CS 150
Introduction to Computer Science 1

Professor: Chadd Williams

chadd@pacificu.edu

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
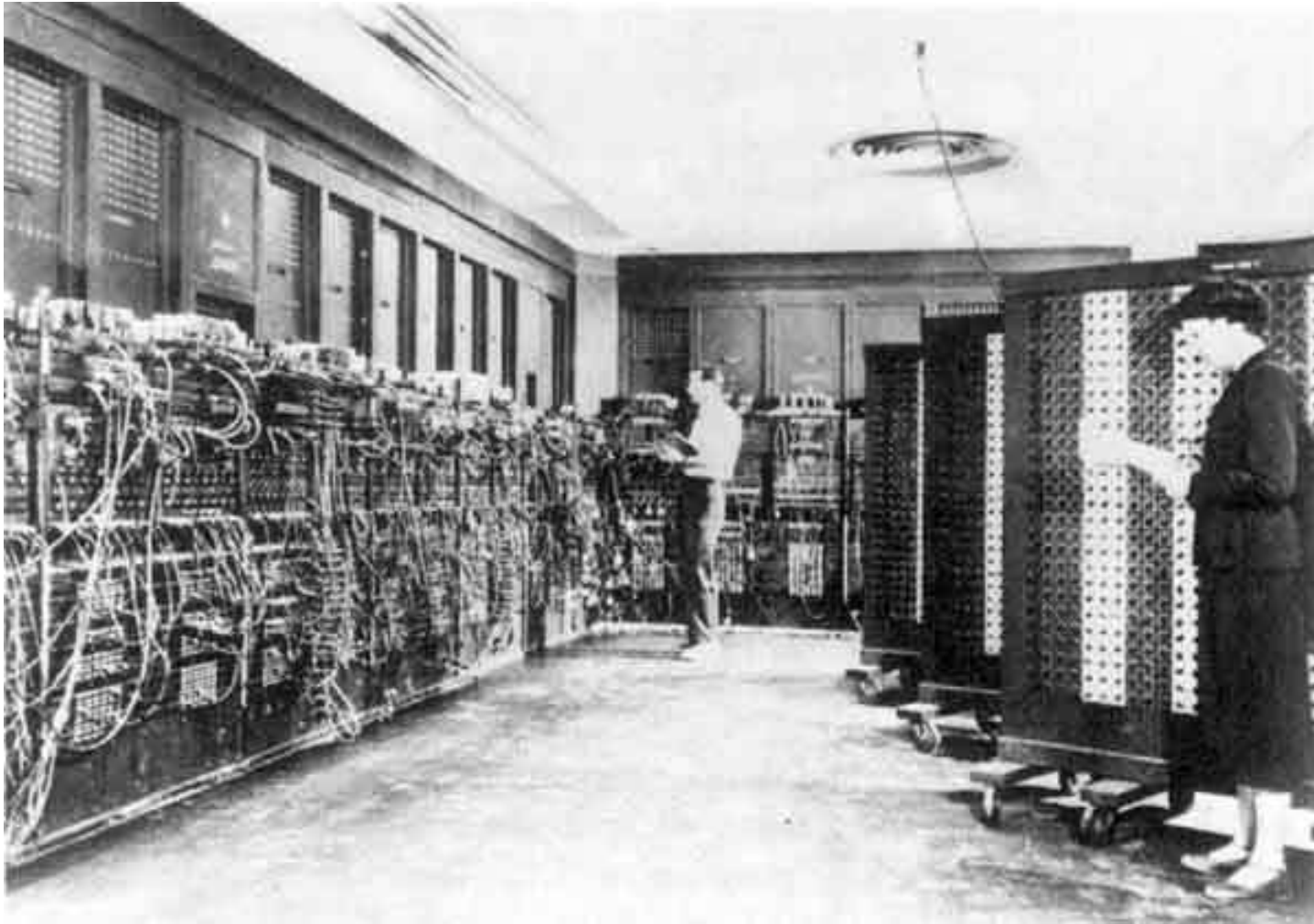
Von Neumann Architecture

- 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

  o First developed in 70's

  o Small processor

  o 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

  - o Fetches instructions

  - o Follows instructions

  - o Produces results

- ## A CPU consists of

  - o Control unit: coordinates computer operations

  - o ALU: performs arithmetic operations

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

-Memory cells are 1 byte in size

-Bytes are groups of bits (8 usually)

-Bits are 0 or 1

-Each memory cell has unique address

-Contents can be data or instruction

-Everything stored as strings of 0s & 1s

-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

  o Set of instructions directing a computer to perform a task

- Programming language

  o A language used to write programs

  o Examples?

Programming Language

- ## Machine language

  - o Zeroes and ones

  - o Machine dependent

- ## High level language

  - o Instructions look like everyday English

  - o 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