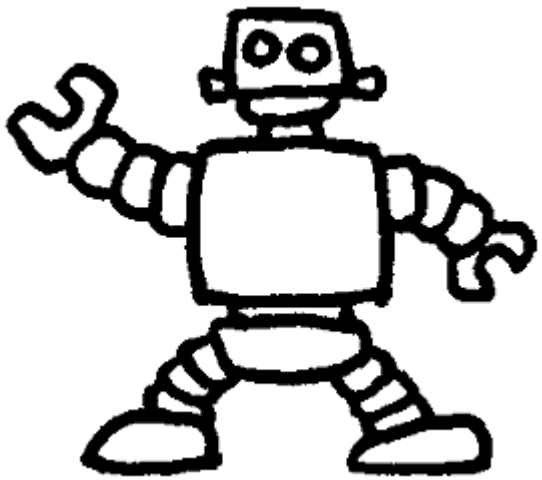
ROBOTS

An introduction



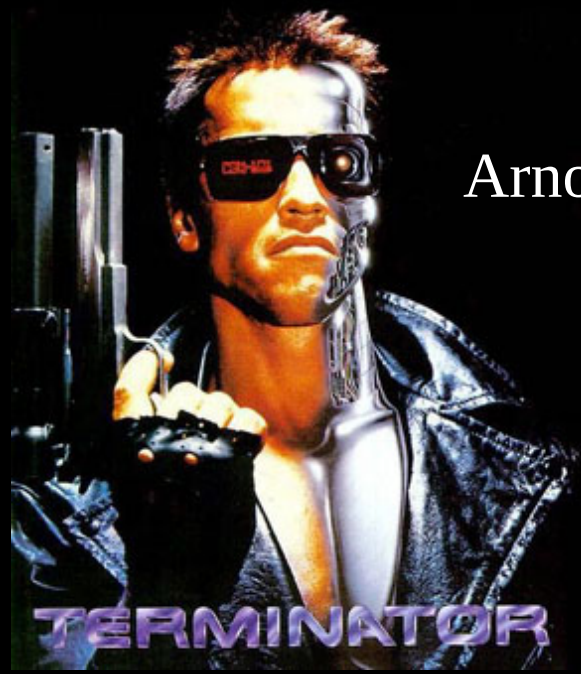
What is a robot?

Main Entry: ro·bot
Pronunciation: 'rO-"bät, -b&t
Etymology: Czech, from robota compulsory labor
1 a : **a machine that looks like a human being** and performs various complex acts (as walking or talking) of a human being; also : a similar but fictional machine whose lack of capacity for human emotions is often emphasized b : an efficient insensitive person who functions automatically
2 : **a device that automatically performs complicated often repetitive tasks**
3 : a mechanism guided by automatic controls

Examples of Robots

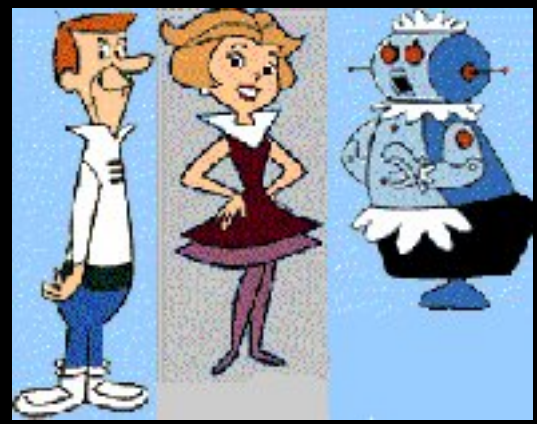
CP30

R2D2



Arnold

Aibo



Rosie

Not-so-well-known bots…

Factories:

- Coca-cola
- Cars
- Krispy Kreme

Universities:

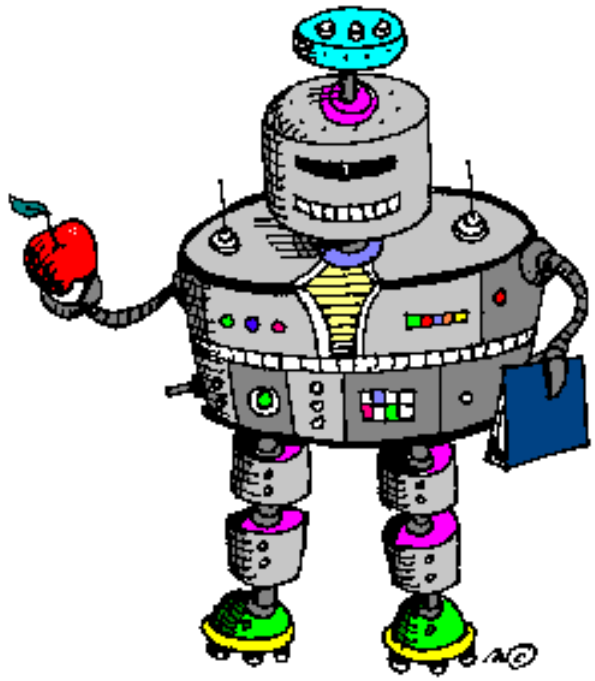
- Minerva, a robotic tour guide developed by Carnegie Mellon *(and the University of Bonn)*
- Humanoid robots at MIT
- The Roomba home Vacuum!

Also think about robots for long distance surgery and outer space… any other ideas?

How difficult is it to create a robot that works?

Use the tour guide example

- What are the functions of a human tour guide?
- How many of those things can a robot do?
- How will it interact with people?
- What are some of the major problems?



Robots need a way to "sense" the world around them. This is where sensors come in!

Sensors

What “sensors” do **we** have? Think about our 5 senses.

eyes
sight

ears
hearing

skin
touch

nose
smell

tongue
taste

Which of these senses can a robot have?
What if you could only use *certain* senses?

Robots can't see...

Get into pairs. One of you is a programmer, the other is a robot. Robots have to obey instructions from their programmers.

Instructions for Programmers

1. Blindfold your 'robot'. Issue instructions (e.g. two steps forward, turn right, etc.), and guide your bot around obstacles.

Now switch places, and let's make things more interesting

2. Take your robot outside. Spin your robot around so it is disoriented. Now tell your robot to wander around on its own. Let it try to find its way back to the MSLab. Alert your robot of obstacles.

Limitations of Robots

It's easy to…

Tell a robot exactly what to do, and when to do it

It's difficult to…

Make a robot intelligent enough to do things like *avoid obstacles* or *guess where it is*

A more complex robot is MUCH more useful (not to mention *way* cooler)

But it depends on how good our sensors are, and how well we can program