CS 161
Intro to CS I
Beginning to Program
Odds and Ends

• Labs and recitations start this week!
• Lab is separate from recitation.
• Assignment #1 posted.
• We are holding office hours this week!
• Read online resources:
  – Halterman (Chap 1-3)
  – O’Reilly (Chap 1-3)
  – Tutorial Pt. (Chap 1-8)
  – Gray (Part 1 Intro – Historical perspective)
More Binary

• What is each digit called?
• What is a Byte?
• How many numbers can be expressed in a Byte?
  – Signed/Unsigned
• What is the smallest number?
• What is the largest number?
Intro to Macros

• C++: `<climits>`
• Use MIN and MAX macros from library
  http://www.cplusplus.com/reference/clibrary/climits/
  (Note that the values listed are not the values on our system!!!)
  – INT_MAX
  – INT_MIN
  – LONG_MAX
  – LONG_MIN
  – SHRT_MAX
  – SHRT_MIN
• Remember unsigned too...
Programming

• Writing **code** that a computer can **execute**
  – Does that mean we have to write in binary?

• High-level language
  – Translated Continuously during runtime
    • Interpreted
    • Just in time compilation/caching
  – **Translated Prior/Ahead of time to runtime**
    • High-level -> machine language
    • High-level -> intermediate language
C++ Programming Environment

• Type a program in a .cpp file, `vim hello.cpp`
• Compile program file, `g++ hello.cpp -o hello`
• Run the compiled version, `hello`
• Example: `hello.cpp`

```cpp
#include <iostream>
int main() {
    std::cout << "Hello CS 161 Class!!!";
    return 0;
}
```
Demo...
More C++

• Libraries
  – Example: #include <iostream>

• Functions
  – Perform particular action/computation
  – Requires special function: main
    • int main() {....}

• Statements
  – Ended by semicolon
  – Examples:
    • std::cout << “Hello World”;
    • return 0;
More C++

• Programming Style: please read your class style guide
  – Program Header/Description
  – Placement of {}
  – Indentation: spaces vs. tabs

• String Literals (Strings)
  – Quotation marks not single quotes!
    • INCORRECT: std::cout << ‘Hello World’;
  – Do not span more than one line!
    • INCORRECT: std::cout << “Hello World”;
Demo...
More C++

• Escape Sequences
  – Display special characters
  – Use backslash, \\', before special character to print

• Examples:
  std::cout << "\"Hello World\"\n";

• Refer to online resources for common escape sequences.
Comments

• Ignored by compiler
• Comment a block of code: /*.....*/
• Comment one line of code: //
• Why use these?
• What are you required to have right now?
  – Header at beginning of program
    /**************************************************
    ** Program: hello.cpp
    ** Author: Jennifer Parham-Mocello
    ** Description: This program prints hello world to the console
    ** Input: none
    ** Output: hello world text
    /***************************************************/
Demo...
Data Type

• What is data?
  – Information
  – Ex: `std::cout << "Hello World!" << std::endl;`
  – Simple value
    • Literals, e.g. 23, 79.5, "Hello", etc.

• What is a data type?
  – Description of the kind of information
    • Primitive Data
    • User Created – (we will cover later)
C++ Primitive Types

• char, double, float, int, long, short, bool
• Fundamental
  – int: whole numbers, e.g. 45, -89, 0
  – double: real numbers, e.g. 2.612, -30.5, 2.3e5
  – char: characters, e.g. ‘A’, ‘&’, ‘x’, ‘\’
• Refer to online resources...
Variables

• What is a variable?
  – Memory location with name and type to store value

• What is a declaration?
  – Statement requesting variable w/ name and type
  – Examples:
    double height;
    int age;
Variables/Identifiers

• Identifier: name given to item in program
  – Ex. Variables and Functions
  – Start with letter
    • Letters include: upper-case, lower-case, underscore (_)
  – Followed by sequence of letters and digits
  – Good examples: hiThere, two_plus_two, _hello
  – Bad examples: 5dogs, hi-there, hello there

• Can’t Use Keywords, refer to online resources...
Variables

• How do we get a value in the variable?
  – Assignment Statement
    ```java
    int age;
    age = 20;
    Or
    int age = 20;
    ```
  – = IS NOT equal to!!!!!!
    • “gets” or “is assigned”
Printing Variables

• C++: cout
  – Example:
    ```cpp
    std::cout << “The integer value is: ” << value;
    ```
  – What about the newline?
Demo...
Constants

• What is a constant?

• How do we define a constant?
  – Use of a macro
    • #define
    • Placed at top of program
    • No semicolon at end
    • Example: #define MAX_SIZE 100
  – Use of const
    • Same as declaring variable but const
    • Example: const int MAX_SIZE = 100;
Demo...