CS 161
Intro to CS I

What is CS all about?
Odds and Ends

• Assignment 1 Due Sunday, 11:59pm

• Questions?
Reflections

• What do the following Linux commands do?
  – ls  — list contents of directory/folder
  – mkdir — create directory
  – cd  — change directory

• What is vi/vim? text editor

• How do get into the insert mode? Command mode?
001 Code/002 will finish Friday

```cpp
#include <iostream>  //library

int main() {
    std::cout << "hello everyone" << std::endl;
    return 0;
}
```
```cpp
#include <iostream>  //library
#include <climits>
#include <cmath>    //access the pow() function

using namespace std;

int main() {
    cout << "hello everyone" << endl;

    //signed mins are off by one from cplusplus.com chart!
    cout << "climits stuff" << endl;
    cout << "int max: " << INT_MAX << endl;
    cout << "int min: " << INT_MIN << endl;
    cout << "unsigned int max: " << UINT_MAX << endl;

    cout << "calculated things" << endl; //calculate for int, short, long
    cout << (unsigned int) pow(2,(sizeof(int)*8))-1 << endl;

    return 0;
}
```
```cpp
#include <iostream>  // brings in library, by preprocessor directive
#include <climits>
#include <cmath>

using namespace std;

int main() {
    cout << "hello" << endl;
    cout << "climits" << endl;
    cout << "LONG_MAX: " << LONG_MAX << endl;
    cout << "SHRT_MAX: " << SHRT_MAX << endl;
    cout << "SHRT_MIN: " << SHRT_MIN << endl;
    cout << "USHRT_MAX: " << USHRT_MAX << endl;
    cout << "sizeof" << endl;  // calculate for int, short, long
    // typecast real number returned from pow to type of whole number you want
    cout << (unsigned short) pow(2, sizeof(short)*8)-1 << endl;
    cout << pow(2, sizeof(long)*8)-1 << endl;  // without typecast, you get real #
    cout << (unsigned long) pow(2, sizeof(long)*8)-1 << endl;
    return 0;  // there are no problems
```
More C++

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

• String Literal in quotations, “”
  – 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"
";  
• Refer online for common escape sequences: http://en.cppreference.com/w/cpp/language/escape

Data Type

• What is data?
  – Information
  – Ex: `std::cout << “Hello World!” << std::endl;`
  – Literals
    • 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
  - `short/int/long`: whole numbers, e.g. 45, -89, 0
  - `float/double`: real numbers, e.g. 2.612, -30.5, 2.3e5
  - `char`: characters, e.g. 'A', '&', 'x', '\'

- Signed by default, need to preface with unsigned keyword
  - `unsigned int`
  - `unsigned float`
  - `unsigned char`
Assignment #1 Macros

• C++: <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...
What is an expression?

- Set of operations producing a value
  12 * 4 + 6 * 10
  ((12 * 4) + 6) * 10
Pieces of an Expression

- **Operators**: indicate operation
  - Add +
  - Subtract -
  - Multiply *
  - Divide /
  - Remainder %

- **Operands**: values in the expression

- **Evaluation**: process of obtaining results from operations on operands
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
  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?
  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
Size of Things Demo...