Tutorial 1

Goal : Learn Loops and iterate in a 2D Array

Examples

- Loops : While & Do While
- Loops: Break & Continue
- Loops : For & For-Each
- Loops : Iterate in 2D array
- Task

Loops : While

```java
public class The_while {
    public static void main(String[] args) {

        String[] names = {"Alice", "Bob", "Charlie"};
        System.out.println(names.length);
        System.out.println("----------------------");
        int i=0 ;
        while(i<names.length) {
            System.out.println(i+": "+names[i]);
            i++;

        }

        System.out.println("----------------------");
        int ii = names.length;
        while (ii > 0) {
            ii--;
            System.out.println(ii + ": " + names[ii]);
        }

        System.out.println("----------------------");
        int iii = names.length - 1;
        while (iii >= 0) {
            System.out.println(iii + ": " + names[iii]);
            iii--;
        }
    }
}
```

```
3
----------------------
0: Alice
1: Bob
2: Charlie
----------------------
2: Charlie
1: Bob
0: Alice
----------------------
2: Charlie
1: Bob
0: Alice
```

Loops : Do While

```java
public class The_do_while {
    public static void main(String[] args) {

        String[] names = {"Alice", "Bob", "Charlie"};
//        String[] names = {};
        int i = 0;
        do {
            if (names.length == 0) {
                System.out.println("No names available");
            }
            else {
                System.out.println(i + ": " + names[i]);
                i++;
            }
        } while (i < names.length);

        }
}
```

```
0: Alice
1: Bob
2: Charlie
```

```java
public class The_do_while {
    public static void main(String[] args) {

//        String[] names = {"Alice", "Bob", "Charlie"};
        String[] names = {};
        int i = 0;
        do {
            if (names.length == 0) {
                System.out.println("No names available");
            }
            else {
                System.out.println(i + ": " + names[i]);
                i++;
            }
        } while (i < names.length);

    }
}
```

```
No names available
```

Loops:
Break & Continue

```java
public class The_Break_Continue {
    public static void main(String[] args) {
        for (int i = 1; i <= 5; i++) {
            if (i == 3) {
                continue;
            }
            System.out.println("i = " + i);
        }
        System.out.println("_____________________");
        for (int i = 1; i <= 5; i++) {
            if (i == 3) {
                break;
            }
            System.out.println("i = " + i);
        }
    }
}
```

```
i = 1
i = 2
i = 4
i = 5

--------
i = 1
i = 2
```

Loops : For

```java
public class The_for {
    public static void main(String[] args) {

        String[] names = {"Alice", "Bob", "Charlie"};
        for(int i=0;i<names.length;i++) {
            System.out.println(i+": "+names[i]);
        }
    }
}
```

```
0: Alice
1: Bob
2: Charlie
```

```java
public class The_for_2d {
    public static void main(String[] args) {

        int[][] myAr = {
                {1, 2, 3},
                {4, 5, 6},
                {7, 8, 9}
        };

        for(int i = 0; i < myAr.length; i++) {
            System.out.println(" ");
            for (int j = 0; j < myAr[i].length; j++) {
                System.out.print(myAr[i][j]);
            }
        }
    }
}
```

```
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
```

For: a tip

```java
public class tst {
    public static void main(String[] args) {
        int[][] myAr = {
                {1, 2, 3},
                {4, 5, 6},
                {7, 8, 9}
        };

        for (int i = 0; i < myAr.length; i++) {
            System.out.println(myAr[i]); //wrong
        }
    }
}
```

```
[I@7b23ec81
[I@6acbcfc0
[I@5f184fc6
```

```
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
```

```java
for(int i = 0; i < myAr.length; i++) {
                System.out.print(Arrays.toString(myAr[i]));
            }
        }
```

Loops : For Each

```java
public class The_for_each {
    public static void main(String[] args) {
        String[] names = {"Alice", "Bob", "Charlie"};

        for (String name : names) {
            System.out.println( name);
        }

    }
}
```

```
Alice
Bob
Charlie
```

Loops : Iterate in 2D array

```java
public class The_2D_arrays {
    public static void main(String[] args) {
                int[][] matrix = {
                        {1, 2, 3},
                        {4, 5, 6},
                        {7, 8, 9}
                };

                for (int i = 0; i < matrix.length; i++) {
                    for (int j = 0; j < matrix[i].length; j++) {
                        System.out.print(matrix[i][j] + " ");
                    }
                    System.out.println();
                }


                System.out.println("--------------------");
                for (int[] row : matrix) {
                    for (int value : row) {
                        System.out.print(value + " ");
                    }
                    System.out.println();
                }
```

```
1 2 3
4 5 6
7 8 9
--------------------
1 2 3
4 5 6
7 8 9
```

Task: Arrays and Loops - Swap

Objective: Write a Java program named *`ArraySwap.java`* that will perform the following:

1. **Create an integer array with random numbers.**
   - Tip 1: You can use *`Math.random()`* (make sure to import the necessary library).
   - Tip 2: You can generate random numbers either in a loop or using other methods.

2. **Swap any two elements in the integer array.**
   - Tip: Create a method *`Swap(int x, int y)`* to handle the swapping of elements.

3. **Multiply each element by the value of the element it was swapped with.**
   - Tip: This can be implemented either in the *`Swap()`* method or in the *`main()`* method.

4. **Print the string representation of a random element from the array.**
   - Tip 1: Generate a random index within the bounds of the array length.
   - Tip 2: Use *`toString()`* to print the selected element.