LAB 4

Exercise 1: Declare and Create Arrays

- Declaring Array
  - *datatype[] arrayVar;*

    Example: `double[] myList;`

    `int[] scores, x, y;` **//*scores*, *x*, and *y* are array**
  - *datatype arrayVar[];*

    Example: `double myList[];`

    `int scores[], x, y[];` **//only *scores* and *y* are array**
- Creating Array

  arrayVar = new datatype[arraySize];

  Example:

```
myList = new double[20];
scores = new int[10];
y = new int[100];
```

Exercise 1

- Declare arrays

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		double[] myDouble;
		char myChar[];

	}
}
```

Exercise 1

- Create arrays

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		double[] myDoubles;
		char myChars[];

		myNumbers = new int[5];
		myDoubles = new double[10];
		myChars = new char[5];

	}
}
```

Exercise 1

- Declare and create arrays at once

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		double[] myDoubles;
		char myChars[];

		myNumbers = new int[5];
		myDoubles = new double[10];
		myChars = new char[5];
		boolean myBoolean[] = new boolean[5];

	}
}
```

Exercise 2: Array Values

- Use the value in an array

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		double[] myDoubles;
		char myChars[];

		myNumbers = new int[5];
		myDoubles = new double[10];
		myChars = new char[5];
		boolean myBoolean[] = new boolean[5];
		System.out.println(myNumbers[0]);
		System.out.println(myDoubles[1]);
		System.out.println(myChars[2]);
		System.out.println(myBoolean[3]);
	}
}
```

Exercise 2

- Assign a value to an array

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		double[] myDoubles;
		char myChars[];

		myNumbers = new int[5];
		myDoubles = new double[10];
		myChars = new char[5];
		boolean myBoolean[] = new boolean[5];
		System.out.println(myNumbers[0]);
		myNumbers[0] = 128;
		System.out.println(myNumbers[0]);
	}
}
```

Exercise 2

- What about assigning a value which is not matched to the type of array?

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		double[] myDoubles;
		char myChars[];

		myNumbers = new int[5];
		myDoubles = new double[10];
		myChars = new char[5];
		boolean myBoolean[] = new boolean[5];
		System.out.println(myNumbers[0]);
		myNumbers[0] = 128.15;
		System.out.println(myNumbers[0]);
	}
}
```

Exercise 2

- What about trying to get the value from the index that is not appear in the arrays?

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers;
		myNumbers = new int[5];
		System.out.println(myNumbers[0]);
		myNumbers[0] = 128;
		System.out.println(myNumbers[0]);
		System.out.println(myNumbers[10]);
	}
}
```

- What is the error?
  - Runtime error – ArrayIndexOutOfBoundsException
- Does the value at the index of 5 exist?

Exercise 2

- Use an initializer list

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers = {10, 15, 18, 132, 0};
		System.out.println(myNumbers[0]);
		System.out.println(myNumbers[1]);
		System.out.println(myNumbers[2]);
		System.out.println(myNumbers[3]);
		System.out.println(myNumbers[4]);
	}
}
```

Exercise 3: Size of Arrays

- You can use a constant called “length” to get the size of an array

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers = {10, 15, 18, 132, 0};
		System.out.println(myNumbers[0]);
		System.out.println(myNumbers[1]);
		System.out.println(myNumbers[2]);
		System.out.println(myNumbers[3]);
		System.out.println(myNumbers[4]);

		System.out.println(myNumbers.length);
	}
}
```

Exercise 4: Use Values in Arrays

- You can call each value in the array by specify the index

```
public class Lab5{
	public static void main(String[] args){
		int[] myNumbers = {10, 15, 18, 132, 0};
		System.out.println(myNumbers[3]);
		System.out.println((myNumbers[3]+2)/4);
		if(myNumbers[3]>100){
			System.out.println("The value is
greater than 100");
		}
	}
}
```

Exercise 5: Array of Objects

- Arrays can contain object values

```
public class Lab5{
        public static void main(String[] args){
                String[] fruits = new String[3];
                fruits[0] = new String("Apple");
                fruits[1] = "Banana";
                fruits[2] = new String("Mango");

                System.out.println(fruits[0] + " " + fruits[1]
+ " " + fruits[2]);
        }
}
```

```
public class Lab5{
        public static void main(String[] args){
                String[] fruits = {new String("Apple"), new
String("Banana"), new String("Mango")};
        }
}
```

Exercise 6: Array and Loop

- Iterate through arrays with simple loops

```
public class Lab5{
	public static void main(String[] args){
		String[] fruits = new String[3];
		fruits[0] = new String("Apple");
		fruits[1] = "Banana";
		fruits[2] = new String("Mango");
		int i = 0;
		while(i<fruits.length){
			System.out.println(fruits[i]);
			i++;
		}
	}
}
```

Exercise 6

- For each: another version of the for loop used only with array elements

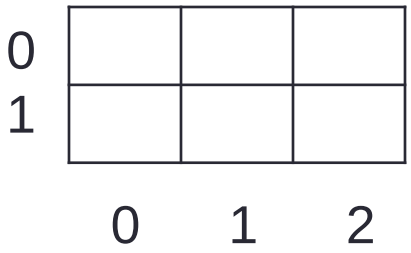
```
public class Lab5{
	public static void main(String[] args){
		String[] fruits = new String[3];
		fruits[0] = new String("Apple");
		fruits[1] = "Banana";
		fruits[2] = new String("Mango");

		for(String f : fruits){
			System.out.println(f);
		}
	}
}
```

Exercise 7: Two-Dimensional Arrays

- Arrays can have more than one dimension

```
public class Lab5{
	public static void main(String[] args){
		int[][] numTable = new int[2][3];
	}
}
```



Exercise 7

- Assign values to the arrays

```
public class Lab5{
	public static void main(String[] args){
		int[][] numTable = new int[2][3];
		numTable [0][0] = 1;
		numTable [0][1] = 2;
		numTable [0][2] = 3;
		numTable [1][0] = 4;
		numTable [1][1] = 5;
		numTable [1][2] = 6;
	}
}
```

0	**1**	**2**	**3**
1	**4**	**5**	**6**
	0	1	2

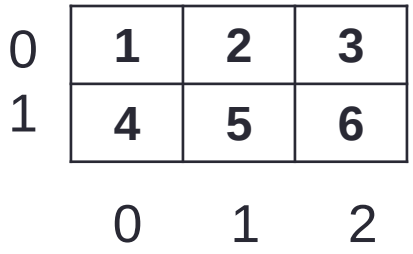
Exercise 7

- Assign values to the arrays

```
public class Lab5{
	public static void main(String[] args){
		int[][] numTable = {
					{1, 2, 3},
					{4, 5, 6}
				};
	}
}
```

0	**1**	**2**	**3**
1	**4**	**5**	**6**
	0	1	2

Exercise 7



- Length of the arrays

```
public class Lab5{
	public static void main(String[] args){
		int[][] numTable = new int[2][3];
		numTable [0][0] = 1;
		numTable [0][1] = 2;
		numTable [0][2] = 3;
		numTable [1][0] = 4;
		numTable [1][1] = 5;
		numTable [1][2] = 6;
		System.out.println(numTable.length);
		System.out.println(numTable[0].length);
		System.out.println(numTable[1].length);
	}
}
```

Exercise 8: Ragged Arrays

- Rows can have different lengths

```
int[][] numTable = {
        {1, 2, 3},
        {4, 5}
};
System.out.println(numTable.length);
System.out.println(numTable[0].length);
System.out.println(numTable[1].length);
System.out.println(numTable[1][0]);
System.out.println(numTable[1][2]);
```