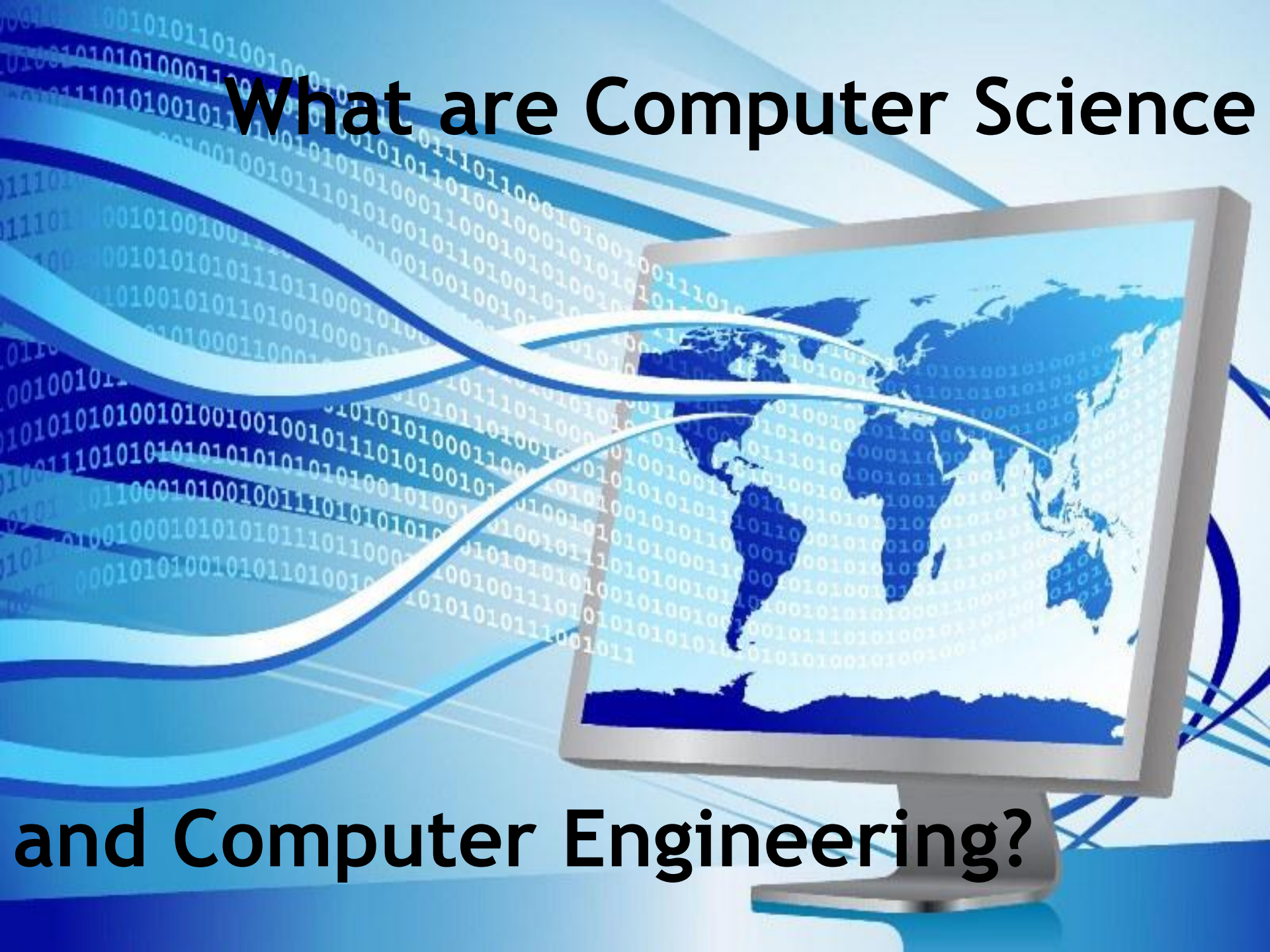
What are Computer Science and Computer Engineering?



Computer Science is…

The use of math and logic to develop an algorithm to solve a problem.

Computer science existed long before computers.

e.x. Binary – 3rd century

Allan Turing (1920s)

"Computer science is no more about computers than astronomy is about telescopes." – Edsger W. Dijkstra

Computer Science is…

- Not just using software, but being able to make your own or optimize existing ones.

  ex: Using Photoshop = Graphic Design

  MAKING Photoshop = Computer Science

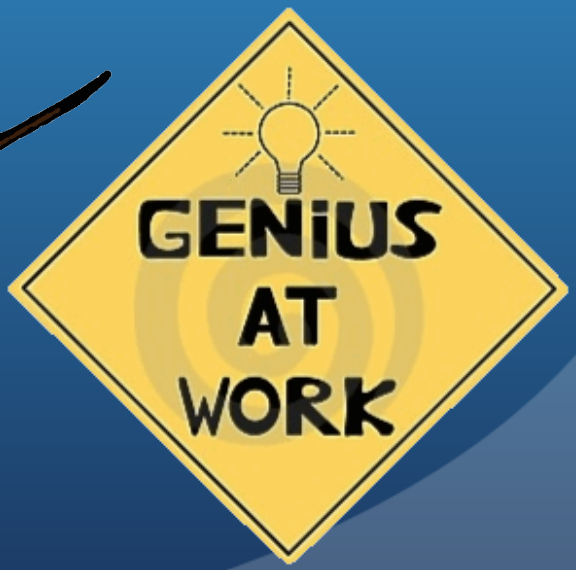
- Understanding how computers interpret the commands you give them and (the “psychology” of computers)

Many programs model complex systems and real-world phenomena, like physics systems in games and cinematic Special FX.

http://www.youtube.com/watch?v=JUdpFN4O4B0

You're the teacher

- A computer can only "learn" new things if you tell it how. It cannot think for itself.
- This means that if you want to model something, you have to understand how it works yourself before you can teach it to the computer.
- This means that Computer Scientists know how everything works which makes us geniuses.

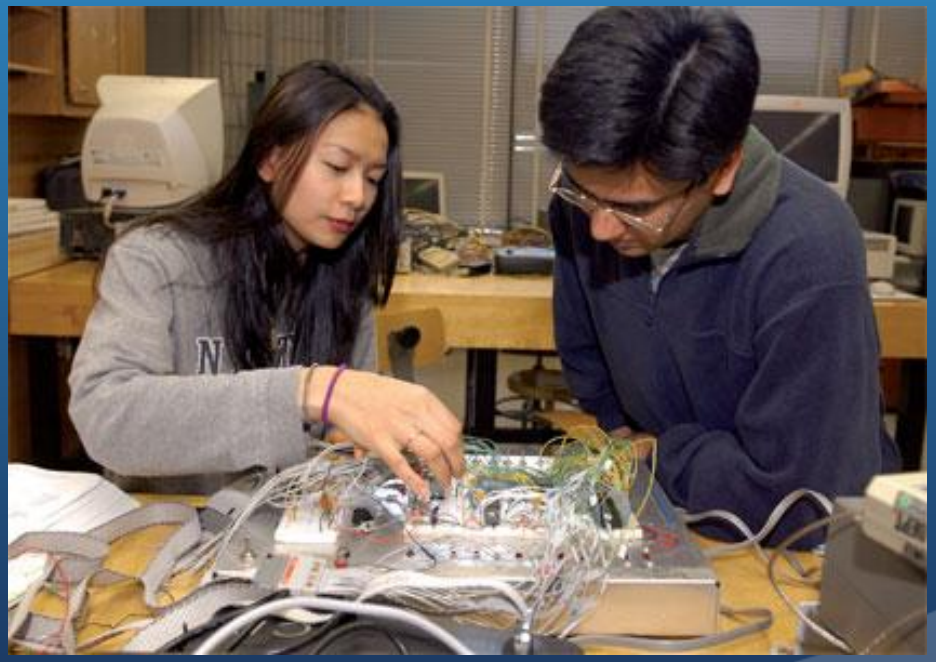


Computer Science is…

- Abstract: First you have to understand how a system works, as well as the math that goes into it.
- Concrete: Once you understand this system, you have to know how to put it into code that the computer will understand.

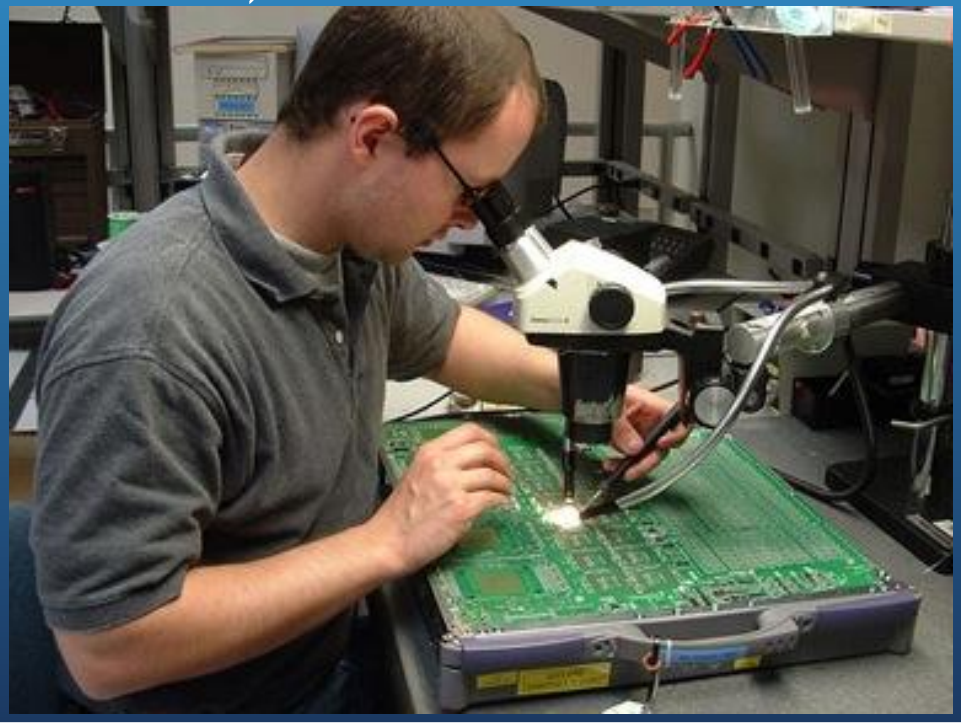
Computer Engineering is…

- While CS is mostly software based, CE is primarily hardware based (though there is some overlap)
- Designing and building computers and their parts
- Make computers faster, smaller, and more powerful. Computer Engineers lead the way in new technology.



Computer Engineering is…

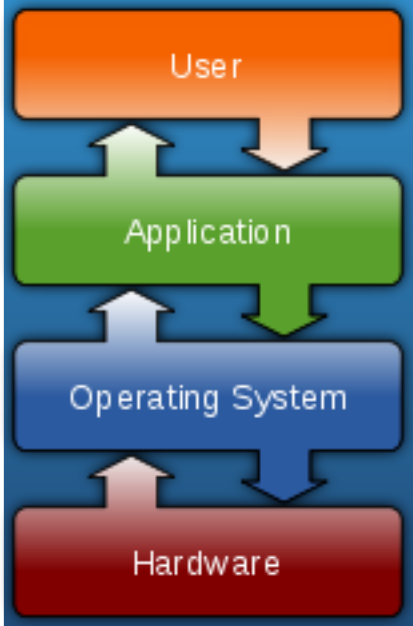
- Computer Engineers must know electrical engineering and some mechanical engineering. Both involve knowledge of physics.
- Build circuit boards, the chips that connect them, & all the devices and other hardware (CD/DVD drives)



A man soldering a motherboard

Computer Engineers also help design the OS

The OS acts as a bridge between the hardware and software, so OS developers need to work with engineers so that this bridge can be tailored to the physical system.



Computer Engineering is…

- Computer Engineers don't just work for companies that make computers
- Also found in Robotics, financial services, chemical companies, defense contractors, transportation, manufacturing, and anything that uses automated computer systems.

Conclusion

- Computer Science is problem solving- knowing how to manipulate computers to model and solve problems and perform tasks

- Computer Engineering is building the hardware and knowing how to make hardware and software work together