ASSIGNMENT 3 & 4

- **PROBLEM STATEMENT:**

1. Write a Java Program to display whether a given number is odd or even.

- **SOURCE CODE:**

```
import java.util.Scanner;
class p1{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter Number:");
		int n = sc.nextInt();

		if(n%2==0)	System.out.println("The Number "+n+" is Even");
		else		System.out.println("The Number "+n+" is Odd");

	}
}
```

- **OUTPUT:**

```
Enter Number:7
The Number 7 is Odd
```

- **PROBLEM STATEMENT:**

2. Write a Java program to find maximum and minimum element in an array of size n. [read size and all elements of array from keyboard].

- **SOURCE CODE:**

```
import java.util.Scanner;
class p2{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter Size:");
		int a = sc.nextInt();
		int n[] = new int[a];

		System.out.print("Enter Numbers:");
		for(int i=0; i < n.length; i++)  n[i]=sc.nextInt();

		int max = n[0],min = n[0];

		for(int i=1; i < n.length; i++){
			if(max < n[i])  max = n[i];
			if(min > n[i])   min = n[i];
		}
		System.out.println("Maximum Number is: "+max);
		System.out.println("Minimum Number is: "+min);
	}
}
```

- **OUTPUT:**

```
Enter Size:5
Enter Numbers:78 54 -5 95 47
Maximum Number is: 95
Minimum Number is: -5
```

- **PROBLEM STATEMENT:**

3. Write a java program to print all prime numbers between 1 to n. Use Scanner BufferedReader class to read n. Also print total prime numbers in above range.

- **SOURCE CODE:**

```
import java.util.Scanner;
class p3{
	public static boolean isPrime(int i){
		if(i<=2)		return false;
		for(int j=2; j<=Math.sqrt(i); j++)	if(i % j == 0)	return false;
		return true;
	}
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter Range:");
		int n = sc.nextInt();
		int count =0;
		System.out.println("Prime Numbers:");

		for(int i=1; i<=n; i++){
			if(isPrime(i)){
				count++;
				System.out.print(i+" ");
			}
		}
		System.out.println("\nTotal Prime Numbers:"+count);
	}
}
```

- **OUTPUT:**

```
Enter Range:20
Prime Numbers:
3 5 7 11 13 17 19
Total Prime Numbers:7
```

- **PROBLEM STATEMENT:**

4. **Write a Java program to find the sum of the digits of a given integer and also print the number in reverse order.**

- **SOURCE CODE:**

```
import java.util.Scanner;
class p4{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter Digits:");
		int sum=0;
		int n = sc.nextInt();
		int r=0;

		while(n>0){
			int a=n%10;
			sum = sum + a;
			r = r*10 + a;
			n=n/10;
		}

		System.out.println("Sum of Digits:"+sum);
		System.out.println("Reverse of Digits:"+r);
	}
}
```

- **OUTPUT:**

```
Enter Digits:4564
Sum of Digits:19
Reverse of Digits:4654
```

- **PROBLEM STATEMENT:**

5. **Write a java program to print the first 'n' terms of the Fibonacci series (0, 1, 1, 2, 3, 5, 8, 13, 21 and 34) using either recursive or non recursive functions.**

- **SOURCE CODE:**

```
import java.util.Scanner;

class p5{
	public static int fibo(int n){
		if(n==0)	return 0;
		if(n==1)	return 1;

		return fibo(n-1) + fibo(n-2);
	}
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);

		System.out.print("Enter Range:");
		int n = sc.nextInt();

		System.out.println("Fibonacchi Series");
		for(int i=0; i<=n; i++) System.out.print(fibo(i)+" ");
		System.out.println();
	}

}
```

- **OUTPUT:**

```
Enter Range:6
Fibonacchi Series
0 1 1 2 3 5 8
```

- **PROBLEM STATEMENT:**

6. **Write a program in Java to find factorial of a given number.**

- **SOURCE CODE:**

```
import java.util.Scanner;
class p6{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter Number:");
		int n=sc.nextInt();
		int f=1;
		for(int i=2; i<=n; i++) f *= i;
		System.out.printf("Factorial of %d is %d\n",n,f);
	}
}
```

- **OUTPUT:**

```
Enter Number:5
Factorial of 5 is 120
```

- **PROBLEM STATEMENT:**

7. **Write a Java program that prints all real solutions to the quadratic equation ax^2+bx+c. Use Scanner/BufferedReader class to read a, b, c value.**

- **SOURCE CODE:**

```
import java.util.Scanner;

class p7{
	public static void main(String[] args){
		Scanner sc = new Scanner(System.in);

		System.out.print("Enter the Value of a:");
		double a = sc.nextDouble();

		System.out.print("Enter the value of b:");
		double b = sc.nextDouble();

		System.out.print("Enter The value of c:");
		double c = sc.nextDouble();

		double d = b*b - 4*a*c;

		if(d>0){
			double r1 = (-b + Math.sqrt(d) / (2*a));
			double r2 = (-b - Math.sqrt(d) / (2*a));

			System.out.println("Roots are real and different");
			System.out.println("root1:"+r1);
			System.out.println("root2:"+r2);

		}else if(d==0){
			double r = -b /(2*a);
			System.out.println("Roots are real and equal");
			System.out.println("Root:"+r);

		}else	System.out.println("Root are Complex and Different");
	}
}
```

- **OUTPUT:**

```
Enter the Value of a:1
Enter the value of b:-2
Enter The value of c:1
Roots are real and equal
Root:1.0
```

- **PROBLEM STATEMENT:**

8. Write a Java program to read two matrices from keyboard and find the sum of the matrices.

- **SOURCE CODE:**

```
import java.util.Scanner;
class p8{
	static int r,c;
	static Scanner sc = new Scanner(System.in);
	public static void CreateMatrix(int a[][]){
		for(int i=0; i<r; i++)
			for(int j=0; j<c; j++)  a[i][j]=sc.nextInt();
	}
	public static void DisplayMatrix(int a[][]){
		for(int i=0; i<r; i++){
			for(int j=0; j<c; j++)  System.out.print(a[i][j]+" ");
			System.out.println();
		}
	}
	public static void main(String[] args){
		System.out.print("Enter Row and column:");
		r = sc.nextInt();
		c = sc.nextInt();
		int n1[][] = new int[r][c];
		int n2[][] = new int[r][c];
		int sum[][] = new int[r][c];

		System.out.println("Enter First Matrix:");
		CreateMatrix(n1);

		System.out.println("Enter Second Matrix:");
		CreateMatrix(n2);

		for(int i=0; i<r; i++)
			for(int j=0; j<c; j++)   sum[i][j] = n1[i][j] + n2[i][j];

		System.out.println("Sum of Matrix:");
		DisplayMatrix(sum);
	}
}
```

- **OUTPUT:**

```
Enter Row and column:3 3
Enter First Matrix:
3 4 6
2 5 3
1 4 5
Enter Second Matrix:
5 2 3
4 2 1
3 2 5
Sum of Matrix:
8 6 9
6 7 4
4 6 10
```

- **PROBLEM STATEMENT:**

9. Write Java program to find the sum of all odd numbers in a 2D array.

- **SOURCE CODE:**

```
import java.util.Scanner;
class p9{
	public static void main(String args[]){
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter row and column:");

		int r = sc.nextInt();
		int c = sc.nextInt();
		int sum = 0;
		int a[][] = new int[r][c];

		for(int i=0; i<r; i++)
			for(int j=0; j<c; j++)   a[i][j] = sc.nextInt();

		for(int i=0; i<r; i++)
			for(int j=0; j<c; j++){
				if(a[i][j] % 2 !=0)       sum = sum + a[i][j];
			}
		System.out.println("Sum of Odd number : "+sum);
	}
}
```

- **OUTPUT:**

```
Enter row and column:3 3
Enter Matrix:
23 18 6
47 38 95
49 73 87
Sum of Odd number : 374
```

- **PROBLEM STATEMENT:**

10. Write a Java program to print the following patterns up to n lines. Supply a value through command line argument

1
10
101
1010
…….

- **SOURCE CODE:**

```
class p10{
        public static void main(String[] args){
                int n = Integer.parseInt(args[0]);
                for(int i=1; i<=n; i++){
                        for(int j=1; j<=i; j++){
                                if(j % 2 != 0)   System.out.print("1 ");
                                else      System.out.print("0 ");
                        }
                        System.out.println();
                }
        }
}
```

- **OUTPUT:**

```
$ java p10 5
1
1 0
1 0 1
1 0 1 0
1 0 1 0 1
```

- **PROBLEM STATEMENT:**

11. Write a Java program to print the following patterns up to n lines. Supply a value through command line argument

*****
******
****
****
…….

- **SOURCE CODE:**

```
class p11{
        public static void main(String[] args){
                int n = Integer.parseInt(args[0]);
                for(int i=1; i<=n; i++){
                        for(int j=1; j<=i; j++)  System.out.print("* ");
                        System.out.println();
                }
        }
}
```

- **OUTPUT:**

```
$ java p11 5
*
* *
* * *
* * * *
* * * * *
```

- **PROBLEM STATEMENT:**

12. Write a program in Java to accept name, city and salary of an employee through command line arguments and display the details of the employee.

- **SOURCE CODE:**

```
class p12{
	public static void main(String[] args){
		String n = args[0],c = args[1],s = args[2];

		System.out.println("Employee Details");
		System.out.println("Name:"+n);
		System.out.println("City;"+c);
		System.out.println("Salary:"+s);
	}
}
```

- **OUTPUT:**

```
$ java p12 Partha Kolkata 200000
Employee Details
Name:Partha
City;Kolkata
Salary:200000
```

- **PROBLEM STATEMENT:**

13. Write a program in Java to accept two integers as command line arguments and display the display the sum of the integers.

- **SOURCE CODE:**

```
class p13{
	public static void main(String[] args){
		int n1 = Integer.parseInt(args[0]);
		int n2 = Integer.parseInt(args[1]);

		System.out.println("Sum of Digits: "+(n1+n2));
	}
}
```

- **OUTPUT:**

```
$ java p13 45 50
Sum of Digits: 95
```

- **PROBLEM STATEMENT:**

14. Write a program in Java to accept the following city name as argument in the command line and sort them in alphabetic order – city names are {Kolkata, Chennai, Mumbai, Delhi, Bangalore, Ahmadabad].

- **SOURCE CODE:**

```
class p14{
	public static void main(String[] city){
		String temp = null;

		for(int i=0; i<city.length; i++){
			for(int j=0; j<city.length; j++){
				if(city[i].compareTo(city[j]) < 0){
					temp = city[i];
					city[i] = city[j];
					city[j] = temp;
				}
			}
		}

		for(int i=0; i<city.length; i++) System.out.println(city[i]);
	}
}
```

- **OUTPUT:**

```
$ java p14 Kolkata Chennai Mumbai Delhi Bangalore Ahmadabad
Ahmadabad
Bangalore
Chennai
Delhi
Kolkata
Mumbai
```

- **PROBLEM STATEMENT:**

15. Write a program to declare & instantiate array to hold 3 Student object. Student class contains roll, name and three different subjects marks. Find out the best student according to average marks of all subjects and display all details of the best student.

- **SOURCE CODE:**

```
class Student{
	int roll;
	String name;
	int[] marks;

	public Student(int r,String n,int[] marks){
		this.roll = r;
		this.name = n;
		this.marks = marks;
	}

	int getAverage(){
		int sum=0;
		for(int i : marks)	sum += i;
		return sum/marks.length;
	}
	void display(){
		System.out.println("Name:"+name);
		System.out.println("Roll:"+roll);
		System.out.print("Marks:");
		for(int i=0; i<marks.length; i++)	System.out.print(marks[i]+" ");
		System.out.println();
	}
}
class p15{

	public static void main(String[] args){
		Student[] s1 = new Student[3];

		s1[0] = new Student(1, "Partha", new int[]{80,85,90});
		s1[1] = new Student(2, "Anwesha", new int[]{95,85,80});
		s1[2] = new Student(3, "sayak", new int[]{90,85,95});

		Student bestS = s1[0];

		for(Student s : s1)
			if(s.getAverage() > bestS.getAverage())	bestS = s;
		System.out.println("Best Student Details:");
		bestS.display();
	}
}
```

- **OUTPUT:**

```
$ java p15
Best Student Details:
Name:sayak
Roll:3
Marks:90 85 95
```