New Operators for Expressions

- What if you have the statement `var = var + 1;`  
  `var += 1; /* Add operand on right to var*/`  
  `var++; /* Increment var by one*/`  
- What if you have the statement `var = var - 5;`  
  OR `var = var + var;`  
  `var -= 5;`  
  `var += var;`  
- Pre vs. Post increment: `++var` vs. `var++`

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

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, pg. 48  
  == - 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)  

C/C++ If/Else Syntax...  
if( x > y) {  
  printf("X is greater than Y\n");  
}  
else {  
  printf("X is less than Y\n");  
}  
• When does this logic fail?
C/C++ If/Else...

if (x > y) {
    printf("X is greater than Y\n");
} else if (x < y) {
    printf("X is less than Y\n");
} else {
    printf("X is equal to Y\n");
}

What are the curly braces for?

if (x > y)
    printf("X is greater than Y\n");
else if (x < y)
    printf("X is less than Y\n");
else
    printf("X is equal to Y\n");

What if we are testing for ==?

if (x == 0) {
    printf("X is zero\n");
} else if (x == 1) {
    printf("X is one\n");
} else if (x == 2) {
    printf("X is two\n");
} else {
    printf("You have entered an invalid number!!!\n");
}
Logical Operators

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

- Precedence of Operators: pg. 51 - 52

Assignment #2/Quiz #2

- Get into groups of 4-5
- Write the logic/pseudocode for the control structure needed in Assignment #1.
- Swap your solution w/ a neighbor.
- What is wrong/right with their solution?
- How does it differ from your group’s solution?
- What is short circuit evaluation?