

Welcome to COMP102!

About myself

- **Name:** Svetlana Stolpner
- **Education:** Ph.D. student in Computer Science
- **Research:** Interpreting visual information by a computer



About you

- What are your names?
- What are you studying?

About the course

- **Prerequisites:** No knowledge of computer science!
- **Topics:**
 - History of Computing
 - Hardware
 - Programming
 - Algorithm Design
 - Social Aspects
 - Artificial Intelligence

This course is *not* about

- This course will *not* teach you how to *use* particular computer programs
- Your understanding of *how* computers *work* should ease the stresses of using computers

Course Outline

- **Evaluation**
 - Participation 5%
 - Come to class and partake in discussions
 - 5 Assignments
 - Best 4/5 worth 10%, worst 1/5 worth 5%
 - Assignment 1 out next week
- **Course Website**
 - Post lecture slides, assignments, solutions, notices

Motivation

- What is a computer?
- What is the computer used for?

Computers Used For ...

- Calculating the **atom bomb** in 1945 using IBM punched card machines (2-3 weeks rather than 3 months of computation)



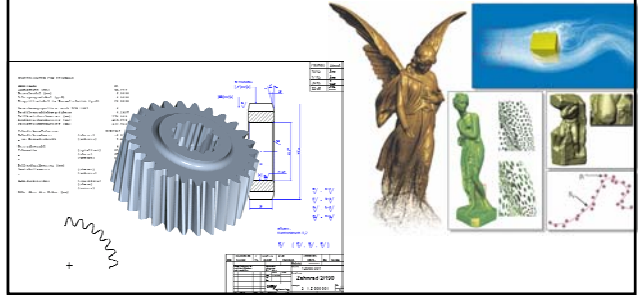
Computers Used For ...

- Simulations in physics, engineering



Computers Used For ...

- Engineering design and computer graphics



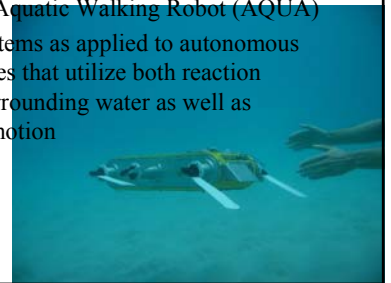
Computers Used For ...

- Space exploration
 - Rovers Spirit and Opportunity
 - 2 years past “warranty”



Computers Used For ...

- Robotics
 - Autonomous Aquatic Walking Robot (AQUA)
 - Intelligent systems as applied to autonomous aquatic vehicles that utilize both reaction against the surrounding water as well as walking locomotion



Computers Used For ...

- NurseBot
 - Lives in the home of a chronically ill elderly person
 - Intelligent Reminding
 - Tele-presence
 - Data collection and surveillance
 - Mobile manipulation: integrates robotic strength with a person's senses and intellects
 - Social interaction



Computers Used For ...

- Supercomputers
 - Human Genome Project (1990-2003)

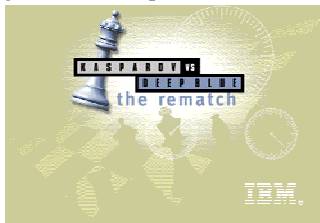
Goals:

 - *identify* all the approximately 20,000-25,000 genes in human DNA
 - *determine* the sequences of the 3 billion chemical base pairs that make up human DNA
 - *store* this information in databases
 - *improve* tools for data analysis



Computers Used For ...

- DeepBlue (1997)
 - Defeated reigning human champion
 - Capable of evaluating 200,000,000 positions per second



Computers Used For ...

- Planning Problems
 - Tracking inventory



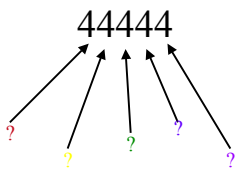
Computers Used For ...

- Voice Recognition
- Character Recognition

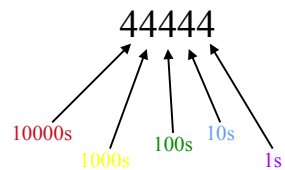


10 minute break

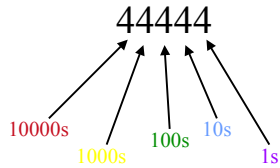
Numbers Are Represented in Bases



Numbers Are Represented in Bases



Numbers Are Represented in Bases



- Decimal System uses 10 digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
- Base 10
- Place-value number system

Origins

- Humans have 10 fingers (including thumbs)
- “digit” refers to finger as well as numerical quantity
- Used stones to represent larger numbers: “calculate” is derived from the Latin word for pebble
- Babylonians used base 60

Origins

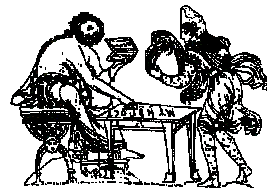
- Bones with notches carved into them found in western Europe, date from 20,000 to 30,000 years ago



The first evidence of the tally system.
Copyright (c) 1997 Macfield & Mathews Interactive Inc.

Abacus

- Invented by the Babylonians sometime between 1,000 BC and 500 BC (Chinese?)
- A flat stone covered with sand with pebbles being placed on lines drawn in the sand

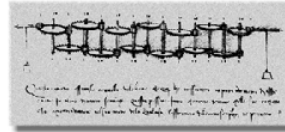


Abacus



Mechanical Calculator

- Conceived in 1500's by Leonardo da Vinci
- 1642: Blaise Pascal's Arithmetic Machine
 - Can only add and subtract



One of da Vinci's original sketches.
Courtesy of IBM



Pascal's Arithmetic Machine.
Courtesy of IBM

Leibniz

- *"It is unworthy of excellent men to lose hours like slaves in the labor of calculation, which could be safely relegated to anyone else if machines were used."*

- 1671: Leibniz introduced the *Step Reckoner*
 - Can multiply, divide, and evaluate square roots by series of additions



Leibniz's Step Reckoner.
Courtesy of IBM

- Derivations of these machines continued to be produced until their electronic equivalents finally became readily available and affordable in the early 1970s

Next Class

- **Guest lecturer:** Scott McCloskey
- **Topics:**
 - History of Computation
 - Survey
- **Office hours** this week canceled