Computer Engineers

Work on both Hardware & Software
Computer Engineers

Work on Computer Networks
Computer Engineers

Work on Embedded Systems
Companies where you can work
Type of Work

- Computer Engineers design, develop, and implement computer technology in consumer, industrial, commercial and military applications.

- Computer Engineers are challenged to develop computer applications that improve the quality of life.

- They must be sensitive to manufacturing and distribution costs.
Type of Work

- Computer Engineers work on hardware, software, and the interface between the two.
- They work in teams with other engineers, and others from other areas.
- They work in offices or laboratories in comfortable surroundings.
Type of Work

- Computer Engineers usually work about 40 hours a week.
- However, evening or weekend work may be necessary to meet deadlines or solve specific problems.
- Given the technology available today, telecommuting is common for computer professionals.
Earnings

- According to the bureau of labor statistics the median monthly income of a computer engineer starting his career is 4000 EGP.
- Within 3 years they can easily reach 6000-7000 EGP.
- The increase depends on performance, experience, supervisory responsibility, accountability of projects.
Computer Engineering vs. Science
(Computer Engineering)

- Concerned with applying existing computer technology, both hardware and software, to solve practical problems.
- Computer Engineers have expertise in all aspects of computers, from the hardware transistor circuits right up to the successful design of software user interfaces.
- Students of Computer Engineering take core courses offered in both Electrical Engineering and Computer Science.
Computer Engineering vs. Science (Computer Science)

- Concerned with the efficient application of computing technology, through the design of efficient algorithms and data structures.

- The emphasis is to cope with hardware constraints using software techniques and to focus mainly on the software organization of computer systems.

- CS deals with programming, while CE engineering deals with the creation of new products. E.g., A CE works to design new motherboards; a CS would design the programs to work with them.
Examples
Product: Motorola Q Pocket PC Phone

Microprocessor: TI OMAP (ARM+DSP)

OS: Windows Mobile 5.0 (Windows CE OS)
Product: Sonicare Elite toothbrush.

Microprocessor: 8-bit

Has a programmable speed control, timer, and charge gauge
Product: Cannon EOS 30D Digital Camera

Microprocessor: DIGIC II Image Processor
Today’s high-end automobile may have 100 microprocessors:

- 4-bit microcontroller checks seat belt;
- Microcontrollers run dashboard devices.
- 16/32-bit microprocessor controls engine.
Product: Vendo Vue 40 vending machine.

Microprocessor: Two 16-bit Hitachi H8/300H Processors

A robot hand dispenses items

Microprocessor: Radiation Hardened 20Mhz PowerPC

Commercial Real-time OS

Software and OS was developed during multi-year flight to Mars and downloaded using a radio link.
Product: Sony Aibo ERS-7 Robotic Dog.

Microprocessor: 64-bit MIPS R7000.

OS: Aperios - Sony’s Real Time OS

Used in Robocup Soccer Teams
Product: High End Systems DL2 Digital Media Server

Microprocessor: X86

OS: Windows XP Embedded

Used for lighting effects in shows and rock concerts
Product: Dresser Wayne Ovation iX Gas Pump

Microprocessor: Marvel Xscale (ARM)

OS: Windows CE

Displays video ads & is networked to a gas station’s back office computer system. Also has remote maintenance features.
Product: Kuka Industrial Robot Arm

Microprocessor: X86

OS: Windows CE OS & Others

Kuka robot arms welding a Mercedes
Product: Bernina Artista 200 Sewing Machine

Microprocessor: Marvel StrongARM

OS: Windows CE

Can download new images from the internet and sew them
## More Examples

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<th>Aircraft autopilots, avionics and navigation systems, automatic landing systems, guidance systems, engine controls.</th>
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<td>Biomedical</td>
<td>XRAY, MRI, and Ultrasound imaging systems, patient monitors, heart pacers.</td>
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<td>Cars</td>
<td>Engine control, anti-lock braking systems, traction control systems, air bag controls, heating and air conditioning controls, GPS mapping, Satellite Radio, On-board Diagnostics.</td>
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<td>Communications</td>
<td>Communication Satellites, network routers, switches, hubs.</td>
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## More Examples

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<td>Computer I/O devices</td>
<td>Keyboards, mice, printers, scanners, displays, modems, hard disk drives, DVD drives, graphics cards, USB devices.</td>
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<td>Electronic Instrumentation</td>
<td>Data acquisition systems, oscilloscopes, voltmeters, signal generators, logic analyzers.</td>
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<td>Home Electronics</td>
<td>Microwave ovens, dishwashers, DVD players, televisions, stereos, security systems, lawn sprinkler controls, thermostats, cameras, TVs, clock radios, answering machines, satellite or cable box, appliances.</td>
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<td>Industrial Equipment</td>
<td>Elevator controls, surveillance systems, robots, CNC machines, Programmable Logic Controllers, industrial automation and control systems.</td>
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<td>Office Machines</td>
<td>FAX machines, copiers, telephones, calculators, cash registers.</td>
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<td>Personal Devices</td>
<td>Cell phones, portable MP3 players, Video players, Personal Digital Assistants (PDAs), electronic wrist watches, handheld video games, digital cameras, GPS systems.</td>
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<td>Robots</td>
<td>Industrial robots, autonomous vehicles, space exploration robots (i.e. Mars robots)</td>
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<td>Toys</td>
<td>Video Game systems, “Aibo”, &quot;Furby“, and “Elmo” type robot toys.</td>
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