CS 161
Intro to CS I

Variables, Constants, Expressions, and User Input
Odds and Ends

• Assignment 1 due tonight!!!
• Please make sure you have a way to get information onto/off the ENGR server.
  – Map a network drive
  – Transfer files: Filezilla
• Assignments must compile and run on ENGR!
• Demos start this week (no laptop required).
• Sign-up for demo on home page, after you submit your assignment.
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”;
More C++

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

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

• Refer to book 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
  ***************************************************/
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 book for types and sizes
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 book...
Variables

• How do we get a value in the variable?
  – Assignment Statement
    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?
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;
Intro to Macros

- C++: `<climits>`
- Use MIN and MAX macros from library
  (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...
Expressions

• What is an expression?
  – Set of operations producing a value
    • Combining simple values
      12 * 4 + 6 * 10 vs. ((12 * 4) + 6) * 10
Expressions cont.

• Pieces of an Expression:
  – Operators
    • Indicate operation, e.g. +, *, /, -, %
  – Operands
    • Values in the expression
  – Evaluation
    • Process of obtaining results from operations on operands
Arithmetic Operators

• Add
  34 + 23
• Subtract
  34 - 23
• Multiply
  2 * 23
• Divide
  40 / 10
• Remainder/Mod
  34 % 5
Arithmetic

• Integer Arithmetic
  std::cout << 3/8;  /*prints 0*/
  std::cout << 34/5;  /*prints 6*/

• Floating Point Arithmetic
  std::cout << 34.0/5.0;  /*prints 6.8*/
  std::cout << 3.0/8;   /*prints .375*/
  std::cout << 3/8.0;   /*prints .375*/
Type Casting

• Casting

```cpp
std::cout << 34 / (int) 5.0; /*prints 6*/
std::cout << (int) (34 / 5.0); /*prints 6*/
std::cout << (float) 34 / 5;    /*prints 6.8*/
```

• What is wrong with these?

```cpp
std::cout << (int) 34 / 5.0; /*prints 6.8*/
std::cout << (float) (34/5);  /*prints 6.0*/
```
Precedence

• What is precedence?
  – Binding power of operator
  – (*, /, %) vs. (+, -)

• How do we override precedence?
  – Parenthesis!

• Examples:
  12 * 4 + 6 * 10 vs. ((12 * 4) + 6) * 10
Demo...
How do we read into a variable in C++?

• Declare a variable
• Read value from user and store at variable location
• How do we do this?
  
  ```cpp
  #include <iostream>
  int main() {
    int x;
    std::cin >> x;
    std::cout << x;
    return 0;
  }
  ```
Demo...
Reading and Assignments...

• Finish Reading Chap. 2
• Assignment 2 posted!!!
• Exercise posted Tuesday!!!