CS 161
Intro to CS I
Variables and Operators
Odds and Ends

- Assignment 2 posted
- Recitation Quiz 2 posted
- Assignments must compile and run on ENGR!
- Demo Assignment 1 (no laptop required).

-Sign up 1st-
Reading

• Through Variables:
  – Chap 1-4 (Halterman)
  – pg. 1-34 (Soulie)
  – Chap 1-2.5 (Wikibook)
  – Lecture 1-2 (Miller)
  – Part 1-2.6 (Gray)
  – Chap. 1-2 (Downey)
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;

C/C++ strictly typed lang

c/++ strictly typed lang

location

size

how to interpret

garbage until you store info

0x10

0x10
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 store 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/
Reading Into Variables

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

• C++: cin
  – Example:
    std::cin >> value;
```cpp
#include <iostream>

using namespace std;

int main() {
    int age = 21; // initialize variable, other contains garbage

    // print the address of age and the contents of age
    cout << "Where age is: " << &age << " Value is: " << age << endl;

    // 0 = age; // illegal lvalue

    return 0;
}
```
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
  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...
```cpp
#include <iostream>

#define BITS 8 // macro/constant for bits in a byte

using namespace std;

int main() {
    int age=21; // initialize variable, other contains garbage

    // print the address of age and the contents of age
    cout << "Where age is: " << &age
         << "Value is: " << age << endl;

    // 0=age;  // illegal lvalue
    cout << BITS << endl;  // compile with -E to stop after preprocessor
    return 0;
}
```