

CompSci 6

Programming Design and Analysis

<http://www.cs.duke.edu/courses/fall08/cps006>

Professor Robert C. Duvall

<http://www.cs.duke.edu/~rcd>

What is Computer Science?

What is it that distinguishes it from the separate subjects with which it is related? What is the linking thread which gathers these disparate branches into a single discipline? My answer to these questions is simple --- *it is the art of programming a computer*. It is the art of designing efficient and elegant methods of getting a computer to solve problems, theoretical or practical, small or large, simple or complex.

C.A.R. (Tony)Hoare

C.A.R. (Tony) Hoare (b. 1934)

- Won Turing Award in 1980
- Knighted by Queen Elizabeth in 2000
- Developed mechanism and theory for concurrent processing

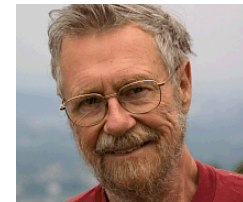


Computer Science and Programming

- **Computer Science is more than programming**
 - The discipline is called *informatics* in many countries
 - Elements of both science and engineering
 - Elements of mathematics, physics, cognitive science, music, art, and many other fields
- **To some programming is an art, to others a science, to others an engineering discipline**

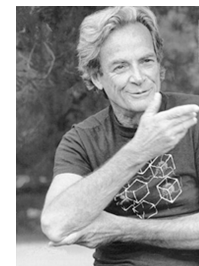
What is Computer Science?

- Computer science is no more about computers than astronomy is about telescopes.



Edsger Dijkstra

- Computer science is not as old as physics; it lags by a couple of hundred years. However, this does not mean that there is significantly less on the computer scientist's plate than on the physicist's: younger it may be, but it has had a far more intense upbringing!



Richard Feynman

Computer Science is a young discipline

- First computer science department formed in 1962

PURDUE
UNIVERSITY

1962



Samuel D. Conte
Professor emeritus of computer science and mathematics was the founding department head of the nation's first computer science program. October 1962.

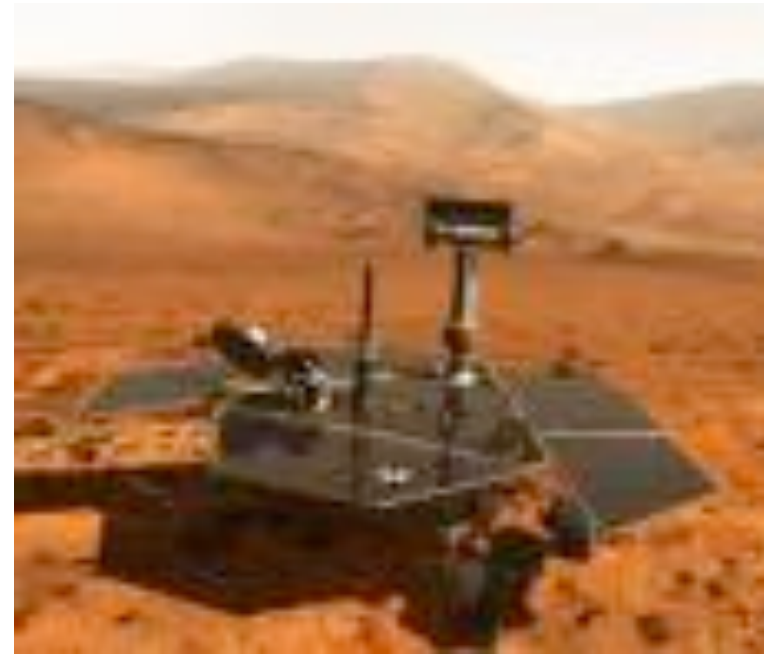
Computer Science is Diverse

- **Artificial Intelligence** thinking machines
- **Scientific Computing** weather, cars, heart, modeling
- **Theoretical CS** analyze algorithms, models
- **Computational Geometry** build and animate 3D models
- **Architecture** hardware-software interface
- **Software Engineering** engineering, science
- **Operating Systems** the soul of the machine
- **Graphics** from Windows to Hollywood
- **Databases** organize and retrieve information
- **Many other subdisciplines**

Artificial Intelligence



Roomba

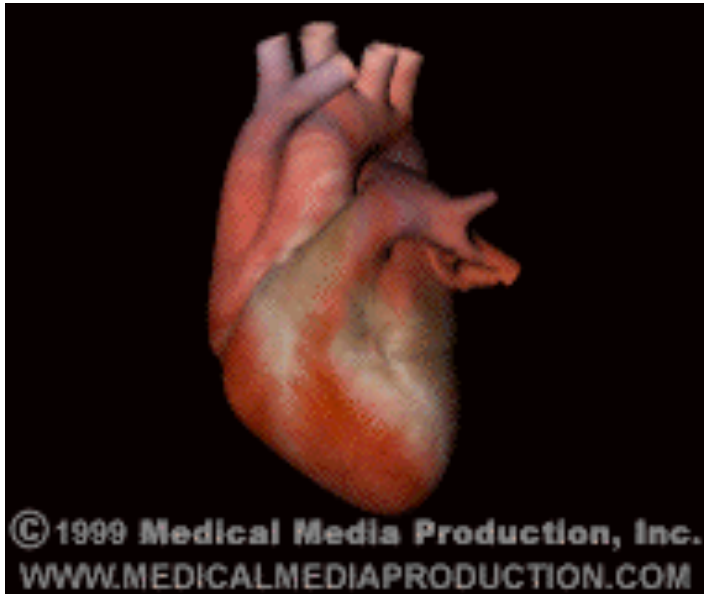


Mars Rover



CMU's Sandstorm

Graphics



The Incredibles from Pixar

3D Representation of the Heart

Organization of Data, and Searching



Web

Did you mean: [computer science](#)



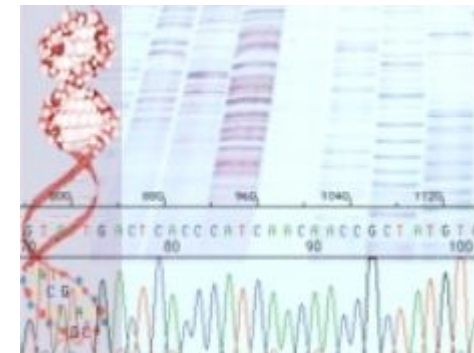
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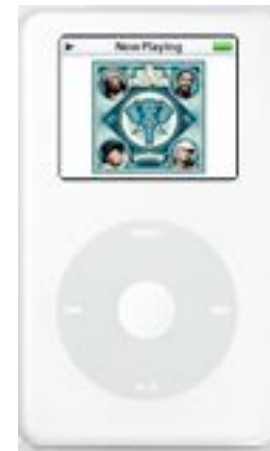
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Medical, Genomics Applications



Devices



What is Computer Science?



- What does a computer scientist do?
- What does a programmer do?
- What does a consultant do?
- What does a systems administrator do?
- What do you want to do?



Jobs in Computer Science

- **Jobs are plentiful and satisfaction is high**

- Money Magazine ranks "Software Engineer" #1 among "Top 10 Best Jobs"
- Five of their top six choices for the "the next job boom" are computer related
- Fortune Magazine ranks Google #1 among "100 Best Companies To Work For"

- **You can impact the world**

(from Google jobs announcements)

- **Have you imagined applying your education and experience to benefit millions of people around the world?**
- **Are you looking to work with really smart people and amazing technology in one of the most inspiring work environments on the planet?**
- **Do you have a passion for innovation and want to help shape the future?**

Why is programming fun?

What delights may its practitioner expect as a reward?

First is the sheer joy of making things

Second is the pleasure of making things that are useful

Third is the fascination of fashioning complex puzzle-like objects of interlocking moving parts

Fourth is the joy of always learning

Finally, there is the delight of working in such a tractable medium. The programmer, like the poet, works only slightly removed from pure thought-stuff.

Fred Brooks

Scientists and Engineers

- **Scientists build to learn, engineers learn to build**

- Fred Brooks



- **Duke Alum**
- **Chair of Computer Science at UNC**
- **Turing Award Winner**