



Lecture (04)

Conditional Logic

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Agenda

- Introduction
- IF Statements
- IF ... ELSE
- IF ... ELSE IF
- Nested IF Statements
- Boolean Values
- Switch Statements

Introduction

- The programming you're doing now is sequential programming, meaning the code is executed from top to bottom.
- It's very linear, in that each and every line of code will be read, starting with the first line of code you write and ending at the last line.
- But you don't always want your programs to work like that.
- Often, you want code to be executed only if certain conditions are met.
- For example, you might want one message to display if a user is below the age of 18 and a different message if he or she is 18 or older.

-
- You want to control the flow of the programme for yourself. You can do this with conditional logic.
 - Conditional logic is mainly about the IF word:
 - IF user is less than 18 then display this message;
 - IF user is 18 or older then display that message.Fortunately,
 - it's very easy to use conditional logic in Java.
 - Let's start with IF Statements.

IF Statements

- For condition says “IF user is less than 18”.
- We use the shorthand notation of the left-pointing angle bracket (<).
- IF the user is less than 18 then we want something to happen, to display a message, for
- example:

```
if ( user < 18 ) {  
//DISPLAY MESSAGE  
}
```

-
- If the user is not less than 18 then the code between the curly brackets will be skipped, and the program continues on its way, downwards towards the last line of code. Whatever you type between the curly brackets will only be executed
 - IF the condition is met, and this condition goes between the round brackets.
 - **“greater than 18”**

```
if ( user > 18 ) {  
//DISPLAY MESSAGE  
}
```

-
- “greater than or equal to 18”

```
    if ( user >= 18 ) {  
        //DISPLAY MESSAGE  
    }
```

- “less than or equal to”

```
    if ( user <= 18 ) {  
        //DISPLAY MESSAGE  
    }
```

ConditionalLogic01

```
1  +  /*...*/
5  package conditionallogic01;
6  import java.util.Scanner;
7  +  /**...*/
11 public class IfStatment01 {
12
13  +  /**...*/
16  -  public static void main(String[] args) {
17      int user;
18      System.out.printf("\nEnter your age =");
19      Scanner s=new Scanner(System.in);
20      user=s.nextInt();
21      if(user<=18)
22      {
23          System.out.println("User is 18 or younger.");
24      }
25
26      }
27  }
28
```

Output - ConditionalLogic01 (run)

```
run:
Enter your age =1
BUILD SUCCESSFUL (total time: 4 seconds)
```

Exercise

- Replace your “less than” symbol with the “less than or equal to” symbols.
- Change your message to suit, something like “user is less than or equal to 18”.
- Run your program again. Do you see the message?

Exercise

- Change the user value to 20. Run your program again.
- Do you still see the message?

ConditionalLogic02

```
1  +  /*...*/
5  package com.Find Previous Occurrence (Shift+F3)
6  -  import java.util.Scanner;
7  +  /**...*/
11 public class IfStatment02 {
12
13  +  /**...*/
16  -  public static void main(String[] args) {
17      int user;
18      Scanner s=new Scanner(System.in);
19      System.out.printf("\nEnter your age =");
20      user=s.nextInt();
21
22      if(user<=18)
23      {
24          System.out.println("User is 18 or younger.");
25      }
26      if(user>18)
27      {
28          System.out.println("User is older than 18.");
29      }
30  }
31 }
```

Output - ConditionalLogic02 (run)

```
run:
Enter your age =15
User is 18 or younger.
BUILD SUCCESSFUL (total time: 3 seconds)
```

IF ... ELSE

- Instead of using two IF Statements, you can use an IF ... ELSE Statement instead.
- Here's the structure of an IF ... ELSE statement:

```
if ( condition_to_test ) {  
    }  
else {  
    }
```

ConditionalLogic04

```
1  +  /*...*/
5  package conditionallogic04;
6  import java.util.Scanner;
7  +  /**...*/
11 public class IfElseStatment01 {
12
13  +  /**...*/
16  -  public static void main(String[] args) {
17      int user;
18      Scanner s=new Scanner(System.in);
19      System.out.printf("\nEnter your age =");
20      user=s.nextInt();
21
22      if(user<=18)
23      {
24          System.out.println("User is 18 or younger.");
25      }
26      else
27      {
28          System.out.println("User is older than 18.");
29      }
30  }
31 }
```

Output - ConditionalLogic04 (run)

run:

Enter your age =15

User is 18 or younger.

BUILD SUCCESSFUL (total time: 2 seconds)

IF ... ELSE IF

- To test more than two conditions you can use the IF ... ELSE IF statement can be used.
- The structure of an IF ... ELSE IF is this:

```
if ( condition_one) {  
    }  
else if ( condition_two ) {  
    }  
else {  
    }
```

-
- Before trying out some new code, you'll need to learn some more conditional
 - operators. The ones you have used so far are these:

> Greater Than

< Less Than

>= Greater Than or Equal To

<= Less Than or Equal To

- Here's four more you can use:

&& AND

|| OR

== HAS A VALUE OF

! NOT

-
- The logical and operator **&&**, can be used to test for two age ranges:

else if (user > 18 && user < 40)

- Here, we want to check if the user is older than 18 but younger than 40.

ConditionalLogic06

```
1  +  /*...*/
5  package conditionallogic06;
6  import java.util.Scanner;
7  +  /**...*/
11 public class IfElseIfStatment01 {
12
13  +  /**...*/
16  -  public static void main(String[] args) {
17      int user;
18      Scanner s=new Scanner(System.in);
19      System.out.printf("\nEnter your age =");
20      user=s.nextInt();
21      if(user<=18)
22      {
23          System.out.println("User is 18 or younger.");
24      }
25      else if ((user>18)&&(user <40))
26      {
27          System.out.println("User is between 19 & 39.");
28      }
29      else
30      {
31          System.out.println("User is older than 40");
32      }
33
34  }
35  }
```

Output - ConditionalLogic06 (run)

run:

Enter your age =15

User is 18 or younger.

BUILD SUCCESSFUL (total time: 4 seconds)

Exercise

Exercise

- Change the value of the user variable from 20 to 45. The message for the **else** section of the code should now display.

Exercise

Hint: You can add as many **else if** parts as you want.

- Suppose we wanted to check if the user was either 45 or 50.
- Suggest a solution?
- We can use two of the new conditional operators above.
- We can check if the user variable “has a value of 45” **OR** “has a value of 50”:

else if (user == 45 || user == 50)

ConditionalLogic07

```
1 +  /*...*/
5  package conditionallogic07;
6 -  import java.util.Scanner;
7 +  /**...*/
11 public class ElseIfElseStatment02 {
12
13 +  /**...*/
16 -  public static void main(String[] args) {
17     int user=45;
18     Scanner s=new Scanner(System.in);
19     System.out.printf("\nEnter your age =");
20     user=s.nextInt();
21     if(user<=18)
22     {
23         System.out.println("User is 18 or younger.");
24     }
25     else if ((user>18)&&(user <40))
26     {
27         System.out.println("User is between 19 & 39.");
28     }
29     else if ((user==45)|| (user ==50))
30     {
31         System.out.println("User is either 45 or 50");
32     }
```

```
33         else
34         {
35             System.out.println("User is older than 40");
36         }
37     }
38
```

```
Output - ConditionalLogic07 (run)
run:
Enter your age =15
User is 18 or younger.
BUILD SUCCESSFUL (total time: 3 seconds)
```

```
Output - ConditionalLogic07 (run)
run:
Enter your age =52
User is older than 40
BUILD SUCCESSFUL (total time: 4 seconds)
```

Nested IF Statements

- Nesting an IF Statement just means putting one IF Statement inside of another.
- For example, suppose you want to find out if somebody is younger than 19, but older than 16.

```
        if (user < 19 ) {  
            if (user > 16 && user < 19 ) {  
System.out.println( "You are 17 or 18");  
                }  
            else {  
System.out.println( "16 or younger");  
                }  
        }
```

ConditionalLogic08

```
1 +  /**...*/
5  package conditionallogic08;
6 -  import java.util.Scanner;
7 +  /**...*/
11 public class NestedIF {
12
13 +  /**...*/
16 -  public static void main(String[] args) {
17     int user;
18     Scanner s=new Scanner(System.in);
19     System.out.printf("\nEnter your age =");
20     user=s.nextInt();
21     if (user < 19 )
22     {
23         if (user > 16 && user < 19 )
24         {
25             System.out.println( "You are 17 or 18");
26         }
27         else
28         {
29             System.out.println( "you are 16 or younger");
30         }
31     }
32 }
33 }
34
```

Output - ConditionalLogic08 (run)

```
run:
you are 16 or younger
BUILD SUCCESSFUL (total time: 1 second)
```

Boolean Values

- A Boolean value is one with two choices: true or false, yes or no, 1 or 0. In Java, there is a variable type for Boolean values:

boolean user = true;

- Notice that the assignment operator is a single equals sign (=).
- If you want to check if a variable “has a value of” something, you need two equal signs (==).

```
boolean user = true;  
    if (user == true) {  
System.out.println("it's true");  
        }  
        else {  
System.out.println("it's false");  
        }  
}
```

```
boolean user = true;  
    if (user) {  
System.out.println("it's true");  
        }  
    else {  
System.out.println("it's false");  
        }
```

ConditionalLogic09

```
1  +  /*...*/
5  package conditionallogic09;
6  -  import java.util.Scanner;
7  +  /**...*/
11 public class Bollean01 {
12
13  +  /**...*/
16  -  public static void main(String[] args) {
17      boolean user = true;
18      Scanner s=new Scanner(System.in);
19      System.out.printf("\nEnter your choice =");
20      user=s.nextBoolean();
21      if (user) {
22          System.out.println("it's true");
23      }
24      else {
25          System.out.println("it's false");
26      }
27  }
28  }
```

Output - ConditionalLogic09 (run)

```
run:
Enter your choice =true
it's true
BUILD SUCCESSFUL (total time: 2 seconds)
```

-
- other conditional operator on our lists is the NOT operator. You can use this with boolean values.
 - Have a look at the following code:

```
boolean user = true;  
if (!user) {  
System.out.println("it's false");  
}  
else {  
System.out.println("it's true");  
}
```

ConditionalLogic10

```
1  +  /*...*/
5  package conditionallogic10;
6  -  import java.util.Scanner;
7  +  /**...*/
11 public class Boolean02 {
12  +  /**...*/
15  -  public static void main(String[] args) {
16      boolean user;
17      Scanner s=new Scanner(System.in);
18      System.out.printf("\nEnter your choice =");
19      user=s.nextBoolean();
20      if (!user)
21      {
22          System.out.println("it's false");
23      }
24      else {
25          System.out.println("it's true");
26      }
27  }
28 }
```

```
Output - ConditionalLogic10 (run)
run:
Enter your choice =false
it's false
BUILD SUCCESSFUL (total time: 4 seconds)
```

Switch Statements

- Another way to control the flow of your programmes is with something called a **switch statement**.
- A switch statement gives you the option to test for a range of values for your variables.
- They can be used instead of long, complex **if ... else if** statements.
- The structure of the switch statement is this:

```
switch ( variable_to_test ) {  
    case value:  
        code_here;  
        break;  
    case value:  
        code_here;  
        break;  
    default:  
        values_not_caught_above;  
}
```

conditionallogic11

```
1  +  /*...*/
5  package conditionallogic11;
6  import java.util.Scanner;
7  +  /**...*/
11 public class SwitchCase01 {
12  +  /**...*/
15  -  public static void main(String[] args) {
16      int user;
17      Scanner s=new Scanner(System.in);
18      System.out.printf("\nEnter your age =");
19      user=s.nextInt();
20      switch(user)
21          {
22          case 18:
23              System.out.println("you are 18 years old");
24              break;
25          case 19:
26              System.out.println("you are 19 years old");
27              break;
28          case 20:
29              System.out.println("you are 20 years old");
30              break;
```

```
31         case 21:
32             System.out.println("you are 21 years old");
33             break;
34         default:
35             System.out.println("you are older than 21.");
36             break;
37     }
38 }
39 }
40 }
```


-
- Sadly, you can't test for a range of values after **case**, just the one value.
 - So you can't do this:

case (user <= 18):

- But you can do this:

case 1: case 2: case 3: case 4:

- So the above line tests for a range of values, from 1 to 4. But you have to “spell out” each value.
- (Notice where all the **case** and colons are.)

Exercise

- Write a program that accepts user input from the console.
- The program should take a number and then test for the following age ranges: 0 to 10, 11 to 20, 21 to 30, 30 and over. Display a message in the Output window in the following format:

user_age + “ is between 21 and 30”

- If the user is 30 or over, you can just display the following message:

“You are 30 or over”

conditionallogic12

```
+  /*...*/  
package conditionallogic12;  
-  import java.util.Scanner;  
+  /**...*/  
public class Exercise {  
  
+  /**...*/  
-  public static void main(String[] args) {  
    int age;  
    System.out.println("Enter you age:");  
    Scanner user_input = new Scanner(System.in);  
    age=user_input.nextInt();  
    if (age<=0)  
    {  
        System.out.println("Invalid age.");  
    }  
    else if(age>0 && age<=10)  
    {  
        System.out.println("your age is between 0 and 10");  
    }  
}
```

```
else if (age>10 && age <=20)
{
    System.out.println("your age is between 11 and 20");
}
else if (age>20 && age <=30)
{
    System.out.println("your age is between 21 and 30");
}
else
{
    System.out.println("you are over 31");
}
}
}
```

Output - conditionallogic12 (run)

```
run:
Enter you age:);
10
your age is between 0 and 10
BUILD SUCCESSFUL (total time: 8 seconds)
```

Exercise

- If you want to check if one String is the same as another, you can use a Method called **equals**.

```
String user_name = "Bill";  
if ( user_name.equals( "Bill" ) ) {  
    //DO SOMETHING HERE  
}
```

- Write a program accepts username and password then display authentication result method.

conditionallogic13

```
1  +  /*...*/
5  package conditionallogic13;
6  -  import java.util.Scanner;
7
8  +  /**...*/
12 public class Exercise {
13  +  /**...*/
16  -  public static void main(String[] args) {
17      String name,pass;
18      Scanner user_input = new Scanner(System.in);
19      System.out.printf("\nEnter your name :");
20      name=user_input.next();
21      System.out.printf("\nEnter your password :");
22      pass=user_input.next();
23
24      if(name.equals("Samy") && pass.equals("123456"))
25      {
26          System.out.println("\nwelcome Samy.");
27      }
28      else if (name.equals("Tamer") && pass.equals("78910"))
29      {
30          System.out.println("\nwelcome Tamer.");
```

```
31     }
32     else
33     {
34         System.out.println("\nInvalid username or password try again later...");
35     }
36
37 }
38 }
39
```

Output - conditionallogic13 (run)



Enter your name :Samy

Enter your password :123456

welcome Ahmed.

BUILD SUCCESSFUL (total time: 6 seconds)

Exercise

- write a program that asks a user to choose between four
- colors: black, white, red, or blue. Use IF ... ELSE IF statements to display one of the following messages, depending on which color was chosen:

BLACK “RGB code is (0,0,0)”

WHITE “RGB code is (255,255,255)”

RED “RGB code is (255,0,0)”

BLUE “RGB code is (0,0,255)”

Green “RGB code is (0,255,0)”

Other “not a defined color”

conditionallogic14

```
+  /*...*/  
package conditionallogic14;  
-  import java.util.Scanner;  
+  /**...*/  
public class Exercise {  
  
+  /**...*/  
-  public static void main(String[] args) {  
    String color;  
    System.out.print("Enter color :");  
    Scanner user_input = new Scanner(System.in);  
    color=user_input.next();  
    if(color.equalsIgnoreCase("red"))  
    {  
        System.out.println("color code is RGB (255,0,0)");  
    }  
    else if (color.equalsIgnoreCase("green"))  
    {  
        System.out.println("color code is RGB (0,255,0)");  
    }  
}
```

```
else if (color.equalsIgnoreCase("blue"))
{
    System.out.println("color code is RGB (0,0,255)");
}
else if(color.equalsIgnoreCase("write"))
{
    System.out.println("color code is RGB (255,255,255)");
}
else if(color.equalsIgnoreCase("black"))
{
    System.out.println("color code is RGB (0,0,0)");
}
else
{
    System.out.println("color is undefined.");
}
}
```

⋮ Output - conditionallogic14 (run)



run:



Enter color :|Blue

color code is RGB (0,0,255)



BUILD SUCCESSFUL (total time: 2 seconds)



Assignment

- Build calculator application that accepts 3 inputs from the user (number1, operator, and number2) execute the operation then display the result.
- First program is a command prompt based application uses if, else if, else statement
- Second program is a command prompt based application uses switch, case statement
- Third uses JOptionPane for input instead of console

conditionallogic15

```
1 |+| /*...*/
5 package conditionallogic15;
6 |-| import java.util.Scanner;
7 |+| /**...*/
11 public class Conditionallogic15 {
12 |+|     /**...*/
15 |-|     public static void main(String[] args) {
16         String op;
17         int num1, num2;
18         float result=0;
19         Scanner S = new Scanner(System.in);
20         System.out.printf("\nEnter First Number :");
21         num1=S.nextInt();
22         System.out.printf("\nEnter Operation :");
23         op=S.next();
24         System.out.printf("\nEnter Second Number :");
25         num2=S.nextInt();
26         if(op.equals("+"))
27         {
28             result=num1+num2;
29         }
30         else if(op.equals("-"))
```

```
31     {
32         result=num1-num2;
33     }
34     else if(op.equals("*"))
35     {
36         result=num1*num2;
37     }
38     else if(op.equals("/"))
39     {
40         result=num1/num2;
41     }
42     else
43     {
44         System.out.printf("\nInvalid Operation try again.");
45         System.exit(0);
46     }
47     System.out.printf("\nResult =%f",result);
48
49 }
50 }
51
```



Thanks,
See you next Lecture, isA

