

Section 6: Conditionals

Introduction: A conditional is an expression, often a comparison, that evaluates to **true** or **false**. This value can be stored in a **boolean** variable or used in your program's control flow.

Comparison Operators: These operators are placed in-between two values and return **true** or **false** after comparing them. The values can come from evaluating expressions. Parentheses are useful, and sometimes even necessary, to clarify your comparison.

equal to: ==	greater than: >	greater than or equal to: >=
not equal to: !=	less than: <	less than or equal to: <=

Examples: **boolean** b = (2*3) <= max(1,4); // false
 boolean b = (color(0) != color(1)); // true

Compound Conditionals: We can combine multiple conditionals using special boolean operators. These operators are placed next to boolean values and return **true** or **false**.

AND (&&):

A	B	A && B
false	false	false
false	true	false
true	false	false
true	true	true

OR (||):

A	B	A B
false	false	false
false	true	true
true	false	true
true	true	true

NOT (!):

A	!A
false	true
true	false

Examples: **boolean** b = (x1==x2) && (y1==y2); // is (x1,y1) same pt as (x2,y2)?
 boolean b = (z < 1) || (z > 10); // is z outside the range 1-10?

If-Statements: Normally, programs are executed sequentially from top to bottom, also jumping to and from functions as they are called. If-statements give us the ability to *choose* between statements to execute based on the value returned by a conditional. The most general form of an if-statement can optionally include any number of else-if statements and an else statement. Like functions, if-statements don't need semicolons.

```
if (cond1) {  
    // this code block executes if cond1 is true  
} else if (cond2) {  
    // this code block executes if cond1 is false AND cond2 is true  
} else {  
    // this code block executes if all conditions before this are false  
}
```

Example: **if** (page == 0) { // assume page was declared earlier as an int
 println("This is page 0.");
 } **else if** (page == 1) {
 println("This is page 1.");
 }

Exercises:

1) What value is returned by the following conditionals when `int x = 120`?

`!(x > 142)` _____ `(x != 4) && (x/10 < 10)` _____
`(x+1)%2 <= x%2` _____ `true || !(min(x, x/5*5) >= x)` _____

2) Fill in the blanks below. The program should print out "Yes" if either 'y' or 'Y' is pressed or print out "No" if any other key is pressed:

```
void keyPressed() {  
    if ( key _____ ) {  
        println( _____ );  
    } else {  
        println( _____ );  
    }  
}
```

3) Examine the Processing code below. Fill in the table on the right for what gets drawn:

```
int x = 0;  
void draw() {  
    background(255);  
    if ( x == 0 ) {  
        ellipse(...);  
    } else if ( x > 3 ) {  
        line(...);  
    } else if ( x != 2 ) {  
        rect(...);  
    } else {  
        triangle(...);  
    }  
    x = x + 1;  
}
```

frameCount	x	What's drawn?
1		
2		
3		
4		
5		

4) Write Processing code below that prints out the sign of the variable `int n`. It should print one of the following messages: "positive", "zero", or "negative".

5) Go to the course website and get started on the homework titled "Jumping Monster." [individual]