INTRODUCTION TO CSCE 221 - LAB

BASIC OF COMPUTERS, C++, UNIX, AND HELLO WORLD
Computers

- Basic architecture
  - Memory stores the data
  - CPU is the brain
    - Fetches data to and from memory
    - Interplay with IO

- CPU
  - ALU
  - Registers
  - Control Logic

- Memory
  - Data
  - Instructions

- Input Devices

- Output Devices
COMPUTERS

• Important as a programmer to understand how your program and rest of computer interact!
MEMORY

Function Stack  (Statically Allocated)

Heap  (Dynamically Allocated)
• Data
  • Type – defines possible actions (primitives, classes – user-defined, templates)
  • Variable – instance in memory
  • Declaration – Tell the compile variable, function, or type exists
  • Definition – Initializing value of variable, full specification of type or function

• Example
  • int i; //declaration
  • Foo bar(10); //declaration + definition
C++ REVIEW

• Operations
  • Math operations (+, -, *, /, %)
  • Comparison (==, !=, >, <, etc)
  • Assignment (=)
  • Access ([], (), *, -)
  • Boolean (&, ^, !, &&, ||, etc)
  • etc
C++ REVIEW

• Loops
  • Basic for
    • for(int i = 0; i < 10; ++i);
    • for(iterator i = begin(); i != end(); ++i);
  • Basic while
    • while(!done) do_something();
  • Basic do while
    • do { something(); } while(!done);
C++ REVIEW

• Functions
  • Basic signature
    return_type function_name(param1, param2, ..., paramN);
  • Example
    • void foo(int, char);
    • Foo bar(int i, char c);
LINUX

- PuTTY is an application to establish SSH connections
- Development machine: linux.cse.tamu.edu
- Open a PuTTY session and log into linux
BASIC UNIX COMMANDS

• cd: change directory
• mkdir: make directory
• ls: list items in a directory
• g++-4.7: invoke GNU’s C++ compiler
• vim / emacs / nano: text editing
Quick start guide
Vim cheat sheet
Vim settings file – put in home directory labeled “.vimrc”
HELPFUL TOOLS FOR LINUX

• **gdb** – debugging tool for Linux
• **valgrind** – memory leak detector/memory profiler
• **screen** – helpful when working remotely in a terminal. Saves the terminal session even if the network connection cuts out
• **LaTeX** – tool for creating documents
• **top** – monitor the system processes
EXERCISE – HELLO WORLD

• Make a directory called `lab1` in your home folder
  • Type `mkdir lab1`
  • Type `cd lab1`

• Create a file called `hello.cpp` using vim
  • Type `vim hello.cpp`
  • Write hello world to the screen
    • Type `i` to go to insert mode then type the program
    • Type `esc` to go to command mode and `:wq` to save and quit vim

• Compile using `g++ -4.7` and run your application
  • Type `g++-4.7 hello.cpp -o hello` to compile
  • Type `./hello` to run the program