CS 161
Intro to CS I
User Input and Conditional Statements
Odds and Ends...

• Finish Reading Chap. 2
• Assignment 2 and Exercise 2 posted!!!
• Assignment 1 demo through Tuesday, 1/19, for full credit.
• TA email list: cs161-ta@engr.orst.edu
• Labs: you can complete/make-up max 3 pts outside lab
• Monday labs are out of sync in beginning
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
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
Help with Lab 2: rand numbers

• Use srand(); to seed rand num generator
  – Only do once...
• User rand(); to generate number
• Example demo:
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 << std::endl;
    return 0;
}
```
Demo...
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

Is it sunny? Yes → Go to beach
No → Is it raining?

Yes → Read book
No → Go outside

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
Examples

- if(2 + 1)  //expression
- if(2 – 4)  //expression
- if(2 – 2)  //expression
- if(4 == 4)  //expression relational op expression
- if((2+1) == 4)  //expression relational op expression
- if(4.1 != 4)  //expression relational op expression
- if(3 <= 4)  //...
- if(4 >= 4)
- if(3.5 > 4)
- if(4 < 4)
- if(3+2*2 > 9)
- if((3+2)*2 > 9)
Logical Operators

- **AND**: if((1>2) && (2<5))
- **OR**: if((1>2) || (2<5))
- **NOT**: if(!(1>2) && (2<5))

- Precedence of Operators: refer to book
C++ If/Else Syntax...

```cpp
if( x > y) {
    cout << "X is greater than Y" << endl;
}
else {
    cout << "X is less than Y" << endl;
}
```

• When does this logic fail?
C++ If/Else...

if (x > y) {
    cout << "X is greater than Y" << endl;
}
else if (x < y) {
    cout << "X is less than Y" << endl;
}
else {
    cout << "X is equal to Y" << endl;
}
What are the curly braces for?

```cpp
if( x > y)
    cout << “X is greater than Y” << endl;
else if( x < y)
    cout << “X is less than Y” << endl;
else
    cout << “X is equal to Y” << endl;
```
What if we are testing for ==?

```cpp
if( x == 0) {
    cout << "X is zero" << endl;
}
else if( x == 1) {
    cout << "X is one" << endl;
}
else if( x == 2) {
    cout << "X is two" << endl;
}
else {
    cout << "Not 0, 1, 2!!!" << endl;
}
```
Demo...