CS 161
Intro to CS I

More Variables, Input, and Conditions
Odds and Ends

- Peer Reviews due Thursday, 11:59pm
  - Use notepad or any text editor to open
- Get Assignment 1 demoed

- **Study Sessions LINC 268:**
  - Tuesdays: 5-6:30pm
  - Wednesdays: 6-7:30pm
  - Thursdays: 7-8:30pm

*lecture, lab assign start today*
Reflections

• What are C++ primitive types?

• What is an acceptable C++ variable name?

• What is an operand?

• What is an lvalue vs. rvalue?
Printing Variables/Reading Into Variables

• C++: `cout`
  – Example:
    ```cpp
    std::cout << "The integer value is: " << value;
    ```
  – What about the newline?

• C++: `cin`
  – Example:
    ```cpp
    std::cin >> value;
    ```
```cpp
#include <iostream> //library for input (cin) and output (cout)
using namespace std;

int main() {
    int var=30;  //garbage until we assign it something
    float fl_var;
    cout << "initial vals" << endl;
    cout << var << endl;
    cout << fl_var << endl;

    cout << "Enter an int value: ";
    cin >> var;   //do not put endl on cin

    cout << "The variable contents: " << var << endl;

    cout << "Enter an float value: ";
    cin >> fl_var; //do not put endl on cin

    cout << "The variable contents: " << fl_var << endl;
    return 0;
}
```
```cpp
#include <iostream>    //library for input (cin) and output (cout)
#include <cstdlib>     //rand() and srand()
#include <ctime>       //time()
using namespace std;

int main() {
    srand(time(NULL));    //only need to do this once
    cout << rand() << endl;
    cout << rand() << endl;
    cout << rand() << endl;

    int var=30;    //garbage until we assign it something
    float fl_var;
    cout << "initial vals" << endl;
    cout << var << endl;
    cout << fl_var << endl;

    cout << "Enter an int value: ";
    cin >> var;    //do not put endl on cin
    cout << "The variable contents: " << var << endl;
    cout << "Enter an float value: ";
    cin >> fl_var;    //do not put endl on cin
```

Already at oldest change
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;`
```cpp
#include <iostream>  //library for input (cin) and output (cout)
#include <cstdlib>   //rand() and srand()
#include <ctime>     //time()

using namespace std;

#define SIZE 100
const int size = 100;

int main() {
    srand(time(NULL));  //only need to do this once
    cout << rand() << endl;
    srand(rand());      //only need to do this once
    cout << rand() << endl;
    srand(rand());      //only need to do this once
    cout << rand() << endl;
    cout << SIZE << endl;

    /* int var=30;  //garbage until we assign it something */
    float fl_var;
    cout << "initial vals" << endl;
    cout << var << endl;
    cout << fl_var << endl;
    cout << "Enter an int value: ";
```
Additional Operators

• Common operation: fetch/store same variable
  var=var + 2;  //increment variable contents
  var=var * 2;  //double variable contents
  – operator/assignment combination (all ops supported):
    var += 2;
    var *= 2;

• Pre/Post increment/decrement: ++ and --
  – Example: age++ vs. ++age
Demo...
Prediction

• What are conditional statements?

• How do we implement these in C++?
Decisions in Life

• What is a decision?
• When do we make decisions?
• How do we make decisions?
  If it is sunny today
   then I’ll go to the beach and fly a kite
Else if it is raining today
   then I’ll stay inside and read a book
Else if it is snowing
   then I’ll go to the mountains to ski
Decisions within Decisions

• What happens if there is no wind at the beach?
• How does this change our decisions?

If it is sunny today
  then I’ll go to the beach
  if it is windy at the beach
    then I’ll fly a kite
  if it is not windy at the beach
    then I’ll walk on the shore
Flow chart for decisions

1. Is it sunny?
   - Yes: Go to beach
   - No: Is it raining?
     - Yes: Read book
     - No: Go outside
2. Is it windy?
   - Yes: Fly kite
   - No: Walk on beach
Decisions in our programs

• Use an if/else
  
  if (<expression>) {
    <statement>;
    ...
    <statement>;
  }
  
  else {
    <statement>;
    ...
  
  }
What is the `<expression>`?

Could be a relational expression:
`<expression> <relational op> <expression>`

• Relational Ops
  `==` - equal to
  `!=` - not equal to
  `<` - less than
  `>` - greater than
  `<=` - less than or equal to
  `>=` - greater than or equal to
If/Else Demo...