CS 150
Introduction to Computer Science 1

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What is CS150?

- CS150 is a programming course
- You will learn
  - The mechanics of writing programs in C++
  - How to solve complex problems using C++
  - How to break a large problem into smaller, more manageable problems
  - How to formulate algorithms to solve problems
- You do not need any previous programming or computer skills to take this course

How to Succeed in CS150

- Don't miss class. It is very difficult to pick up any material that you miss
- Try and read ahead even if you don't understand much
- Start programming assignments early
- Do as much on your own as possible. The more help you get the less sure of yourself you will become

How to Succeed in CS150

- Read the assignments carefully and follow all directions
- See me as soon as possible about any in class information that you are unclear on
- Attack the computer, you can't hurt a thing!

Course Schedule

- The course schedule I have given you is tentative. I expect to follow this schedule, but I may have to adjust it from time to time
- The online schedule will be accurate and up to date. That is the schedule that you should refer to when studying or revising

Introduction to Computers and Programming

Chapter 1

Topics

- What are computers?
- A little bit of history
- Computer basics
- Programming languages

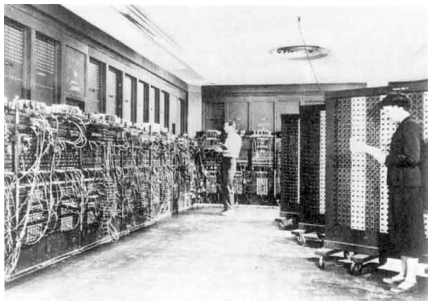
What is a Computer?

- What is your definition?
- The most important thing to remember is that a computer is a machine that follows directions. In the case of programming, the machine is following *your* directions exactly
- You need to be very specific about what you want the computer to do

History

- First electronic digital computer
  - Late 1930's at Iowa State
  - Dr. John Atanasoff and Clifford Berry
  - Mathematical computations for nuclear physics
- First large-scale, general purpose computer
  - ENIAC in 1946 at U. Penn. for US Army
  - J. Presper Eckert and John Mauchley
  - Weighed 30 tons and occupied 1500 sq. ft.
  - Cost $500,000 to develop and build
  - Used for calculating ballistics tables, predicting weather and making atomic energy calculations

Picture of ENIAC



Von Neumann Architecture

- Dr. John von Neumann proposed the concept of a stored-program computer
- In ENIAC data is stored in memory, so why not a program
- The von Neumann architecture is the basis of the digital computers we know today

Today

- Most of us use microcomputers
  - First developed in 70's
  - Small processor
  - Mac's and PC's are examples

Hardware

- Physical components of a computer
  - Central Processing Unit (CPU)
  - Main Memory (RAM)
  - Secondary Storage
  - Input Devices
  - Output Devices
- Let's look at each of these in detail

CPU

- A CPU
  - Fetches instructions
  - Follows instructions
  - Produces results
- A CPU consists of
  - Control unit: coordinates computer operations
  - ALU: performs arithmetic operations

Memory

Address	Contents	
0	-27.2	-Memory is a sequence of storage cells
1	354	-Memory cells are 1 byte in size
2	0.05	-Bytes are groups of bits (8 usually)
3	-26	-Bytes are groups of bits (8 usually)
4	H	-Bits are 0 or 1
5	400	-Each memory cell has unique address
6	RTV 001	-Contents can be data or instruction
7	ADD 003	-Contents can be data or instruction
8	STO 005	-Everything stored as strings of 0s & 1s
9	X	-Everything stored as strings of 0s & 1s
10	1005	-RAM is volatile

Secondary Storage

- Not volatile
- Disk drives
  - Hard disks
  - Floppy disks
  - Zip disks
- Optical drives
  - CDs
  - DVDs

Input/Output Devices

- Input: sends information to the computer from outside
- Output: sends information from the computer to outside
- Examples?

Software

- Operating System
- Application Software

Question

- Can computers think?
- Computers need a list of instructions to perform operations
- These instructions are *programs*

Program

- Program
  - Set of instructions directing a computer to perform a task
- Programming language
  - A language used to write programs
  - Examples?

Programming Language

- Machine language
  - Zeroes and ones
  - Machine dependent
- High level language
  - Instructions look like everyday English
  - Each instruction can perform many machine language instructions

C++

- Based on the C programming language
- C++ is a high level programming language
- One of today's most popular programming languages
- Used extensively in industry

Summary

- Today we have looked at:
  - The history of computers
  - The hardware of computers
  - The software of computers
  - Concept of programming
- Next time we will:
  - Start coding
- Completed sections 1.1 - 1.3 from the book
  - Pages1-9