Assignment 2

1. Write a java program for Matrix Addition.

Program:

```
import java.util.Scanner;
public class MatrixAdd
{
    public static void main(String[] args)
 {
        int i,j,n;
                Scanner sc=new Scanner(System.in);
                System.out.println("Enter the value for n :");
                n=sc.nextInt();
                int a[][]=new int[n][n];
            int b[][]=new int[n][n];
            int c[][]=new int[n][n];
                System.out.println("Enter First Matrix elements :");
                for(i=0;i<n;i++)
                 {
                  for(j=0;j<n;j++)
                  {
                    a[i][j]=sc.nextInt();
                  }
                 }
                 System.out.println("Enter second Matrix elements :");
                for(i=0;i<n;i++)
                 {
                   for(j=0;j<n;j++)
                   {
                     b[i][j]=sc.nextInt();
                   }
                 }
                System.out.println("The sum of Matrices is : \n");

                 for(i=0;i<n;i++)
                 {
                  for(j=0;j<n;j++)
               {
                 c[i][j]=a[i][j]+b[i][j];
                 System.out.print(c[i][j]+ "    ");
              }
              System.out.println(" ");
              }
       }
}
```

Output:

```
F:\RSC>javac MatrixAdd.java

F:\RSC>java MatrixAdd
Enter the value for n :
2
Enter First Matrix elements :
1
2
3
4
Enter second Matrix elements :
3
4
5
6
The sum of Matrices is :

4   6
8   10
```

2. Write a java program for Matrix Multiplication.

Program:

```
import java.util.Scanner;

class MatrixMul
{
   public static void main(String args[])
   {
      int m,n,p,q,sum=0,c,d,k;

      Scanner sc= new Scanner(System.in);
      System.out.println("Enter the number of rows and columns of
first matrix");
      m = sc.nextInt();
      n = sc.nextInt();
      int first[][] = new int[m][n];
          System.out.println("Enter elements of first matrix");
      for (c = 0; c < m; c++)
         for (d = 0; d < n; d++)
            first[c][d] = sc.nextInt();
          System.out.println("Enter the number of rows and columns of
second matrix");
      p = sc.nextInt();
      q = sc.nextInt();
      if (n != p)
         System.out.println("The matrices can't be multiplied with each
other.");
      else
      {
         int second[][] = new int[p][q];
         int multiply[][] = new int[m][q];
                 System.out.println("Enter elements of second matrix");
             for (c = 0; c < p; c++)
            for (d = 0; d < q; d++)
               second[c][d] = sc.nextInt();
                 for (c = 0; c < m; c++)
         {
```

```
        for (d = 0; d < q; d++)
        {
          for (k = 0; k < p; k++)
          {
            sum = sum + first[c][k]*second[k][d];
          }

          multiply[c][d] = sum;
          sum = 0;
        }
      }

      System.out.println("Product of the matrices:");

      for (c = 0; c < m; c++)
      {
        for (d = 0; d < q; d++)
          System.out.print(multiply[c][d]+"\t");

        System.out.print("\n");
      }
    }
  }
}
```

Output:

```
F:\RSC>javac MatrixMul.java

F:\RSC>java MatrixMul
Enter the number of rows and columns of first matrix
2
3
Enter elements of first matrix
2
3
```

```
3
4
5
6
Enter the number of rows and columns of second matrix
2
3
The matrices can't be multiplied with each other.

F:\RSC>java MatrixMul
Enter the number of rows and columns of first matrix
1
2
Enter elements of first matrix
1
2
Enter the number of rows and columns of second matrix
2
1
Enter elements of second matrix
1
2
Product of the matrices:
5
```

3. Write a java program to demonstrate method overloading.

Program:

```
class Overloading{
  void sum(int a,int b)
  {
        System.out.println(a+b);
  }
  void sum(int a,int b,int c)
  {
        System.out.println(a+b+c);
  }
  public static void main(String args[]){
  Overloading ol=new Overloading();
  ol.sum(23,35);
  ol.sum(11,22,33);

  }
}
```

Output:

```
F:\RSC>javac Overloading.java

F:\RSC>java Overloading
58
66
```

4. **Write a java program to create a class Point with two data members x & y. Include all constructors and display().**

Program:

```
class Constructor{
      int  x;
      int  y;
       Constructor(){
        x= 10;
       y= 20;
       System.out.println("Inside 1st Constructor");
     }
    Constructor(int a){
      x= a;
      System.out.println("Inside 2nd Constructor");
    }
    Constructor(int a,int b){
    x= a;
    y= b;
    System.out.println("Inside 3rd Constructor");
   }
   public void display(){
      System.out.println("Value1 === "+x);
      System.out.println("Value2 === "+y);
  }
  public static void main(String args[]){
    Constructor d1 = new Constructor();
    Constructor d2 = new Constructor(30);
    Constructor d3 = new Constructor(30,40);
    d1.display();
    d2.display();
    d3.display();
 }
}
```

Output:

```
F:\RSC>javac Constructor.java

F:\RSC>java Constructor
Inside 1st Constructor
Inside 2nd Constructor
Inside 3rd Constructor
Value1 === 10
Value2 === 20
Value1 === 30
Value2 === 0
Value1 === 30
Value2 === 40
```

5. Write a java program using static method.

Program:

```
class UseStatic{
static String s="RightStroke";
  static void display(String s){
  System.out.println(s+" : "+"I am from Static method");
  }

  public static void main(String args[]){
display(s);
  System.out.println("This is main method");
  }
}
```

Output:

```
F:\RSC>javac UseStatic.java

F:\RSC>java UseStatic
RightStroke : I am from Static method
This is main method
```

1.**What is conditional statement?**

A Conditional statement lets us choose which statement will be executed next.Therefore they are also called as Selection Statements. These Statements give us the power to make basic decisions.
The Java Conditional statements are:
1)if statement
2)if-else statement
3)switch statement

2.Write the syntax of switch..case statement.

Syntax of Switch case:

```
switch(expression/variable){
case  value1:
//statement of case1
break;
}
case value2:
//statements of case2
break;
...
...
default:
//default statements
}
```

3.Write the difference between break and continue statement.

The break keyword is used to breaks(stopping) a loop execution, which may be a for loop, while loop, do while or for each loop.
The continue keyword is used to skip the particular recursion only in a loop execution, which may be a for loop, while loop, do while or for each loop.

4.What is looping statement?

A loop statement is a series of steps or sequence
of statements executed repeatedly zero or more times satisfying the given condition is satisfied.
In Java we have three types of basic loops: for, while and do-while

6. Write the difference between while and do..while statement.

The while loop in java executes one or more statements after testing the loop continuation condition at the start of each iteration.

The do-while loop, however, tests the loop continuation condition after the first iteration has completed.So,this loop guarantees one execution of the loop logic whereas the while does not.

7. What is array? How it is created?

An array is a homogenous data structure that is an indexed collection of data elements. The elements of an array are stored in a contiguous memory location.
Array Creation:

```
 Data_type  Array_name[ ];                    //declaring
Array_name=new Data_type[size];          // allocating memory
     (OR)
Data_type  Array_name[ ]=new Data_type[size];
```

8. What is class?

A **class** is used in object-oriented programming to describe one or more objects. It serves as a template for creating, or instantiating, specific objects within a program.

9. What is constructor?

Constructor is a block of code that initializes the newly created object. A constructor resembles an instance method in java but it's not a method as it doesn't have a return type.

Example:

```
public class Myclass{
  public Myclass(){
  }
}
```

10. What is the use of copy constructor?

A copy constructor in a Java class is a constructor that creates an object using another object of the same Java class.
That's helpful when we want to copy a complex object that has several fields, or when we want to make a deep copy of an existing object.

11. What is the use of this keyword?

In java, this is a reference variable that refers to the current object.

Usage of java this keyword:

1. this can be used to refer current class instance variable.
2. this can be used to invoke current class method (implicitly)
3. this() can be used to invoke current class constructor.
4. this can be passed as an argument in the method call.
5. this can be passed as argument in the constructor call.
6. this can be used to return the current class instance from the method.

12 . What is method overloading?

Method Overloading is a feature that allows a class to have more than one method having the same name, if their argument lists are different.

In order to overload a method, the argument lists of the methods must differ in either of these:
1. Number of parameters.
2.Data type of parameters.
3. Sequence of Data type of parameters.

13. What is static variable?

When you declare a variable as static, then a single copy of the variable is created and divided among all objects at the class level. Static variables are, essentially, global variables. Basically, all the instances of the class share the same static variable. Static variables can be created at class-level only.

14.What is access modifier?

Java provides a number of access modifiers to set access levels for classes, variables, methods, and constructors. The four access levels are −

- Visible to the package, the default. No modifiers are needed.
- Visible to the class only (private).
- Visible to the world (public).
- Visible to the package and all subclasses (protected).

15. Write the difference between instance and static methods.

Difference between Static methods and Instance methods

1. Instance method are methods which require an object of its class to be created before it can be called. Static methods are the methods in Java that can be called without creating an object of class.
2. Static method is declared with static keyword. Instance method is not with static keyword.

3. Static method means which will exist as a single copy for a class. But instance methods exist as multiple copies depending on the number of instances created for that class.
4. Static methods can be invoked by using class reference. Instance or non static methods are invoked by using object reference.
5. Static methods can't access instance methods and instance variables directly. Instance method can access static variables and static methods directly.

16. What is object? How it is created?

It is a basic unit of Object Oriented Programming and represents the real life entities. A typical Java program creates many objects, which as you know, interact by invoking methods.

There are three steps when creating an object from a class −

- **Declaration** − A variable declaration with a variable name with an object type.
- **Instantiation** − The 'new' keyword is used to create the object.
- **Initialization** − The 'new' keyword is followed by a call to a constructor. This call initializes the new object.

> Class_Name **Object_id** = new Class_Name();