CS 150 Introduction to Computer Science I

Professor: Douglas J. Ryan
ryandj@pacificu.edu

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CS150 Introduction to Computer Science I

What is CS150?
• CS150 is a programming course
• You will learn
  o The mechanics of writing programs in C++
  o How to solve complex problems using C++
  o How to break a large problem into smaller, more manageable problems
  o 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 be available to help you, but you must let me know that you need help
• I will be available during my scheduled office hours

What You Can Expect from Me
• I do not correspond well using email, so please use the scheduled office hours or phone me.
• 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

Course Schedule

- I will maintain an online schedule that will be accurate and up to date. The online schedule will contain all reading assignments, notes, and assignments.
- I will try and put out class notes at least one hour before class to allow you to print the notes if you so desire.

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

Von Neumann Architecture

- Dr. John von Neumann proposed the concept of a stored-program computer
- 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

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- 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?
• 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