## 1) Write a Java program to display default value of all primitive data type of JAVA

```
Program:
class Default
static int var1;
static float var2;
static long var3;
static String var4;
static boolean var5;
static double var6;
public static void main( String[ ] args)
System.out.println("var1="+var1);
System.out.println("var2="+var2);
System.out.println("var3="+var3);
System.out.println("var4="+var4);
System.out.println("var5="+var5);
System.out.println("var6="+var6);
}
```

2) Write a Java program to find the discriminant value D and find out the roots of the quadratic equation of the form ax2+bx+c=0.

## **Problem:-**

```
import java.util.Scanner;
class Quadratic
{
  public static void main( String[ ] args)
  {
  double a,b,c,r1,r2;
  Scanner sc=new Scanner(System.in);
  System.out.println("Enter the value of a");
  a=sc.nextInt();
  System.out.println("Enter the value of b");
  b=sc.nextInt();
  System.out.println("Enter the value of c");
```

```
c=sc.nextInt();
double d=b*b-4*a*c;
double e=2*a;
if(d>0)
  r1=(-b+Math.sqrt(d))/e;
  r2=(-b-Math.sqrt(d))/e;
  System.out.println("root1="+r1+" "+"root2="+r2);
  System.out.println("the root are real and distinct");
}
else if(d==0)
{
  r1=r2=-b/e;
  System.out.println("root1="+r1+" " +"root2="+r2);
  System.out.println("the root are equal");
}
else{
  r1=-b/e;
  r2=(Math.sqrt(-d))/e;
  System.out.println("root1="+ r1+ "+" + r2+ "i");
  System.out.println("root2="+ r1+ "-" + r2+ "i");
  System.out.println("The root are real and imaginary");
}
}
}
```

3. Five Bikers Compete in a race such that they drive at a constant speed which may or may not be the same as the other. To qualify the race, the speed of a racer must be more than the

average speed of all 5 racers. Take as input the speed of each racer and print back the speed of qualifying racers.

# **Program**

```
import java.util.Scanner;
class Bike
{
  public static void main(String[] args)
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter the speed of 5 biker racer");
    double r1=sc.nextInt();
    double r2=sc.nextInt();
    double r3=sc.nextInt();
    double r4=sc.nextInt();
    double r5=sc.nextInt();
    double avg=(r1+r2+r3+r4)/5;
    System.out.println("Average speed is" + avg);
    System.out.println("Qualify racer are:- ");
    if(r1>avg)
    {
      System.out.println("race1 speed is" + r1);
    }
     if(r2>avg)
      System.out.println("race2 speed is" + r2);
    }
     if(r3>avg)
    {
```

```
System.out.println("race3 speed is" + r3);
}

if(r4>avg)
{

System.out.println("race4 speed is" + r4);
}

if(r5>avg)
{

System.out.println("race5 speed is" + r5);
}

}
```

3. Write a Java program to select all the prime numbers within the range of 1 to 100.

# **Program**

```
class Prime
{
    public static void main(String[] args)
    {
        for(int i=1; i<=100; i++)
        {
            int cnt=0;
            for(int j=1; j<=i; j++)
            {
                if(i%j==0)
            {
                      cnt++;
                 }
            }
}</pre>
```

```
if(cnt==2)
{
          System.out.print(i+ " ");
        }
     }
}
```

4) Write a Java program to Find the sum of all even terms in the Fibonacci sequence up to the given range N.

```
import java.util.Scanner;
class Fibonacci
  public static void main(String[] args)
  {
    Scanner sc=new Scanner(System.in);
    System.out.println("enter a number");
    int n=sc.nextInt();
    int a=0, b=1,c,sum=0;
    c=a+b;
   while(c<n)
    {
    if(c%2==0)
      sum=sum+c;
      a=b;
      b=c;
      c=a+b;
    }
```

```
System.out.println(sum);
}
```

5) Write a Java program to check whether a given number is Armstrong or not.

# **Program**

```
import java.util.Scanner;
class Armstrong
  public static void main(String[] args)
    Scanner sc=new Scanner(System.in);
    System.out.println("enter a number");
    int n=sc.nextInt();
    int c=0;
    int a=n;
    int b=n;
    int sum=0;
    while(n!=0)
      int r=n%10;
      C++;
      n=n/10;
    while(b!=0)
      int rem=b%10;
      sum=sum+(int)Math.pow(rem,c);
      b=b/10;
    }
    if(sum==a)
      System.out.println("Armstrong");
    }
       System.out.println("Not Armstrong");
    }
```

}6) Write a Java program to implement binary search.

## **Program**

```
import java.util.Scanner;
public class Binary
        public static void main(String[] args)
          Scanner sc=new Scanner(System.in);
                System.out.println("Enter a number");
                 int n=sc.nextInt();
         int a[]=new int[n];
         System.out.println("Enter array elements");
         for(int i=0; i<a.length; i++)</pre>
         {
           a[i]=sc.nextInt();
         }
         System.out.println("Enter a elements to be searched");
         int ser=sc.nextInt();
         int l=0, h=n-1;
         while(I<=h)
           int mid=(I+h)/2;
           if(a[mid]==ser)
           {
              System.out.println("Element is found at index" +mid);
              break;
           }
           else if(a[mid]<ser)
           {
              I=mid+1;
           }
```

```
else{
    h=mid-1;
}

if(l>h)

{
    System.out.println("sorry!! Element is not found");
}
}
```

# **USING PACKAGE for implementing binary search**

```
int ser=sc.nextInt();
    System.out.println(ser +" is found at index="+ Arrays.binarySearch(a,ser));
}
```

# **USING METHOD(FUNCTION)** for implementing binary search

```
import java.util.Scanner;
public class Main
{
  public static void binarysearch(int a[], int n, int ser)
  {
         int I=0, h=n-1;
         while(I<=h)
         {
           int mid=(I+h)/2;
           if(a[mid]==ser)
           {
             System.out.println("Element is found at index " +mid);
              break;
           }
           else if(a[mid]<ser)
           {
             l=mid+1;
           }
           else{
             h=mid-1;
           }
         }
```

```
if(l>h)
           System.out.println("sorry!! Element is not found");
         }
  }
        public static void main(String[] args)
        {
          Scanner sc=new Scanner(System.in);
                System.out.println("Enter a number");
                 int n=sc.nextInt();
         int a[]=new int[n];
         System.out.println("Enter array elements");
         for(int i=0; i<a.length; i++)</pre>
         {
           a[i]=sc.nextInt();
         System.out.println("Enter a elements to be searched");
         int ser=sc.nextInt();
         binarysearch(a,n,ser);
        }
}
```

7) Write a Java program to sort elements in a given list of elements using bubble sort.

## **Program**

```
import java.util.Scanner;
public class Bubble
{
    public static void main(String[] args)
    {
```

```
Scanner sc=new Scanner(System.in);
   System.out.println("Enter a number");
int n=sc.nextInt();
    int a[]=new int[n];
    System.out.println("Enter array elements");
    for(int i=0; i<a.length; i++)</pre>
    {
      a[i]=sc.nextInt();
    }
    for(int i=0; i<n; i++)
    {
      for(int j=0; j<n-i-1; j++)
      {
         if(a[j]>a[j+1])
        {
           int temp=a[j];
           a[j]=a[j+1];
           a[j+1]=temp;
        }
      }
    for(int i=0; i<n; i++)
      System.out.print(a[i]+ " " );
    }
   }
```

}

8) Write a Java program to sort for an element in a given list of elements using merge

```
import java.util.Scanner;
public class Main
  public static void merge(int a[], int lb, int mid, int ub)
  {
    int p=ub-lb+1;
    int b[] = new int[p];
    int i=lb;
    int j=mid+1;
    int k=0;
    while(i<=mid && j<=ub)
    {
      if(a[i]<a[j])
      {
         b[k]=a[i];
         i++;
         k++;
      }
      else
         b[k]=a[j];
         j++;
         k++;
      }
    }
    while(i<=mid)
    {
      b[k]=a[i];
      i++;
```

```
k++;
  }
  while(j<=ub)
    b[k]=a[j];
    j++;
    k++;
  }
 int s=0;
  for( k=lb; k<=ub; k++)
  {
    a[k]=b[s];
    S++;
 }
}
public static void mergesort(int a[], int lb,int ub)
{
  if(lb>=ub)
    return;
  int mid=(ub+lb)/2;
  mergesort(a,lb,mid);
  mergesort(a,mid+1, ub);
  merge(a,lb,mid,ub);
}
public static void printarrays(int a[], int n)
{
  for( int i=0; i<n; i++)
```

```
{
       System.out.print(a[i]+" ");
    }
  }
  public static void main(String[] args) {
    Scanner sc=new Scanner (System.in);
    System.out.println("Enter the size of array");
    int n=sc.nextInt();
    System.out.println("Enter the array elements");
    int a[]=new int [n];
    for(int i=0; i<n; i++)
    {
       a[i]=sc.nextInt();
    }
    int lb=0;
    int ub=n-1;
    mergesort(a,lb,ub);
    printarrays(a,n);
  }
}
```

9) Write a Java program to implement constructor and constructor overloading

# Write a java program of default constructor

```
//default constructor
class Rectangular
{
  int l,b;
  Rectangular()
```

# Write a java program for parameterized constructor

```
//parameterized constructor
class Rectangular
{
  int length,breadth;
  Rectangular(int I, int b)
  {
    length=I;
    breadth=b;
  }
```

```
void show()
{
    System.out.print("Area of rectangle is:"+(length*breadth));
}
class Demo
{
    public static void main(String[] args)
    {
         Rectangular r=new Rectangular(10,20);
         r.show();
    }
}
```

# **Constructor overloading method**

```
//constructor overloading method
import java.util.*;
class Box
{
  int lenght, breadth, height;
  Box()
  {
   lenght=20;
   breadth=10;
   height=10;
}
Box(int I, int b, int h)
```

```
{
    lenght=l;
    breadth=b;
    height=h;
 void show()
 {
    System.out.println("Volume of box is:"+ (lenght*breadth*height));
  }
}
class Demo
{
  public static void main(String[] args)
       {
              Box b=new Box();
              b.show();
              Box b1=new Box(10,10,5);
              b1.show();
       }
}
10) Write a Java program to implement method overloading
//overloading method
import java.util.*;
class Shape
{
 void area(int I, int b )
 {
```

```
System.out.println("Area of rectangle is:"+(I*b));
  }
  void area(float r)
  {
    System.out.println("Area of circle is:"+ (Math.PI*r*r));
  }
  void area(int side)
  {
    System.out.println("Area of circle is:"+ (side*side));
  }
}
class Demo
{
  public static void main(String[] args)
       {
               Shape r=new Shape();
               r.area(20,10);
               r.area(7.0f);
               r.area(10);
       }
}
11) Write a Java program to sort given set of strings.
import java.util.Scanner;
public class Sort
{
```

```
public static void main(String args[])
  Scanner sc=new Scanner(System.in);
  int n=sc.nextInt();
  String a[]=new String[n];
  for(int i=0; i<n; i++)
  {
    a[i]=sc.next();
  }
  for(int i=0; i<n; i++)
  {
    for(int j=0; j<n-1-i; j++)
    {
       if(a[j].compareTo(a[j+1])>0)
      {
         String temp=a[j];
         a[j]=a[j+1];
         a[j+1]=temp;
      }
    }
  }
  for(int i=0; i<n; i++)
    System.out.print(a[i]+" ");
  }
}
```

12) Write a Java program for using String Buffer to remove or delete a character

import java.util.\*;

}

```
class Buffer
{
   public static void main(String args[])
   {
      StringBuffer s1=new StringBuffer("hello World");
      System.out.println(s1.delete(0,4));
      StringBuffer s2=new StringBuffer("hello World");
      System.out.println(s2.deleteCharAt(0));
   }
}
```

## <u>Inheritance</u>

13) Write a Java program to implement Single Inheritance.

```
class Person
{
    String name;
    int age;
    void getp()
    {
       name="sanjit";
       age=21;
    }
}
class Student extends Person
{
    String pinno, clz;
    void gets()
    {
       pinno="5k1";
       clz="AEC";
}
```

```
}
  void show()
  {
    System.out.println("Name "+name);
    System.out.println("Age: "+age);
     System.out.println("pinno "+pinno);
    System.out.println("clz: "+clz);
  }
}
class Demo
{
        public static void main(String[] args)
         Student s=new Student();
         s.gets();
         s.getp();
         s.show();
        }
}
14) Write a Java program to implement multi-level Inheritance
import java.util.*;
class Person
  String name;
  int age;
  void getp()
  {
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter name and age");
```

```
name=sc.next();
    age=sc.nextInt();
 }
}
class Student extends Person
  String clz;
  String pinno;
  void gets()
  {
    getp();
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter college name and pinno");
    clz=sc.next();
    pinno=sc.next();
 }
}
class Marks extends Student
  int m1,m2,m3;
 void getm()
    gets();
   m1=90;
   m2=89;
   m3=87;
  void show()
```

```
{
    System.out.println("Name: "+ name);
    System.out.println("Age: "+ age);
    System.out.println("Pin_no: "+ pinno);
    System.out.println("College Name: "+ clz);
    System.out.println("Java: "+ m1);
    System.out.println("DBMS: "+ m2);
    System.out.println("DSA: "+ m3);
  }
}
class Demo
{
 public static void main(String args[])
    Marks m=new Marks();
   m.getm();
    m.show();
 }
```

15) Write a Java program to find the areas of different shapes using abstract classes.

# **Abstract class using method**

```
abstract class Shapes
{
    abstract void area();
}
class Circle extends Shapes
{
    int r;
    void area()
    {
       r=6;
       System.out.println("Area of Circle is: "+(Math.PI*r*r));
```

```
}
class Rectangle extends Shapes
  int l,b;
 void area()
   I=10;
   b=20;
   System.out.println("Area of Rectangle is: "+(I*b));
 }
class Square extends Shapes
  int s;
 void area()
   s=5;
   System.out.println("Area of square is: "+(s*s));
 }
}
class Main
  public static void main(String args[])
   Circle c=new Circle();
    c.area();
    Rectangle r= new Rectangle();
    r.area();
    Square s=new Square();
    s.area();
  }
Abstract class using constructor
abstract class Shapes
{
  abstract void area();
}
class Rectangel extends Shapes
{
  int length, breadth;
```

Rectangel()

```
{
   length=10;
   breadth=5;
 void area()
  {
    System.out.println("Area of rectangle: "+length*breadth);
 }
}
class Circle extends Shapes
{
  double r;
  Circle()
  {
   r=9.9;
  }
 void area()
  {
    System.out.println("Area of circle: "+ Math.PI*r*r);
 }
class Square extends Shapes
  int side;
  Square()
  {
   side=10;
  }
  void area()
```

```
{
    System.out.println("Area of square: "+ side*side);
  }
}
class Abstract
  public static void main(String args[])
  {
   Rectangel r=new Rectangel();
   r.area();
   Circle c=new Circle();
   c.area();
   Square s=new Square();
   s.area();
  }
}
16) Write a Java program for "super" keyword
class A
{
  void show()
    System.out.println("Class A method is invoked");
  }
}
class B extends A
{
  void show()
  {
    super.show();
```

```
System.out.println("Class B method is invoked");
}
class Main
{
  public static void main(String args[])
  {
    B b=new B();
    b.show();
  }
}
```

17) Take the details of internal exam marks in one Interface. Take the details of external exam marks in another interface. Write a Java program to find the total marks obtained in each subject by a student. (Note: Make use of Multiple Inheritance using interfaces.)

```
interface Internal
{
    public void intmarks();
}
interface External
{
    public void extmarks();
}
class Total implements Internal,External
{
    int i1,i2,i3,i4,i5,e1,e2,e3,e4,e5;
    public void intmarks()
    {
        i1=28;
        i2=30;
}
```

```
i3=27;
    i4=29;
    i5=25;
 public void extmarks()
  {
    e1=65;
    e2=62;
    e3=59;
    e4=63;
    e5=69;
  }
 public void total()
  {
    System.out.println("Marks in java: "+ (i1+e1));
    System.out.println("Marks in DSA: "+ (i2+e2));
    System.out.println("Marks in CPP: "+ (i3+e3));
    System.out.println("Marks in Python: "+ (i4+e4));
    System.out.println("Marks in c: "+ (i5+e5));
  }
}
class Main
  public static void main(String args[])
  {
    Total t=new Total();
    t.intmarks();
    t.extmarks();
    t.total();
```

```
}
```

# 18) Write a JAVA program that implements Runtime polymorphism.(Dynamic Method Dispatching)

```
class A
{
 void show()
  {
    System.out.println("Class A methods are invoked");
  }
}
class B extends A
 void show ()
 {
    System.out.println("Class B methods are invoked");
  }
}
class C extends B
{
 void show ()
    System.out.println("Class C methods are invoked");
  }
}
class Main
{
  public static void main(String args[])
```

```
{
    A a=new A();
    B b=new B();
    C c=new C();
    A r;
    r=a;
    a.show();
    r=b;
    b.show();
    r=c;
    c.show();
}
```

## **Packages**

19) Write a Java program that import and use user defined package.

# Step-1

```
package sanjit;
public class Arithematics
{
  public void show(int a, int b)
  {
    System.out.println("Addition of two number is: "+(a+b));
    System.out.println("Subtraction of two number is: "+(a-b));
    System.out.println("Multiplication of two number is: "+(a*b));
    System.out.println("Division of two number is: "+(a/b));
}
```

# Step-2

```
☐ C:\Windows\System32\cmd.e × + ∨

C:\Users\hp\OneDrive\Desktop>|

C:\Users\hp\OneDrive\Desktop>|
```

## Step-3

```
import sanjit.Arithematics;
public class Example
{
public static void main(String args[])
{
Arithematics a=new Arithematics();
a.show(20,10);
}
}
```

# Step-4

```
C:\Users\hp\OneDrive\Desktop>javac -d . Arithematics.java
C:\Users\hp\OneDrive\Desktop>javac Example.java
C:\Users\hp\OneDrive\Desktop>java Example
Addition of two number is: 30
Subtraction of two number is: 10
Multiplication of two number is: 200
Division of two number is: 2
C:\Users\hp\OneDrive\Desktop>
```

20) Write a Java program to illustrate the use of protected members in a package.

# Case1:-

# Step-1

```
package pack1;
public class A
{
protected void show()
```

```
{
System.out.println("procted member is invoked");
}
}
Step-2
package pack2;
import pack1.A;
public class B extends A
public static void main(String args[])
B b = new B();
b.show();
}
Step-3
 Microsoft Windows [Version 10.0.22631.3447]
(c) Microsoft Corporation. All rights reserved
 C:\Users\hp\OneDrive\Desktop>javac -d . A.java
 C:\Users\hp\OneDrive\Desktop>javac -d . B.java
 C:\Users\hp\OneDrive\Desktop>java pack2.B
procted member is invoked
```

#### Case2

# Step-1

```
package pack1;
public class A
{
protected void show()
```

C:\Users\hp\OneDrive\Desktop>

```
{
System.out.println("procted member is invoked");
}

Step-2
package pack2;
import pack1.A;
public class B extends A
{
public static void main(String args[])
{
A a= new A();
a.show();
}

Step-3
```

```
C:\Users\hp\OneDrive\Desktop>javac -d . A.java
C:\Users\hp\OneDrive\Desktop>javac -d . B.java
B.java:B: error: show() has protected access in A
a.show();
1 error
C:\Users\hp\OneDrive\Desktop>
```

21) Write a Java program to illustrate exception handling mechanism using multiple catch clauses.

```
class MultipleCatch
{
   public static void main(String args[])
   {
     try
     {
     int a=Integer.parseInt(args[0]);
}
```

```
int b=Integer.parseInt(args[1]);
System.out.println(a/b);
}
catch(ArithmeticException e)
{
    System.out.println(e);
}
catch(NumberFormatException e)
{
    System.out.println(e);
}
```

# 22) Write a Java program to make use of Built-in and user-defined Exceptions in handling a run time exception

```
Scanner sc=new Scanner(System.in);

System.out.println("Enter your age");
int age=sc.nextInt();
if(age<18)
{
    throw new InvalidAgeException("age should be greater than 18");
}
else
{
    System.out.println("YOu are eligible to vote");
}

catch(InvalidAgeException e)
{
    System.out.println(e);
}
}
```

## Multithreading

23) Write a Java program that creates threads by extending Thread class .First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds, (Repeat the same by implementing Runnable).

```
import java.util.*;
class A extends Thread
{
   public void run()
   {
   try
   {
     for(int i=1; i<=5; i++)</pre>
```

```
{
      Thread.sleep(1000);
      System.out.println("Good Morning");
    }
  }
  catch(Exception e)
    System.out.println(e);
  }
}
class B extends Thread
  public void run()
  {
    try
     for(int i=1; i<=5; i++)
     {
       Thread.sleep(2000);
       System.out.println("Hello ");
     }
    }
    catch(Exception e)
    {
      System.out.println(e);
    }
}
class C extends Thread
```

```
{
  public void run()
  {
    try{
      for(int i=1; i<=5; i++)
        Thread.sleep(3000);
        System.out.println("Welcome");
      }
    }
    catch(Exception e)
      System.out.println(e);
    }
  }
}
class Multithread
{
  public static void main(String args[])
    A a=new A();
    B b=new B();
    C c =new C();
    a.start();
    b.start();
    c.start();
 }
}
```

24) Write a JDBC program to perform the following operations by connecting to MYSQL database.

- I) Inserting Data into Table
- II) Updating Data in the Table.
- III) Deleting Data From the Table based on a column value.

# 1: Program

```
import java.sql.*;
import java.util.Scanner;
import javax.swing.JOptionPane;
class Insertions {
  public static void main(String[] args) {
    try{
      String url = "jdbc:mysql://localhost:3306/newdatabase";
      String user = "root";
      String pass = "Sanjit@123";
      Connection con = DriverManager.getConnection(url,user, pass);
      if(con != null) System.out.println("Connection Successful");
      Statement st = con.createStatement();
      Scanner sc = new Scanner(System.in);
      System.out.println("How many insertions: ");
      int n = sc.nextInt();
      for (int i = 1; i <= n; i++)
      {
         String roll = JOptionPane.showInputDialog("Enter rollno of Student" + i + ":");
         String name = JOptionPane.showInputDialog("Enter name of student" + i + ":");
         String age = JOptionPane.showInputDialog("Enter age of student" + i + ":");
         String query = "insert into Studetails values (" + roll + ", "" + name + "'," + age +
")";
         st.executeUpdate(query);
      }
    }catch (SQLException e){
      System.out.println(e);
     }
    }
}
```

# 25) JDBC program to perform Updating Data into Table.

```
Program:
```

```
import java.sql.*;
import java.util.Scanner;
import javax.swing.JOptionPane;
class Updations {
  public static void main(String[] args) {
    try{
      String url = "jdbc:mysql://localhost:3306/newdatabase";
      String user = "root";
      String pass = "sanjit@123";
      Connection con = DriverManager.getConnection(url,user, pass);
      if(con != null) System.out.println("Connection Successful");
      Statement st = con.createStatement();
      Scanner sc = new Scanner(System.in);
      String query = "Update Studetails SET name ='Sanjit' where rollno = 123";
      st.executeUpdate(query);
    }
catch (SQLException e){
      System.out.println(e);
     }
    }
}
```

# 26) JDBC program to perform Deleting Data from A Table

## Program:

```
}
catch (SQLException e){
    System.out.println(e);
}
}
```