



Computer Science Virtual Learning

HS Computer Science A

April 27th, 2020



Lesson: **What is a Conditional?**

Objective/Learning Target:

Understanding what a Conditional is and the how to apply it
using Java

What is a Conditional?

Java statements normally execute one at a time from top to bottom. If you want a statement to only execute when something is true use a **conditional**. Something that can only be true or false is called a **Boolean**. If the condition is true then the next statement or a block of statements will execute. If the condition is false then the next statement or block of statements is skipped.

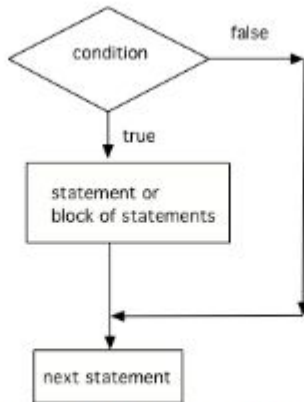


Figure 1: The order that statements execute in a conditional

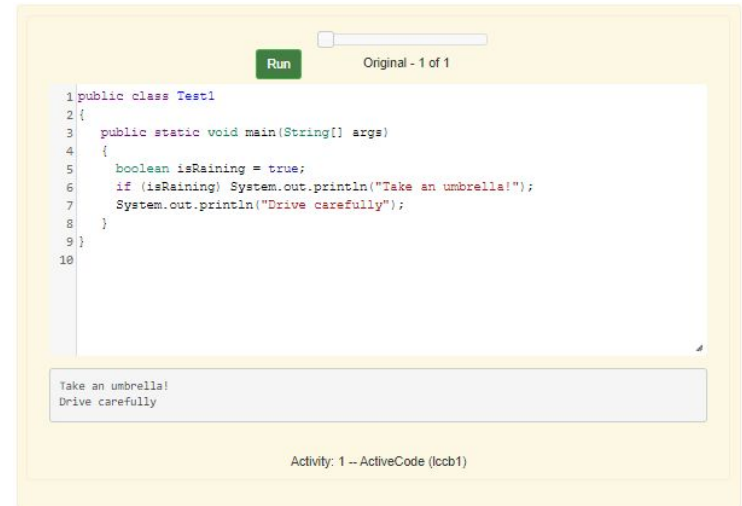
A conditional uses the keyword `if` followed by Boolean expression inside of an open parenthesis (and a close parenthesis) and then followed by a single statement or block of statements. The single statement or block of statements are only executed if the condition is true. A block of statements is enclosed by an open curly brace { and a close curly brace }.

What is a Conditional?

Imagine that your cell phone wanted to remind you to take an umbrella if it was currently raining in your area when it detected that you were leaving the house. This type of thing is going to become more common in the future and it is an area of research called Human Computer Interaction (HCI) or Ubiquitous Computing (computers are everywhere).

The variable `isRaining` is a boolean variable that is either true or false. If it is true then the message `Take an umbrella!` will be printed and then execution will continue with the next statement which will print `Drive carefully`.

What if we changed the code to `boolean isRaining = false;`. What will it print?

A screenshot of a code editor window. At the top right, there is a "Run" button and a progress indicator showing "Original - 1 of 1". The code is as follows:

```
1 public class Test1
2 {
3     public static void main(String[] args)
4     {
5         boolean isRaining = true;
6         if (isRaining) System.out.println("Take an umbrella!");
7         System.out.println("Drive carefully");
8     }
9 }
10
```

Below the code, the output is displayed in a light gray box:

```
Take an umbrella!
Drive carefully
```

At the bottom of the editor, it says "Activity: 1 -- ActiveCode (lccb1)".

Choosing Between Two Possibilities

What if you want to pick between two possibilities? If you are trying to decide between a couple of things to do, you might do one thing if a coin flip is heads and another if it is tails. In this case use the **if** keyword followed by a statement or block of statements and then the **else** keyword also followed by a statement or block of statements.

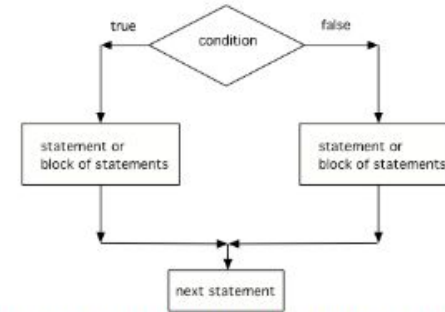


Figure 2: The order that statements execute in a conditional with 2 options: if and else

Let's Flip a Coin

If `isHeads` is true it will print `Let's go to the game` and then `after conditional`. Run the code above to see this.

An if will only execute one single statement following it unless there is a block of statements enclosed in a pair of open and closed curly braces { and }. Java doesn't care if you indent the code to show what you intend!

What if we changed the code to `boolean isHeads = false;`. What line will be printed before the after conditional?

A screenshot of a Java IDE interface. At the top right, there is a green "Run" button and a progress indicator showing "Original - 1 of 1". Below this is a code editor with the following Java code:

```
1 public class Test2
2 {
3     public static void main(String[] args)
4     {
5         boolean isHeads = true;
6         if (isHeads) System.out.println("Let's go to the game");
7         else System.out.println("Let's watch a movie");
8         System.out.println("after conditional");
9     }
10 }
11
```

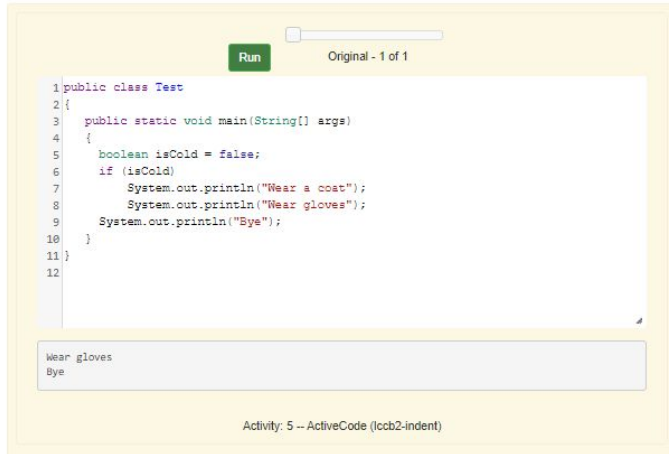
Below the code editor is a text area showing the output of the program:

```
Let's go to the game
after conditional
```

At the bottom of the IDE, it says "Activity: 3 -- ActiveCode (lccb2)".

Check Your Understanding

- The code below doesn't work as expected. Fix it to only print "Wear a coat" and "Wear gloves" when isCold is true.



```

1 public class Test
2 {
3     public static void main(String[] args)
4     {
5         boolean isCold = false;
6         if (isCold)
7             System.out.println("Wear a coat");
8             System.out.println("Wear gloves");
9             System.out.println("Bye");
10    }
11 }
12

```

Run Original - 1 of 1

```

Wear gloves
Bye

```

Activity: 5 -- ActiveCode (lcb2-indent)

- What is the value of grade when the following code executes and score is 93?

```

if (score >= 90) grade = "A";
if (score >= 80) grade = "B";
if (score >= 70) grade = "C";
if (score >= 60) grade = "D";
else grade = "E";

```

- A
- B
- C
- D
- E

- Which of the following is equivalent to the code segment below?

```

if (x > 2) x = x * 2;
if (x > 4) x = 0;

```

- $x = 0;$
- if ($x > 2$) $x *= 2;$
- if ($x > 2$) $x = 0;$
- if ($x > 2$) $x = 0;$ else $x *= 2;$



For More Resources and to Check Answers

Go to: <https://runestone.academy/runestone/books/published/apcsareview/Conditionals/cbasics.html>