Topic 1.6: Booleans & Conditionals

Learning Goals (Week 1):

- Identify data types based on value
- Map variables to the current values
- Perform basic operations on variables
- Create and use Java and user-defined methods
- Format Printed Output
- Obtain and process user input from the console
- **Use booleans, conditionals, and compound conditionals correctly**
- Select and implement different types of loops depending on scenario
- Use special String and Math operations
- Successfully implement and manipulate java arrays

Boolean Basics

- booleans can only equal **true** or **false**

```
boolean myBool = true;
myBool = false;
```

Three operations on booleans:

- && (and: binary)
- || (or: binary)
- ! (not: unary)

```
boolean myBool = true;
myBool = !myBool;          // false
myBool = myBool && false; // true
```

p	q	p && q	p || q
T	T	T	T
T	F	F	T
F	T	F	T
F	F	T	F

- !true -> false
- !false -> true

Relational Operators which Return a boolean value

- == -> equals (not for Strings)
- != -> not equals
- < -> less than
- <= -> less than or equal to
- > -> greater than
- >= -> greater than or equal to

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Two Notes:

- Do not use == on boolean
  - myBool == true **(NO)**
    - instead just use myBool
  - myBool == false or myBool != true **(SO MUCH NO)**
    - instead just use !myBool
- Use the following options for String comparison
  - .equals()
  - .equalsIgnoreCase()
  - .compareTo()

Conditional Logic (If/Else If/Else Statements)

- if/ else if/ else give us choices
- if and else if are following by an expression giving a boolean results in ()
- else does not have an expression

- in all cases you open a code block using { top containing the statements to execute if the condition is true
- close the code block with }
- Unlike Python, indentation isn't required....but it is. (Not compiler required but as a decent human)

- if there is only one statement inside the conditional block you don't **need** {} but consistency is a good idea (so put them anyways)

Conditional Logic (Examples)

```
boolean myBool = true;
if(myBool) { // if myBool is true
  System.out.println(“True”);
} else {
 System.out.println(“False”);
}
```

Conditional Logic (Examples)

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if(myBool) { // if myBool is true
  System.out.println(“True”);
} else {
 System.out.println(“False”);
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```

```
int x = 6;
int y = 4;
if(x <= y) {
  System.out.println(“True”);
}
```

Conditional Logic (Examples)

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boolean myBool = true;
if(myBool) { // if myBool is true
  System.out.println(“True”);
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```
int x = 6;
int y = 4;
if(x <= y) {
  System.out.println(“True”);
}
```

```
int x = 6;
int y = 6;
if(x < y) {
  System.out.println(“True LESS”);
} else if(x == y) {
 System.out.println(“True EQUAL”);
} else {
 System.out.println(“False MORE”);
}
```

Pause & Practice

1. Check if a **number** is positive: Write an if/else statement to print "Positive" if a variable **num** is greater than 0, otherwise print "Non-positive".
2. Odd or Even: Write an if/else statement that prints "Odd" if a variable **number** is odd, otherwise prints "Even".
3. Maximum of Two Numbers: Given two integer variables **a** and **b**, write an if/else statement to print the larger of the two.
4. Check for Zero: Write an if/else statement to print "Zero" if a variable **x** is 0, otherwise print "Not Zero".

Pause & Practice (Solutions)

- Check if a number is positive: Write an if/else statement to print "Positive" if a variable **num** is greater than 0, otherwise print "Non-positive".

```
if(num > 0) {
    System.out.println(“Positive”);
} else {
    System.out.println(“Non-Positive”);
}
```

- Odd or Even: Write an if/else statement that prints "Odd" if a variable **number** is odd, otherwise prints "Even".

```
if(num%2 == 0) {
    System.out.println(“Event”);
} else {
    System.out.println(“Odd”);
}
```

- Maximum of Two Numbers: Given two integer variables **a** and **b**, write an if/else statement to print the larger of the two.

```
if(a > b) {
    System.out.println(a);
} else {
    System.out.println(b);
}
```

- Check for Zero: Write an if/else statement to print "Zero" if a variable **x** is 0, otherwise print "Not Zero".

```
if(x != 0) {
    System.out.println(“Not Zero”);
} else {
    System.out.println(“Zero”);
}
```