# Introduction To Computer Science

**In this section you will get
an overview of some areas
of Computer Science.**

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# Introduction To Computer Science

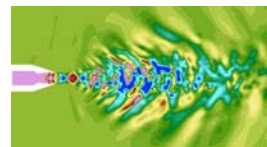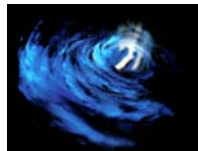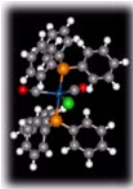• What is Computer Science?

# Introduction To Computer Science

•What is Computer Science?

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# Introduction To Computer Science

•Computer Science is about problem solving

# Computer Science Is Not The Same As Computer Programming

•Computer Science does require the creation of computer programs ('programming') but goes beyond that.
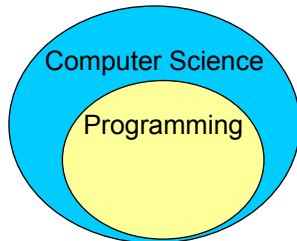
Computer Science

Programming

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# Some Areas Of Study And Research In Computer Science

•Human-Computer Interaction
•Computer Graphics
•Information Visualization
•Databases
•Computer theory
•Computer networking and distributed systems
•Artificial Intelligence
•Computer Vision
•Software Engineering
•Games programming

This list provides only a brief introduction to the different areas of Computer Science and is far from comprehensive:
For a more updated list: http://www.cpsc.ucalgary.ca/Research/

# Some Areas Of Study And Research In Computer Science

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- Databases
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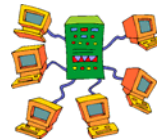
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# Human-Computer Interaction (HCI)

- Most of Computer Science deals with the 'technical' side of computers.
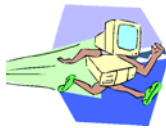


Run computers faster!

Make computers store more information!!

Increase the networking capabilities of computers!!!

- These technical issues (and others) are all very important but something is still missing...

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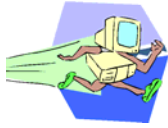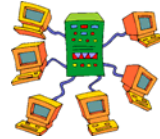
Increase the networking capabilities of computers!!!

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# **Human**-Computer Interaction

- ...but don't forget about the other side of the relationship.
- No matter how powerful the computer and how well written is the software, if the user of the program can't figure out how it works then the system is useless.
- Software should be written to make it as easy as possible for the user to complete their task. (Don't make it any harder than it has to be).
- This is just common sense and should/is always taken into account when writing software?
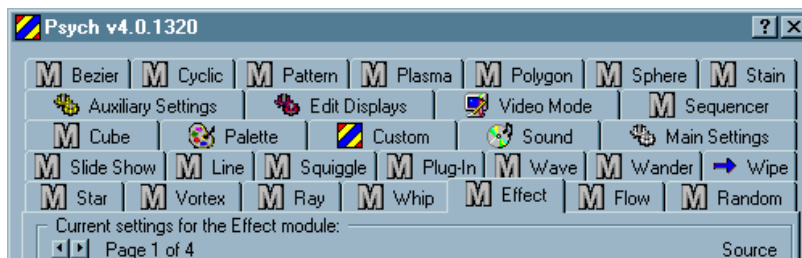
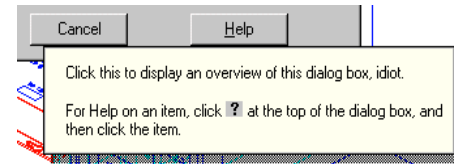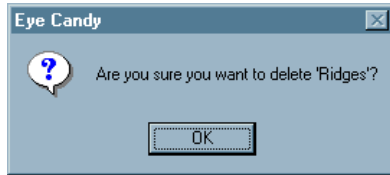# Human-Computer Interaction: Not Just Common Sense Information
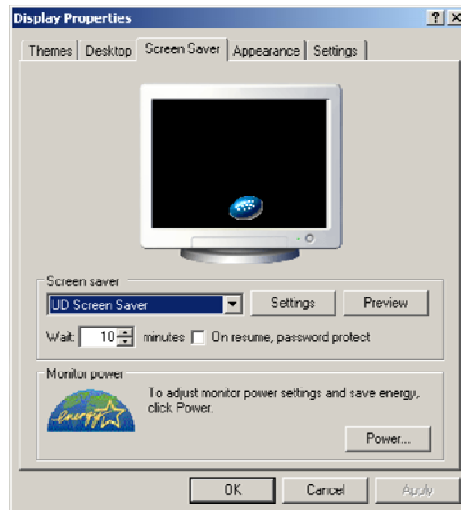


James Tam

# Human-Computer Interaction: Not Just Common Sense Information (2)


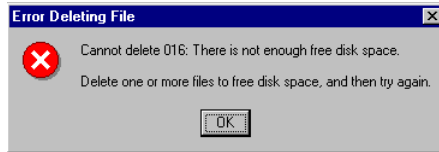
James Tam

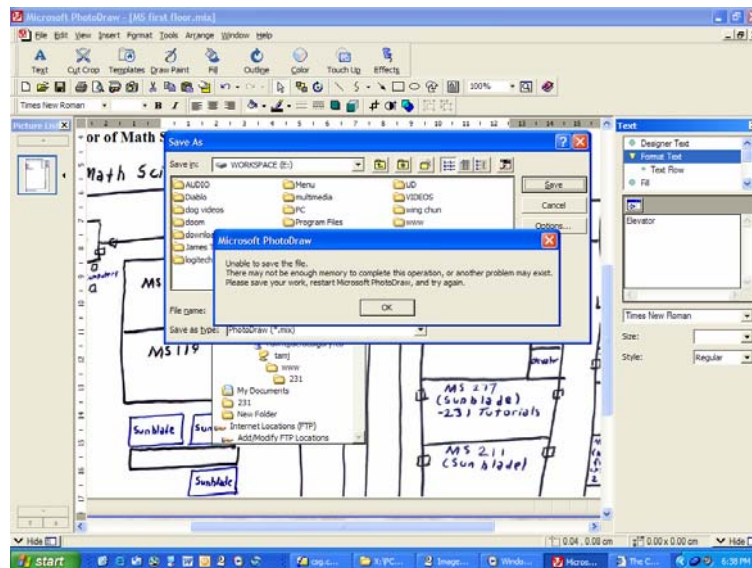# Human-Computer Interaction: Not Just Common Sense Information (3)



AutoCAD Mechanical

Windows 95

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# Human-Computer Interaction: Not Just Common Sense Information (4)

# Ways Of Including The 'Human' In The Development Process

- Get in touch with real people who will be potential users of your system.
- Spend time with them discussing how the system might fit in to their work.
- Learn about the user's tasks:
  - Articulate concrete, detailed examples of tasks they currently complete or those that they want to complete (ones that they want to do but can't do with the existing system)

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# Ways Of Including The 'Human' In The Development Process (2)

- All this may seem simple and common-sense but a surprising number of systems are completed with no user involvement or with the end-user seeing only the completed system.

# Computer Graphics

•Concerned with producing images on the computer.



Gran Turismo 5 Prologue © Sony

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# Computer Graphics: Issues

•How to make the images look "real"?



From http://klamath.stanford.edu/~aaa/
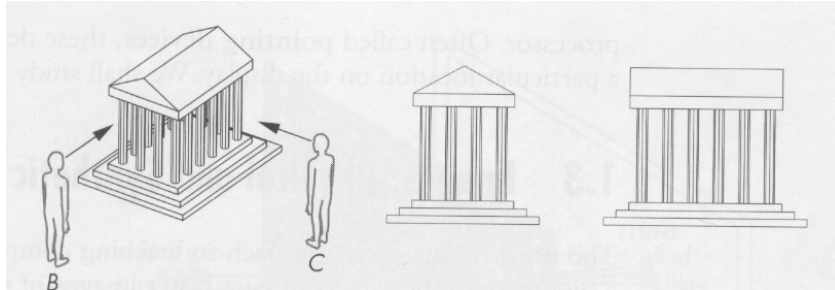


Final Fantasy: The spirits within © 2001 - Columbia Pictures

# Computer Graphics: Highly Mathematical

•Highly mathematical

# Computer Graphics: Still A Long Way To Go

•"Even though modeling and rendering in computer graphics have been improved tremendously in the past 35 years, we are still not at the point where we can model automatically, a tiger swimming in the river in all it's glorious details." [1]



[1] From "The Tiger Experience" by Alain Fournier at the University of British Columbia
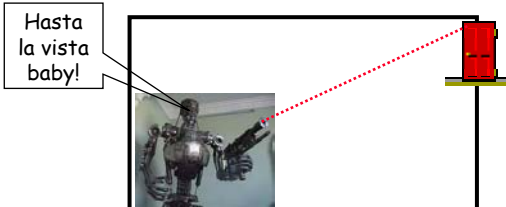
# Artificial Intelligence

• What makes a person smart?
• How do we build a smart machine?
  - How to make a machine think like a person?
  - How to make a machine behave like a person?

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# Artificial Intelligence (2)

• Approaches:
   1) Trying to simulate a person (strong equivalence)



Hasta la vista baby!

   2) Trying to simulate what the person can do

# Artificial Intelligence (2)

- Approaches:
  1) Trying to simulate a person (strong equivalence)



  2) Trying to simulate what the person can do (weak equivalence)
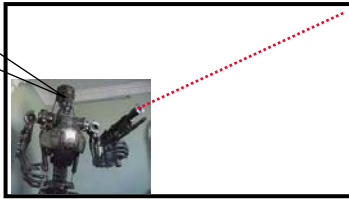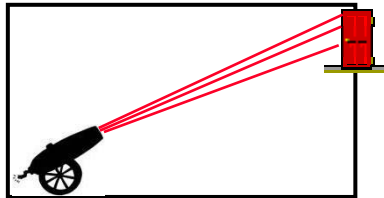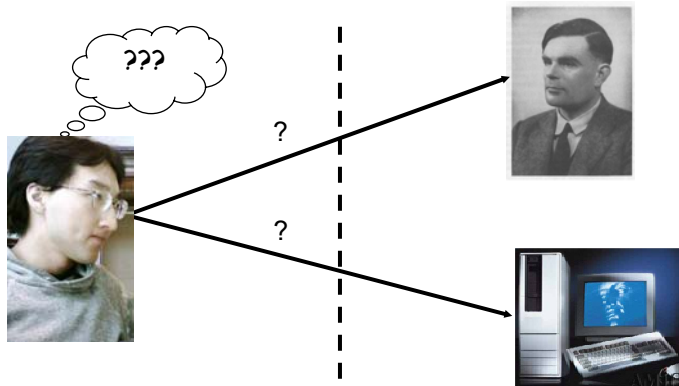
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# Artificial Intelligence (3)

•How do we know we have a "smart machine"?
  - The Turing test

# Artificial Intelligence (4)

•Much work still needs to be done



Photo from www.startrek.com © Paramount

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# Computer Vision

•Determining what an object is based on it's visual appearance
- Hand writing recognition: six?
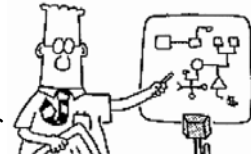


- Analyzing digital video: studying running styles



For more information: http://pages.cpsc.ucalgary.ca/~parker/DML/welcome.html or
http://vma.cpsc.ucalgary.ca/projects

# Software Engineering


Dilbert © United Features Syndicate

- Concerned with employing systematic ways of producing good software on time and within budget.
- One approach employed is 'pair programming':



Image from http://collaboration.csc.ncsu.edu/laurie

# Games Programming

- Pulls together many areas of Computer Science
- The University of Calgary was the first Canadian university to offer this area of study.

**<< Warning!!! >>**

**Blatant advertisement**

**<< Warning!!! >>**


"Scarface: The World is Yours" © Radical Entertainment