

OOP LAB #06

Objective: Implementation of arrays.

Exercise#01: Write a program to create a rectangular array containing a multiplication table from 1 x 1 up to 12 x 12. Output the table as 13 columns with the numeric values right aligned in columns. (The first line of the output will be the column headings, the first column with no heading, then the numbers 1 to 12 for the remaining columns. The first item in each of the succeeding lines is the row heading, which ranges from 1 to 12.)

Source code:

```
package lab6task1;
public class Lab6task1 {
public static void main(String[] args) {
int size=12;
int table[][]=new int[size][size];
//filling array with multiplication table
for(int i=0;i<table.length;i++){
for(int j=0;j<table[i].length;j++){
table[i][j]=(i+1)*(j+1);
}
}
System.out.print("    :");
//heading of tables
for(int i=1;i<=12;i++){
System.out.print((i<9?" ":" ")+i);
}
System.out.println("\n-----");
for(int i=0;i<table.length;i++){
System.out.print("Row"+(i<9?" ":" ")+(i+1)+":");
for(int j=0;j<table.length;j++){
System.out.print((table[i][j]<10?" ":"")+table[i][j]);
}
System.out.println();
}
}
}
```

Output:

| : | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| <hr/> | | | | | | | | | | | | |
| Row 1: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Row 2: | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| Row 3: | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| Row 4: | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| Row 5: | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| Row 6: | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| Row 7: | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| Row 8: | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| Row 9: | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| Row 10: | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| Row 11: | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| Row 12: | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

Exercise#02: Create an array of String variables and initialize the array with the names of the months from January to December. Create an array containing 12 random decimal values between 0.0 and 100.0. Display the names of each month along with the corresponding decimal value. Calculate and display the average of the 12 value.

Source code:

```
package lab6task2;
public class Lab6task2 {
```

```
public static void main(String[] args) {
String months[]={ "January","February","March","April","May"
,"June","July","August","September","October","November","December"};
double no[]=new double[12];
double sum=0,average;
for(int i=0;i<no.length;i++){
no[i]=Math.random()*100;
sum=sum+no[i]; }
for(int i=0;i<months.length;i++){
System.out.print(no[i]+".");
System.out.println(months[i]); }
System.out.print("Average of 12 number is: "+(sum/12)); } }
```

Output:

```
30.13724558125721.January
34.79470258381991.February
68.88440683123629.March
49.33449897075688.April
6.222531898407668.May
85.2515481230982.June
47.89162859550819.July
40.95293480225401.August
27.62955697921379.September
97.1127520828924.October
24.94634390671471.November
75.59341385648408.December
Average of 12 number is: 49.06263035097027
```

Exercise#03: Write a Java program to calculate the average value of array elements.

Source code:

```
package lab6task3;
public class LAb6task3 {
public static void main(String[] args) {
int arr[]=new int[10];
int sum=0;
for(int i=0;i<arr.length;i++){
arr[i]=(int)(Math.random()*100);
sum=sum+arr[i]; }
for(int i=0;i<arr.length;i++){
System.out.println(arr[i]); }
System.out.println("Sum of array elements are: "+sum);
System.out.println("Average of array elements is: "+(sum/arr.length));
}}
```

Output:

```
89
```

```
57
```

```
84
```

```
49
```

```
61
```

```
59
```

```
30
```

```
12
```

```
27
```

```
23
```

```
Sum of array elements are: 491
```

Average of array elements is: 49

Exercide#04: Write a Java program to reverse an array of integer values.

Source code:

```
package lab6task4;
public class Lab6task4 {
    public static void main(String[] args) {
        int arr[] = new int[5];
        for (int i = 0; i < arr.length; i++) {
            arr[i] = (int)(Math.random() * 100);
        }
        System.out.println("Original Array!");
        for (int i = 0; i < arr.length; i++) {
            System.out.print(arr[i] + " ");
        }
        System.out.println();
        System.out.println("Reversed Array!");
        for (int i = arr.length - 1; i >= 0; i--) {
            System.out.print(arr[i] + " ");
        }
    }
}
```

Output:

```
Original Array!
98 31 60 70 49
Reversed Array!
49 70 60 31 98
```

Exercise#05: Write a Java program to sort a numeric array and a string array.

Source code:

```
package lab6task5;
public class Lab6task5 {
    public static void main(String[] args) {
        //Numeric Array Sorting
        int arr[] = new int[5];
        int temp;
        String arr1[] = {"Haider", "Aoun", "Ali", "Ahmad"};
        String temp1;
        for (int i = 0; i < arr.length; i++) {
            arr[i] = (int) (Math.random() * 100);
        }
        System.out.println("Orriginal Array!");
        for (int i = 0; i < arr.length; i++) {
            System.out.print(arr[i] + " ");
        }
        System.out.println();
        for (int i = 0; i < arr.length; i++) {
            int flag = 0;
            for (int j = 0; j < arr.length - 1 - i; j++) {
                if (arr[j] > arr[j + 1]) {
                    temp = arr[j];
                    arr[j] = arr[j + 1];
                    arr[j + 1] = temp;
                    flag = 1;
                }
            }
            if (flag == 0) {
```

```
break;
}
}
System.out.println("Sorted Array!");
for (int i = 0; i < arr.length; i++) {
System.out.print(arr[i] + " ");
}
System.out.println();
System.out.println("Original Array!");
for (int i = 0; i < arr1.length; i++) {
System.out.print(arr1[i] + " ");
}
System.out.println();
for (int i = 0; i < arr1.length; i++) {
int flag = 0;
for (int j = 0; j < arr1.length - 1 - i; j++) {
if (arr1[j].compareTo(arr1[j + 1])>0) {
temp1 = arr1[j];
arr1[j] = arr1[j + 1];
arr1[j + 1] = temp1;
flag = 1;
}
}
if (flag == 0) {
break;
}
}
System.out.println("Sorted Array!");
for (int i = 0; i < arr1.length; i++) {
System.out.print(arr1[i] + " ");
}
}
```

Output:

Original Array!
79 69 57 22 83
Sorted Array!
22 57 69 79 83
Original Array!
Haider Aoun Ali Ahmad
Sorted Array!
Ahmad Ali Aoun Haider