Quick Relational Operator Quiz!

To review, take a few minutes and write these conditions as `if` statements with relational operators:

1. A `String`, `name`, is equal to `"Katie"`
2. A `double`, `income`, is at least 15000
3. A course is below 300-level
4. A `boolean`, `fail`, is not true

switch Statement Review

Recall the structure of a switch statement:

```
switch (<variable>) {
    case <value 1>:
        <statements>;
        break;
    case <value 2>:
        <statements>;
        break;
    default:
        <statements>;
        break;
}
```

Write a statement if I want to increment dup if x is equal to 11, 22, or 33, and nothing otherwise.

Logical Operators

How could we rewrite that with an `if` construction?

1. What does the program flow look like?
2. In English, what is the condition?

New operators: `||` and `&&` (`!` is also a *logical* operator)
Now write the condition in Java.

Compound conditions

We can now test multiple conditions at the same time!

How would we write these, using logical operators:

1. `5 < x < 10`
2. `response == 'q' || 'Q'`
3. `x != y`

DeMorgan's Law

Logical operators can get a little confusing. Keep this in mind, given that `a` and `b` are `booleans`:

$$\texttt{!(a \&\& b)} \Leftrightarrow \texttt{(!a) || (!b)}$$
$$\texttt{!(a || b)} \Leftrightarrow \texttt{(!a) \&\& (!b)}$$

That is, "it is not the case that both of these are true" is equivalent to "at least one of these is false", and "it is not the case that either of these are true" is equivalent to "both of these are false".

Lazy Evaluation

As with `if-else` groups, Java is lazy when it comes to compound conditions:

```
if ( (x == y) || (x == (y+2)) )
```

```
if ( (x > y) && (x == (y+2)) )
```

Operator Precedence

There were a lot of parentheses in here:

```
if ( (x == y) || (x == (y+2)) )
```

```
if ( (x > y) && (x == (y+2)) )
```

Could I have done this without all the parentheses? YES:

```
if (x == y || x == (y+2))
```

```
if (x > y && x == (y+2))
```

See this website for full order of operations; exams will have a precedence table so you don't need to memorize it.