CS 161
Intro to CS I

More Programming and Conditional Statements
Odds and Ends...

- Make demo appointment (signup homepage)
- Assignment #2 posted/due next Sunday.
- Recitation quiz (study)
Additional Operators

• Common operation: fetch/store same variable
  \[ \text{var} = \text{var} + 2; \] //increment variable contents
  \[ \text{var} = \text{var} * 2; \] //double variable contents
  – Assignment/operator combination (all ops supported):
    \[ \text{var} += 2; \]
    \[ \text{var} *= 2; \]

• Pre/Post increment/decrement: ++ and –
  – Example: \text{age}++ vs. \text{++age}
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

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
Examples

• if(2 + 1)
• if(2 – 4)
• if(2 – 2)
• if(4 == 4)
• if((2+1) == 4)
• if(4.1 != 4)
• 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: 
  [Link](http://en.cppreference.com/w/cpp/language/operator_precedence)
C++ If/Else Syntax...

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

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

if( x > y) {
    std::cout << “X is greater than Y\n”;
}
else if( x < y) {
    std::cout << “X is less than Y\n”;
}
else {
    std::cout << “X is equal to Y\n”;
}
What are the curly braces for?

if( x > y)
    std::cout << “X is greater than Y\n”;  
else if( x < y)
    std::cout << “X is less than Y\n”;  
else
    std::cout << “X is equal to Y\n”;
What if we are testing for ==?

if( x == 0) {
    std::cout << “X is zero\n”; 
}
else if( x == 1) {
    std::cout << “X is one\n”; 
}
else if( x == 2) {
    std::cout << “X is two\n”; 
}
else {
    std::cout << “You have entered an invalid number!!!\n”; 
}
Demo...