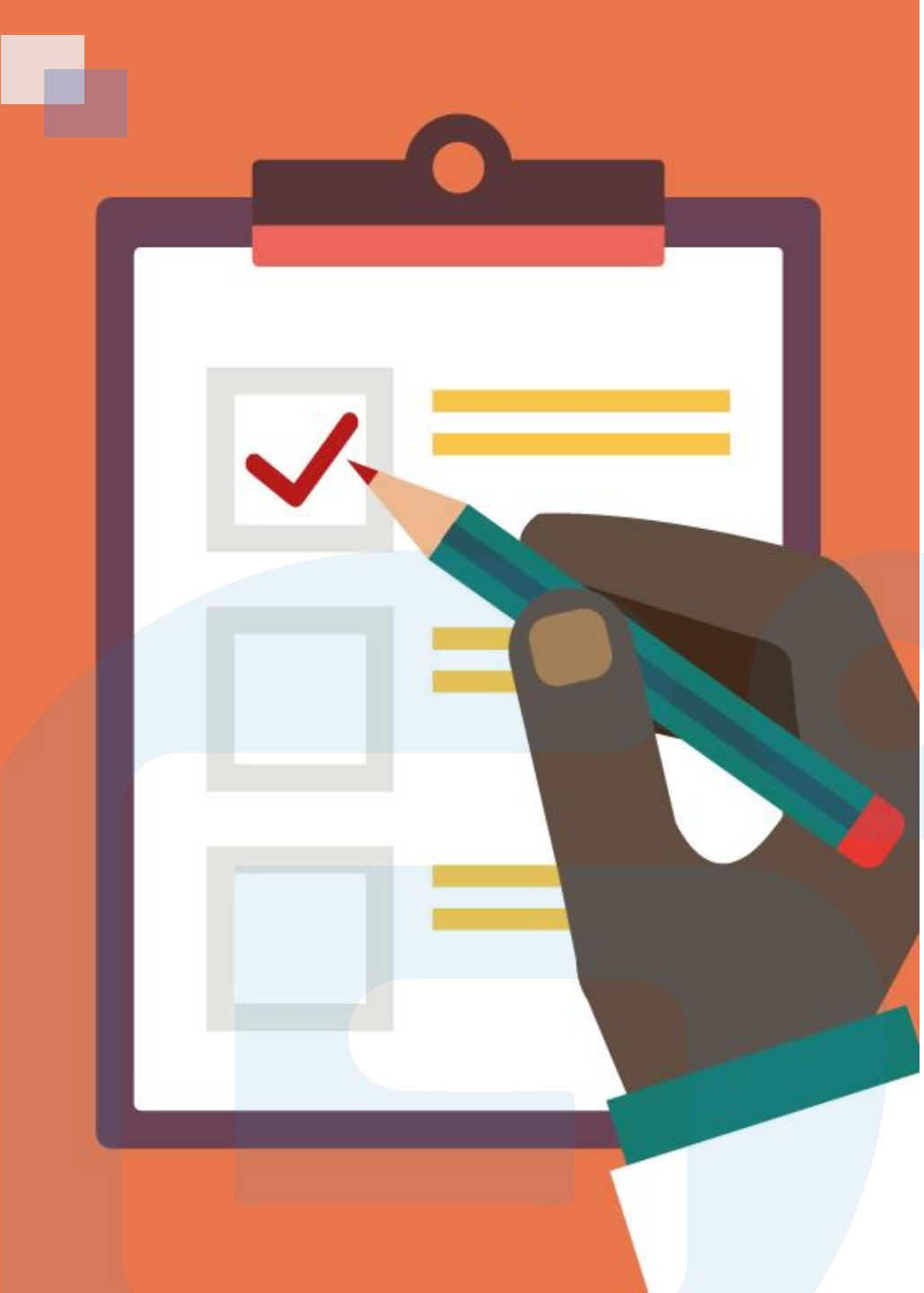
Lecture 3: Java Language Foundations II



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Java Booleans

Java has a boolean data type, which can take the values true or false.

When we define the boolean variables, their values only can be true or false.

```
boolean isJavaFun = true;
boolean isFishTasty = false;
System.out.println(isJavaFun);     // Outputs true
System.out.println(isFishTasty);   // Outputs false

int x = 10;
int y = 9;
System.out.println(x > y); // returns true
System.out.println(x == y);// returns false
```

Java If...Else

Java conditional statements:
if – If a specified condition is true, a block of code will be executed.
else – If a specified condition is false, another block of code will be executed.
else if – If the first condition is false, a new condition will be specified and tested.
switch – Many alternative blocks of code can be specified to execute.

Syntax

```
if (condition1) {  // block of code to be executed if condition1 is true
} else if (condition2) {
  // block of code to be executed if the condition1 is false and condition2 is true
} else {
  // block of code to be executed if the condition1 is false and condition2 is false
}
```

Q: What will be the result?

```java
public class Main
{
    public static void main(String[] args) {
        int time = 11;
        if (time < 10) {
            time += 1;
        System.out.println(time);
        } else if (time < 20) {
        System.out.println("Good day.");
        } else {
        System.out.println("Good evening.");
        }
    }
}
```

```java
public class Main
{
    public static void main(String[] args) {
        int time = 9;
        if (time < 10) {
            time += 1;
        System.out.println(time);
        } else if (time < 20) {
        System.out.println("Good day.");
        } else {
        System.out.println("Good evening.");
        }
    }
}
```

Java Switch

Switch Syntax

```
switch(expression) {
  case x:
    // code block
    break;
  case y:
    // code block
    break;
  default:
    // code block
}
```

- switch statement is to select one of many code blocks to execute.
- The value of the expression is compared with the value of each case.
- break will stop the execution of the following code.
- default specifies some code to run if there is no case match.

Q: What will be the result?

```
int day = 4;
switch (day) {
  case 6:
    System.out.println("Today is Saturday");
    break;
  case 7:
    System.out.println("Today is Sunday");
    break;
  default:
    System.out.println("Looking forward to the
Weekend");
}
```

Java While Loop

While Loop – It will execute a block of code when a specified condition is true.

Syntax

```
while (condition) {
  // code block to be executed
}
```

```
int i = 0;
while (i < 5) {
  System.out.println(i);
  i += 1;
}
```

Do/while Loop – The loop will always be executed at least once, since the code block is executed before the condition is tested.

Syntax

```
do {
  // code block to be executed
}
while (condition);
```

```
int i = 0;
do {
  System.out.println(i);
 i += 1;
}
while (i < 5);
```

Java For Loop

For Loop – It can execute a block of code when certain condition is met.

Syntax

```
for (statement 1; statement 2; statement 3) {
  // code block to be executed
}
```

Statement 1 is executed before the execution of the code block. It can be a default value.

Statement 2 defines the condition for executing the code block.

Statement 3 is executed after the code block has been executed.

Q: What will be the results?

```
for (int i = 0; i < 5; i++) {
  System.out.println(i);
}
```

```
for (int i = 0; i <= 10; i = i + 2) {
  System.out.println(i);
}
```

Java
Break/Continue

break statement can be used to jump out a switch statement and also a loop statement.

```
for (int i = 0; i < 10; i++) {
  if (i == 4) {
    break;
  }
  System.out.println(i);
}
```

continue statement can stop a iteration in the loop, if a specified condition is met, and continues with the next iteration in the loop.

```
for (int i = 0; i < 10; i++) {
  if (i == 4) {
    continue;
  }
  System.out.println(i);
}
```

Java Arrays

Java Arrays – Arrays can store multiple values in a single variable. To declare an array, the variable type can be defined with square brackets.

```
String[] cars;
```

• We can set value to this array using an array list with comma-separated values.

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
```

• We can also create an array of integers.

```
int[] myNum = {10, 20, 30, 40};
```

• The array element can be accessed through the index number.

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
System.out.println(cars[0]);
```

Note: Array indexes start with 0.

• The value of specific element can be changed through accessing the index number.

```
String[] cars = {"Volvo", "BMW", "Ford",
"Mazda"};
 cars[0] = "Opel";
 System.out.println(cars[0]);
```

• Through array length, the total number of array elements can be counted.

```
String[] cars = {"Volvo", "BMW", "Ford",
"Mazda"};
System.out.println(cars.length);
```

Arrays Loop – The loop can run through the array elements with the for loop and use the length property to specify how many times the loop should be iterated.

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
for (int i = 0; i < cars.length; i++) {
  System.out.println(cars[i]);
}
```

For-each loop – It can loop through elements in an array.

Syntax

```
for (type variable : arrayname) {  ...
}
```

For each String element (called **i** - as in **i**ndex) in **cars**, print out the value of **i**

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
for (String i : cars) {
  System.out.println(i);
}
```

Access multidimensional arrays using for loop

We can define a multidimensional array.

```
int[][] myNumbers = { {1, 2, 3, 4}, {5, 6, 7} };
```

We can access a certain element through index number.

```
int x = myNumbers[1][2];
 System.out.println(x);
```

Note: First is the row index and the second is the column index.

To get the elements of a multidimensional array, we can use for loop to access these two indexes.

```
public class Main {
  public static void main(String[] args) {
    int[][] myNumbers = { {1, 2, 3, 4}, {5, 6, 7} };
    for (int i = 0; i < myNumbers.length; ++i) {
      for(int j = 0; j < myNumbers[i].length; ++j) {
        System.out.println(myNumbers[i][j]);
      }
    }
  }
}
```

Thank you!
Any questions?