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

What You Can Expect from Me

I will begin and end lectures and labs on time

I will post all class notes, assignments and labs online

I will try to follow the course outline as closely as possible

I will be available to help you, but you must let me know that you need help

What You Can Expect from Me

I will be available during the scheduled office hours

I will answer emails promptly

I will grade fairly and responsibly, returning your assignments to you in a timely manner. I do not grade on a curve, and will grade each assignment on its own merit

I will do my best to help you, but I cannot learn the material for you

What I Expect from You

You have read the syllabus, are aware of what will be covered and the workload required

You will attend class and lab regularly and on time

You will be responsible for all material that we cover in class

You will turn off any noisy devices (cell phones, watch alarms) during class

What I Expect from You

You will turn in your assignments on time

You will take every exam with the rest of the class unless you have a doctors note and notify me in advance

You will participate fully in class (take notes, ask questions, respond to questions)

You will ignore the computers during class unless I specifically tell you to use them

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

High Thoughts Must Have a High Language

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
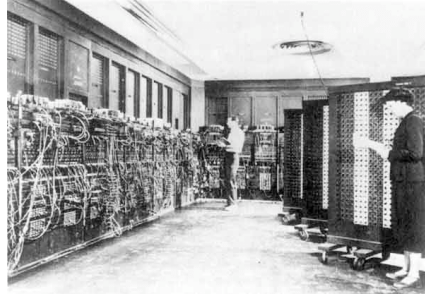
Von Neumann Architecture

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

Main Memory

Secondary Storage

CPU (central processing unit)

Input Devices

Output Devices

ALU (arithmetic and logic unit)

Memory

Address	Contents
0	-27.2
1	354
2	0.05
3	-26
4	H
5	400
6	RTV 001
7	ADD 003
8	STO 005
9	X
10	1005

-Memory is a sequence of storage cells

-Each memory cell has unique address

-Contents can be data or instruction

-Memory cell composed of bytes

-Bytes are groups of bits (8 usually)

-Bits are 0 or 1

-Everything stored as strings of 0s & 1s

Memory

Main Memory
- o RAM
- o ROM

Secondary Storage
- o Hard disks
- o Floppy disks
- o CD ROMs

CPU and ALU

CPU
- o Its job is to coordinate all operations

ALU
- o Performs arithmetic operations

Today, CPU's are integrated circuits

Software

Operating System

Application Software

Programming Language Compiler

Question

Can computers think?

No

Computers are dumb

Computers need a list of instructions to perform operations

These instructions are *programs*

Programming Language

Machine language
- o Zeroes and ones
- o Machine independent

Assembly language
- o English-like abbreviations to represent computer instructions

High level language
- o Instructions look like everyday English
- o Each instruction can perform many machine language instructions

C++

C++ is a high level programming language

One of today's most popular programming languages

Used extensively in industry

The book says "C++ is a challenging language that is taught only to experienced programmers" (p.2)

Summary

Today we have looked at:
- o The history of computers
- o The hardware of computers
- o The software of computers

Next time we will:
- o Start coding

Completed sections 1.1 - 1.19 from the book