

Tutorial 1

link: https://github.com/kos00pas/ECE318_Documentations.git

Goal : Learn Loops and iterate in a 2D Array

- [Examples](#)
 - Loops : For & For-Each
 - Loops : While & Do While
 - Loops: Break & Continue
 - Loops : Iterate in 2D array
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Loops : For & For-Each



```
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]);  
        }  
    }  
}
```



```
public class The_for_each {  
    public static void main(String[] args) {  
        String[] names = {"Alice", "Bob", "Charlie"};  
  
        for (String name : names) {  
            System.out.println( name);  
        }  
    }  
}
```

Loops : While

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

Loops : Do While



```
public class The_do_while {  
    public static void main(String[] args) {  
  
        String[] names = {"Alice", "Bob", "Charlie"};  
  
        int i = 0;  
        do {  
            System.out.println(i + ": " + names[i]);  
            i++;  
        } while (i < names.length);  
  
    }  
}
```

Loops: Break & Continue



```
public class The_Break_Continue {  
    public static void main(String[] args) {  
        String[] names = {"Alice", "Bob", "Charlie", "Diana", "Eve"};  
        int i = 0;  
  
        do {  
            if (names[i].equals("Bob")) {  
                i++;  
                continue;  
            }  
            if (names[i].equals("Diana")) {  
                break;  
            }  
            System.out.println(names[i]);  
            i++;  
        } while (i < names.length);  
    }  
}
```

Loops : Iterate in 2D array

```
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();  
        }  
    }  
}
```

```
System.out.println("-----");  
int i = 0, j;  
while (i < matrix.length) {  
    j = 0;  
    while (j < matrix[i].length) {  
        System.out.print(matrix[i][j] + " ");  
        j++;  
    }  
    System.out.println();  
    i++;  
}  
  
System.out.println("-----");  
i = 0;  
do {  
    j = 0;  
    do {  
        System.out.print(matrix[i][j] + " ");  
        j++;  
    } while (j < matrix[i].length);  
    System.out.println();  
    i++;  
} while (i < matrix.length);  
}
```

Using ArrayList and Looping

```
import java.util.ArrayList;

public class Dynamically {
    public static void main(String[] args) {
        // Initializing an ArrayList
        ArrayList<Integer> numbers = new ArrayList<>();
        numbers.add(10);
        numbers.add(20);
        numbers.add(30);

        for (int i = 40; i <= 60; i += 10) {
            numbers.add(i); // Add 40, 50, 60
        }

        System.out.println("-----");
        for (int number : numbers) {
            System.out.println(number);
        }

        System.out.println("-----");
        for (int i = numbers.size() - 1; i >= 0; i--) {
            if (numbers.get(i) >= 50) {
                numbers.remove(i);
            }
        }

        System.out.println("-----");
        for (int number : numbers) {
            System.out.println(number);
        }
    }
}
```

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.