POWERING POTENTIAL

# More on conditionals

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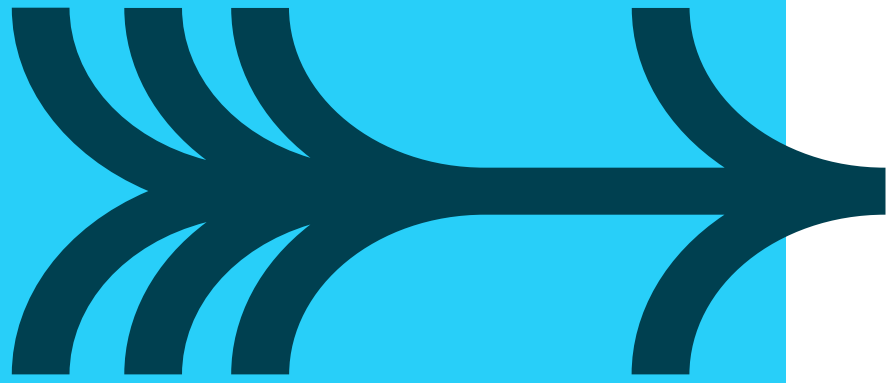


- **Objectives**
  - To cover the conditional expressions of the Java language
- **Contents**
  - The Conditional operator ?:
  - Logical operators (AND, OR & NOT)
    - But in Java, **&& ||** and **!**
  - Options for structuring statements in methods
- **Hands on Labs**

# The ternary Conditional Operator ( ? : )

- **Produces less code for simple if statements resulting in a value**
- **These two examples produce the same result.**

```
double salary = getSalary();

double rate = (salary < 21000) ? 0.2 : 0.4;
```

```
double salary = getSalary();

if(salary < 21000) {
    rate = 0.2;
}
else {
    rate = 0.4;
}
```

# Logical operators AND and OR

A

```
int var1 = 4, var2 = 2, var3 = 0;
if ((var1 > var2) && (var3 == 0))
{
  print( "Will we see this?" );
}
```

B

```
int var1 = 4, var2 = 6, var3 = 0;
if ((var1 > var2) || (var3 == 0))
{
  print( "Will we see this?" );
}
```

C

```
int var1 = 1, var2 = 2, var3 = 3;
if ((var1 == 1) || (var2 == 2) && (var3 == 1))
{
  print( "Will we see this?" );
}
```

| | |
|---|---|
| && | AND |
| \|\| | OR |
| ! | NOT |

# Logical operator – NOT (!)

A

```
String name = getName();

  if ( name.endsWith("ed") ) { } // does nothing
  else {
    print("The name doesn't end in 'ed'");
  }
```

B

```
if ( name.endsWith("ed") == false ) {
   print("The name doesn't end in 'ed'");
}
```

C

```
if (!name.endsWith("ed")) {
    print("The name doesn't end in 'ed'");
}
```

# NOT (!) examples continued ..

```
boolean flag = true;
// flag may change…
if (flag) {
   flag = false;
}
else {
   flag = true;
}
```

toggle a bool flag

```
flag = !flag;
```

Achieves the same result

```
if (year % 4 != 0)     { isLeapYear = false; }
```

```
if (!(year % 4 == 0)) { isLeapYear = false; }
```

```
if (!year % 4 == 0)    { isLeapYear = false; }
```

# Fun and Games

**What's the value of var3 after this executes?**

```
int  var1 = 7, var2 = 13, var3 = 0;

boolean flag = (var1 > var2) && (var3++ == 0);
```

Does 'flag' become true or false?

```
public static void processString(String s) {
  if (s != null && s.length() == 8) {
    // process the valid 8 character string
  }
}
```

Here is where it can be useful

# Code Structuring Options (void) method

A

```
public static void doStuff(int x) {
  if (x > 10) {
     // do loads and loads of stuff ..
     // many statements
  }
  else {
     // very few statement(s)
  }
}
```

Just personal preference

B

```
public static void doStuff(int x) {
  if (x <= 10) {
     // few statements
     return;
  }
     // do loads and loads of stuff ..
     // many statements
}
```

'else' not needed!

# Options (non-void) method

```
public static boolean isGoodValue(int x)
```

Assume this signature

A

```
boolean retval;
if (x > 10) {
  retval = true;
}
else {
  retval = false;
}
return retval;
```

B

```
boolean retval = false;
if (x > 10) {
  retval = true;
}
return retval;
```

These 6 'code structures' would work for Boolean type

You will have a preference but prepare to see all 6 of these coded

C

```
if (x > 10) {
  return true;
}
else {
  return false;
}
```

D

```
if (x > 10) {
  return true;
}
return false;
```

E

```
return x > 10;
```

F

```
return (x > 10);
```

# QUIZ (Part 1)

```
if (x > 10 && y > 10) { // x & y are int with values
  // do stuff
} else {
  print("What could we say here?”);
}
```

1

int x = 11, y=5;

```
if (x > 10 || y > 10) {
  // do stuff
} else {
  print("What could we say here?”);
}
```

2

int x = 11, y=5;

```
if (!isSummer() || !isWinter()) { // boolean methods
  // do stuff
} else {
  print(“What could we say here?”);
}
```

3

If it is Winter

# QUIZ (Part 2)

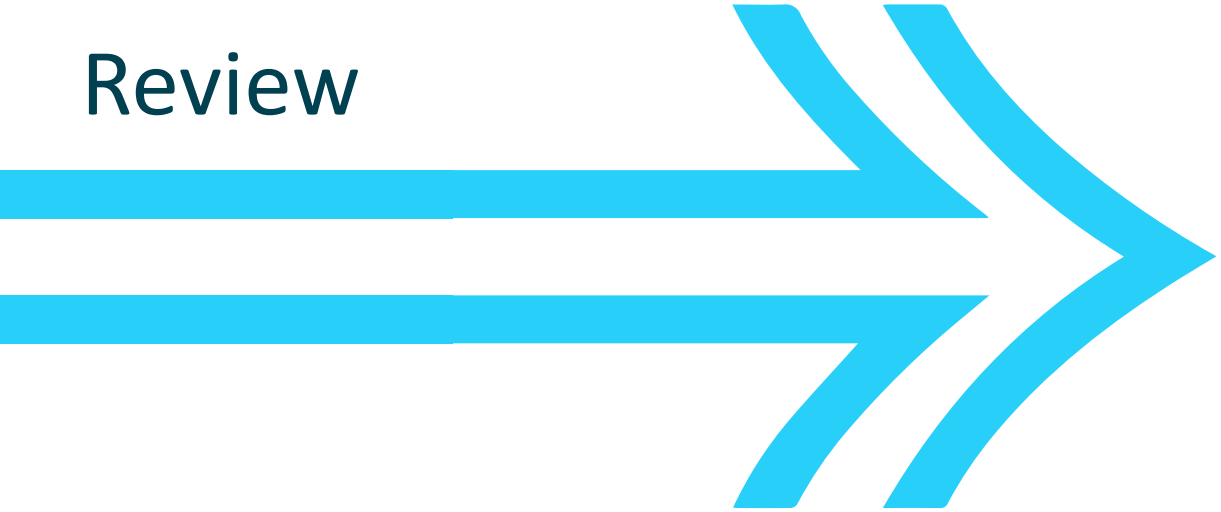
- **Let's see who has been paying attention?**

```
int x = 9, y = 4;
```

What would this print?

| | |
|---|---|
| True | `print( x > y + 4 );` |
| True | `print( x > y++ * 2 );` |
| False | `print( x * y <= 36);` |
| True | `print( x / y == 1 );` |
| 4 | `print( x % y);` |
| Worm | `print( (x > y) ? "Worm" : "Words" );` |

# Review



- **Conditional operator - ?:**
- **Logical operators && || and !**
  - Short circuiting behaviour of && and ||
- **Code structuring options**

# Hands On Labs

- → Student grades
- → Evening Behaviors (Optional) using &&, || and !