
- product development.

COMPUTER SOFTWARE ENGINEERS

- From design to development, testing to troubleshooting, computer software engineers use their ability with applications and systems software to create the elements that make computers work. They use computer programs like C, C++, and Java to create packaged software and customized applications, often working in teams to create complex products.

- Computer software engineers are highly trained in a range of technologies and well-compensated for their knowledge. No wonder Forbes placed computer engineers, including software engineers, at the top of their list of most lucrative specializations.

COMPUTER HARDWARE ENGINEERS

- Computer hardware engineers research, design, develop, and test computer systems and components such as processors, circuit boards, memory devices, networks, and routers. By creating new directions in computer hardware, these engineers create rapid advances in computer technology.

COMPUTER SCIENCE

Computer science (CS) spans the range from theory through programming to cutting-edge development of computing solutions. Computer science offers a foundation that permits graduates to adapt to new technologies and new ideas. The work of computer scientists falls into three categories:

a) designing and building software;

b) developing effective ways to solve computing problems, such as storing information in databases, sending data over networks or providing new approaches to security problems; and

c) devising new and better ways of using computers and addressing particular challenges in areas such as robotics, computer vision, or digital forensics (although these specializations are not available in all computer science programs).

Most computer science programs require some mathematical background.

Career path in each area.

- **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, and so on. This is the career path that the majority of computer specialization graduates follow. While a bachelor's degree is generally sufficient for entry into this kind of career, many software professionals try to obtain a 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.). Degree programs in software engineering also educate students for this career path.

- **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.

- **Career Path 4**:

  Planning and managing organizational technology infrastructure. This is the type of work for which the new information technology (IT) programs explicitly aim to educate students.

Career paths 2 and 3 are undenably in the domain of computer science graduates. Career paths 1 and 4 have spawned the new majors in software engineering and information technology, respectively, and information systems graduates often follow Career path 1, too. Computer scientists continue to fill these positions, but programs in software engineering, information technology, and information systems offer alternative paths to these careers.

BUILDING THE REQUIRED SKILLS.

1) Technical Skills

A computer engineer must have extensive technical skills to design and choose software components for a project. This includes understanding technical language, such as C++, Java, JavaScript, HTML, CSS, SERVLET and UML design. It also includes recognizing the major differences between operating systems like Windows, DOS, Mac and Linux. Some computer engineers also work with computer databases like MySQL, Access and Oracle.

2) Be logical

It really does go a long way. When you are discreet with logic, it works well in developing the skills needed for algorithms and coding when it comes to computer science."

3) Be mathematical

In every way, computer science is based around a mathematical foundation. So when you're programming functions and commands into computers, you need to understand the basis of all of that is in mathematics."

4) Challenge yourself

One thing that can help an aspiring computer specialist is by testing in real-life technical situations. These opportunities available on the Internet.
There are online websites that holds weekly competitions to see who is the most skilled in computer programming.

5) Get involved with a group

Nothing develops skills more than hanging around a group of friends who shares the same interests.
Getting involved with a group of that caliber really develops your skills. It's much better to learn with a group of friends, learning the same technical skills, than it is a teacher lecturing in a class.

6) Be calm in stressful environments

Ability to process large amounts of technical information quickly.
"The computer can be a toy, not just a tool," Pierce said. "One should choose a field where one has a natural passion, and those who tinkering with their computer will probably be comfortable working with it professionally."

7) Be creative

Being a computer expert doesn't really mean you are restricted to one single method or practice. Being a computer expert means branching out and always striving for the impossible.
"Nothing in computers is ever really isolated," Pierce said. "It is important to have a general breadth of computer knowledge, because computer scientists often have to develop interesting solutions to interesting problems."

8) Branch out

You need to learn software engineering, how computers work, how operating systems work, as well as countless programming languages.

9) Read and write a lot of code

While it doesn't sound fun to be going through countless streams of code and data, it is a necessity in order to stay in the computer science workforce.
Due to technology becoming exponentially complex, one must continuously update their skills to stay competitive within the field.

10) Understand your tools

You need to understand how your tools work. You need not only know what a compiler, linker, assembler, interpreter and web browser is, but what they do for you to succeed.

11) Communication Skills

Communication and interaction is a vital part of a computer engineer's job. He must interact with managers or business owners for company projects or directly with customers, if the computer engineer is working on developing solutions for customers. The computer engineer must communicate the possibilities of the given project budget, update customers or managers on the progress of projects and be able to conduct presentations on the computer development projects.

EVERYTHING YOU WANTED TO KNOW ABOUT YOUR CHOSEN CAREER

REFER FOLLOWING WEBPAGES

http://www.onetonline.org/link/summary/17-2061.00

http://www.onetonline.org/link/summary/15-1133.00?redir=15-1032.00

http://www.onetonline.org/link/summary/15-1111.00?redir=15-1011.00