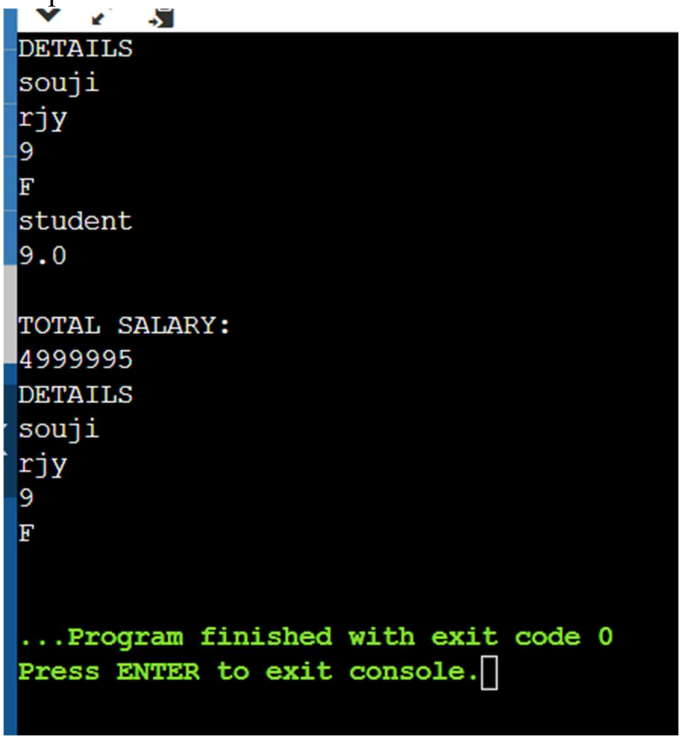
1. Create a class named Employee with the following details
   Data members:
   (a) name (b) address (c) age (d) gender
   Methods :
   (a) Display () to show the employee details
   Create another class FullTimeEmployee that inherits the Employee class :
   Data members :
   (a) Salary Designation
   Method :
   (a) Display () to show the salary and designation along with other employee details.
   Create another class PartTimeEmployee that inherits the Employee class :
   Data members :
   (a) Workinghours rateperhour
   Methods :
   (a) caluculatepay() to caluculate the amount payable
   (b) display() to show the amount payable along with the employee details.
   Create objects of these classes and call their methods .use appropriate constructors

Program:

```
class Employee1{
   String name,address,gender;
   int age;
   Employee1(String name,String address,int age,String gender)
   {
      this.name = name;
      this.address = address;
      this.age = age;
      this.gender = gender;
   }
   void dis1()
   {
      System.out.println(name);
      System.out.println(address);
      System.out.println(age);
      System.out.println(gender);
   }
}
class FullTimeEmployee extends Employee1{
   String designation;
   float salary;
   FullTimeEmployee(String name,String address,int age,String gender,String
designation,float salary)
   {
      super(name,address,age,gender);
      this.designation = designation;
      this.salary = salary;
   }
```

```
    void dis2()
    {
        System.out.println("DETAILS");
        System.out.println(name);
        System.out.println(address);
        System.out.println(age);
        System.out.println(gender);
        System.out.println(designation);
        System.out.println(salary);

    }
}
class PartTimeEmployee extends Employee1{
    int wh,rph;
    PartTimeEmployee(String name,String address,int age,String gender,int wh,int rph)
    {
        super(name,address,age,gender);
        this.wh = wh;
        this.rph = rph;
    }
    void calpay()
    {
        System.out.println(wh*rph);
    }
    void dis3()
    {
        System.out.println();
        System.out.println("TOTAL SALARY:");
        System.out.println(wh*rph);
        System.out.println("DETAILS");
        System.out.println(name);
        System.out.println(address);
        System.out.println(age);
        System.out.println(gender);
    }
}
public class Main {
    public static void main(String args[])
    {
        FullTimeEmployee f = new FullTimeEmployee("souji","rjy",9,"F","student",9);
        f.dis2();
        PartTimeEmployee p = new PartTimeEmployee("souji","rjy",9,"F",5,999999);
        p.dis3();
    }
}
```

Output:-

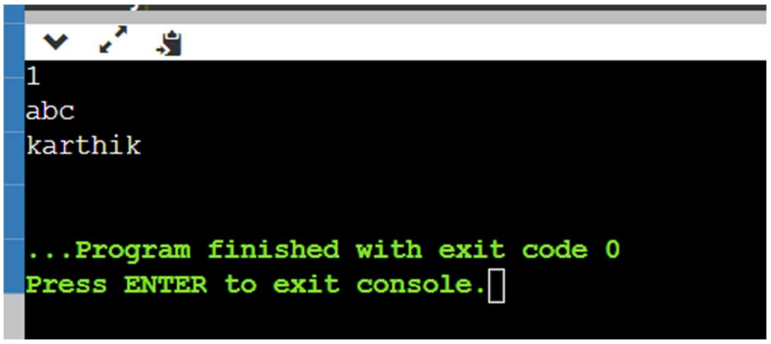


2. Create a class Emp with the fields eno,ename,company_name. Take the company_name as a static variable. Write a method set() to set the values and print the information using display() method

Program:

```
import java.io.*;
import java.util.*;
class Emp{
   int eno;
   static String company_name = "abc";
   String ename;
   void set(int eno,String ename)
   {
      this.eno = eno;
      this.ename = ename;
   }
   void display()
   {
      System.out.println(eno);
      System.out.println(company_name);
      System.out.println(ename);
   }
}
```

```
public class Main{
   public static void main(String args[])
   {
      Emp e1 = new Emp();
      e1.set(1,"karthik");
      e1.display();
   }
}
```



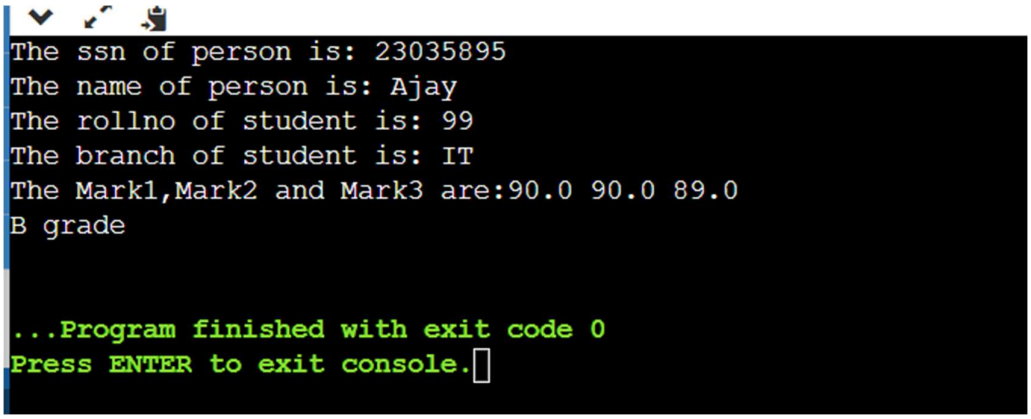
3. Create a base class called person with SSN and name as data types with getdata and display as member functions. Derive a new class called student with rollno, branch,mark1,mark2,mark3 as datamembers and getdata and display as member functions and finally derive a new class called grade from student class in that calculate the average for marks and display the grade for the student
   a. A grade >=90%
   b. B grade>=80%
   c. C grade>=70%
   d. Less than 70% fail.

Program:

```
import java.io.*;
import java.util.*;
class Person
{
   int ssn;
   String name;
   void getdata(int ssn,String name)
   {
      this.ssn=ssn;
      this.name=name;
   }
   void display()
   {
     System.out.println("The ssn of person is: "+ssn);
     System.out.println("The name of person is: "+name);
   }
```

```
}
class student extends Person
{
  int rollno;
  String branch;
  float mark1,mark2,mark3;
  void getdata2(int rollno,String branch,float mark1,float mark2,float mark3)
   {
       this.rollno=rollno;
       this.branch=branch;
       this.mark1=mark1;
       this.mark2=mark2;
       this.mark3=mark3;
   }
   void display2()
   {
     System.out.println("The rollno of student is: "+rollno);
     System.out.println("The branch of student is: "+branch);
     System.out.println("The Mark1,Mark2 and Mark3 are:"+mark1+" "+mark2+" "+mark3);

   }

}
class grade extends student
{
  float avg;
  float sum;
  void average()
  {
   sum=mark1+mark2+mark3;
   avg=sum/3;
  }
  void display3()
  {
     if(avg>=90)
     {
       System.out.println("A grade");
     }
     else if(avg>=80)
     {
       System.out.println("B grade");
     }
     else if(avg>=70)
     {
       System.out.println("C grade");
     }
     else if(avg<70)
```

```
      {
        System.out.println("Fail");
      }
    }

}

public class inheritance
{

   public static void main(String args[])
    {

     grade g=new grade();
     g.getdata(23035895,"Ajay");
     g.display();
     g.getdata2(99,"IT",90,90,89);
     g.display2();
     g.average();
     g.display3();

    }
}
```

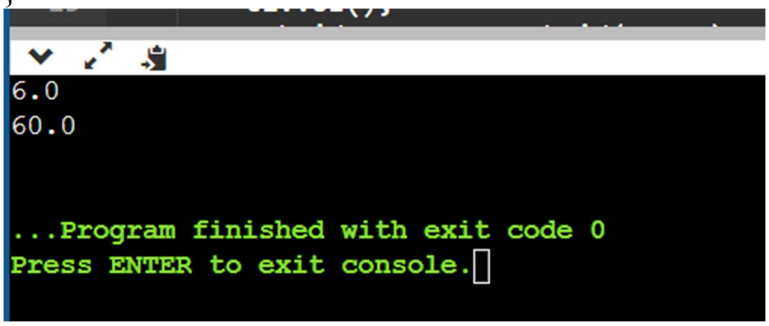


4. Create a class cuboid with the variables length, breadth and height. Set the values to these
   variables using default and parametersied constructors. Compute the volume of the cuboid and display the information.

Program:

```
class Cuboid{
   float length,breadth,height;
   Cuboid()
   {
      length = 1;
```

```
        breadth = 2;
        height = 3;
    }
    Cuboid(float length,float breadth,float height)
    {
        this.length = length;
        this.breadth = breadth;
        this.height = height;
    }
    void vol(){
    System.out.println(length*breadth*height);}
}
public class Main{
    public static void main(String args[])
    {
        Cuboid c1 = new Cuboid();
        c1.vol();
        Cuboid c2 = new Cuboid(3,4,5);
        c2.vol();
    }
}
```

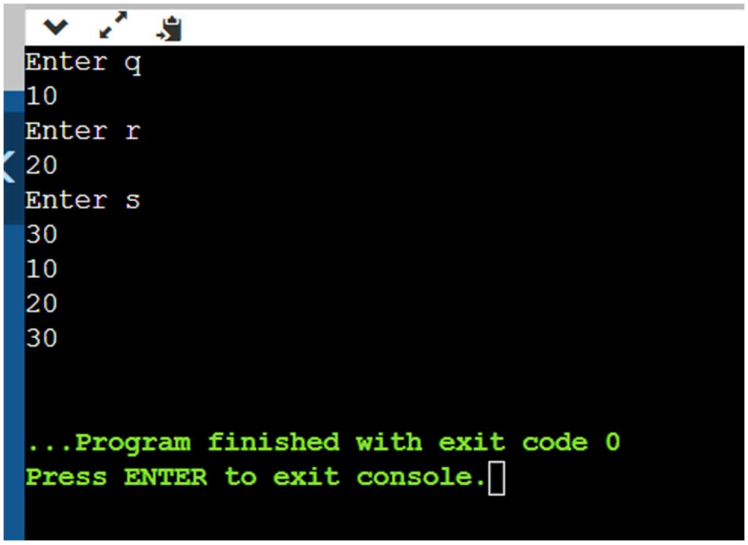


5. Create a class Q with a variable q and consider default constructor for setting to q. Create a subclass R with a variable r and consider default constructor for setting to r. Create a subclass to R as S with a variable s and consider a default constructor for setting for s. Create a display function in each of the classes. Create a main method to call the functions

Program:

```
import java.io.*;
import java.util.*;
class Q{
    int q;
    Q()
    {
        System.out.println("Enter q");
        Scanner s  = new Scanner(System.in);
        q = s.nextInt();

    }
```

```
    void dis1()
    {
        System.out.println(q);
    }
}
class R extends Q{
    int r;
    R()
    {
        System.out.println("Enter r");
        Scanner s  = new Scanner(System.in);
        r = s.nextInt();

    }
    void dis2()
    {
        System.out.println(r);
    }
}
class S extends R{
    int s;
    S()
    {
        System.out.println("Enter s");
        Scanner sc  = new Scanner(System.in);
        s = sc.nextInt();

    }
    void dis3()
    {
        System.out.println(s);
    }
}
public class inherit_2 {
    public static void main(String args[])
    {
        S obj = new S();
        obj.dis1();
        obj.dis2();
        obj.dis3();
    }
}
```

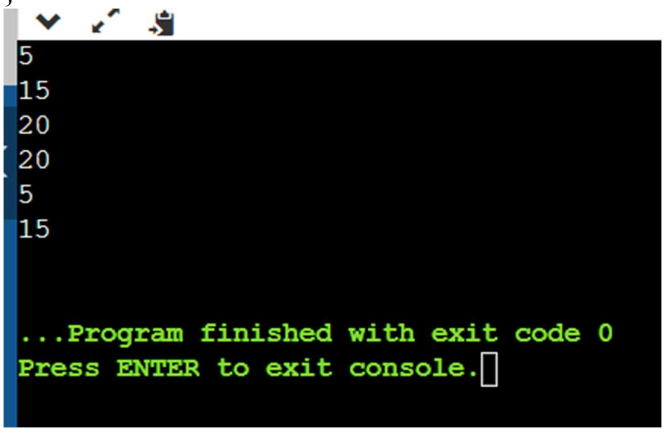


6. Create a class A with the variables x,y. Create a method to set the date to x and y. Create a subclass B with the variable z. create a method to set the data to z. Write a method to display the information.

Program:

```
import java.util.*;
import java.io.*;
class A11{
   int x,y;
   void set()
   {
      Scanner sc = new Scanner(System.in);
      x = sc.nextInt();
      y = sc.nextInt();
   }
}
class B11  extends A11{
   int z;
   void set2()
   {
      Scanner sc = new Scanner(System.in);
      z = sc.nextInt();
   }
   void display()
   {
      System.out.println(z);
      System.out.println(x);
      System.out.println(y);
   }
}
public class inherit_1 extends B11{
   public static void main(String args[])
   {
```

```
        B11 obj = new B11();
        obj.set();
        obj.set2();
        obj.display();
    }
}
```

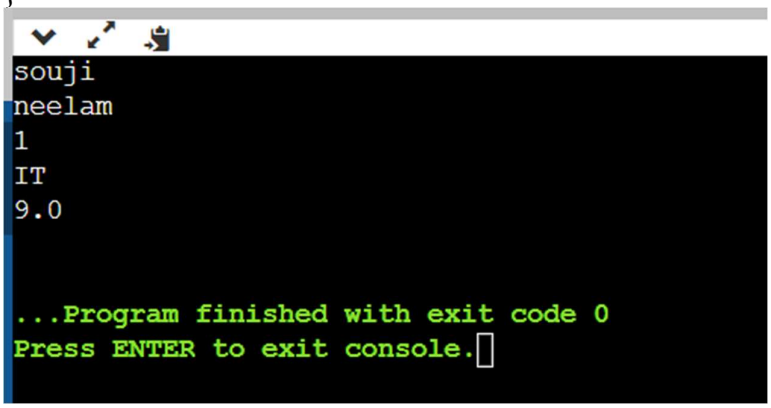


7. Create a class person with the filed firstname, lastname. Use parameterized method to set the values to the variables at runtime. Create sub class Employee with the variable eno, edept, esal. Create parameterized method for setting the data and default method for display the information.

   Program:

```
class person{
    String firstname;
    String lastname;
    void p1(String firstname,String lastname)
    {
        this.firstname = firstname;
        this.lastname = lastname;
    }
}
class employee extends person{
    int eno;
    String edept;
    float esal;
    void e1(int eno,String edept,float esal)
    {
        this.eno = eno;
        this.edept  =edept;
        this.esal = esal;
    }
    void dis()
    {
        System.out.println(firstname);
        System.out.println(lastname);
        System.out.println(eno);
        System.out.println(edept);
```

```
            System.out.println(esal);


        }
    }
    public class Main extends employee{
        public static void main(String args[])
        {
            employee e = new employee();
            e.p1("souji","neelam");
            e.e1(1,"IT",9);
            e.dis();
        }
    }
```

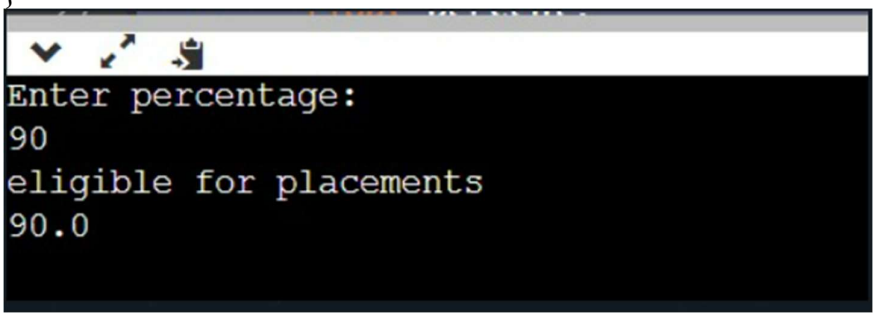


8. Write a program to ask the user to enter the percentage of marks in III semester. If the percentage entered is less than 50, raise an IneligibleException to inform them that he is not eligible for placements. Otherwise Print his percentage.

Program:

```
import java.io.*;
import java.util.*;
class IneligibleException extends Exception{
IneligibleException(String s){
super(s);
}
}
class Main{
   static void fun(float p) throws IneligibleException
   {
      if(p<50)
      {
         throw new IneligibleException("Not eligible for placements");
      }
      else
      {
         System.out.println("eligible for placements");
```

```
            System.out.println(p);
        }
    }
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        float percent;
        System.out.println("Enter percentage: ");
        percent = sc.nextFloat();
        try{
        fun(percent);}
        catch(Exception e)
        {
            System.out.println(e);
        }
    }
}
```

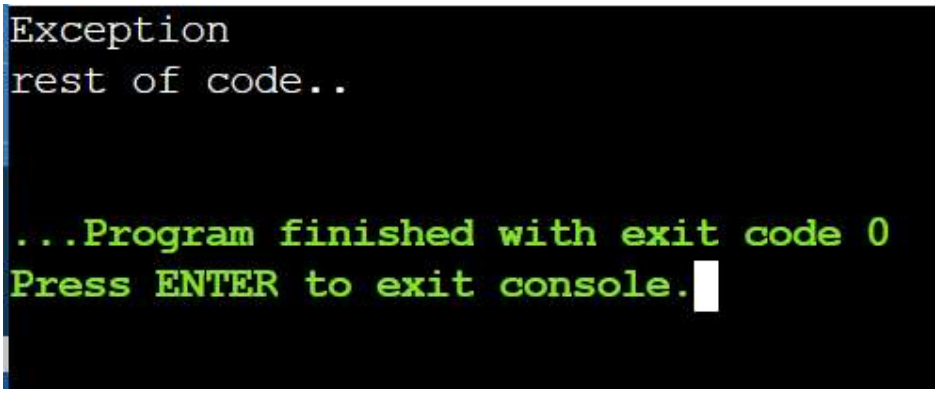


9.Write a program to raise ArrayIndexOutOfBoundsException to access an element in the array which is not there in it.

Program:

```
public class Main{
    public static void main(String args[]){
        int arr[]={1,2,3,4,5};
        try{
            System.out.println(arr[6]);
        }
        catch(ArrayIndexOutOfBoundsException e){
            System.out.println("Exception");
        }
        System.out.println("rest of code..");
    }
}
```

Output:



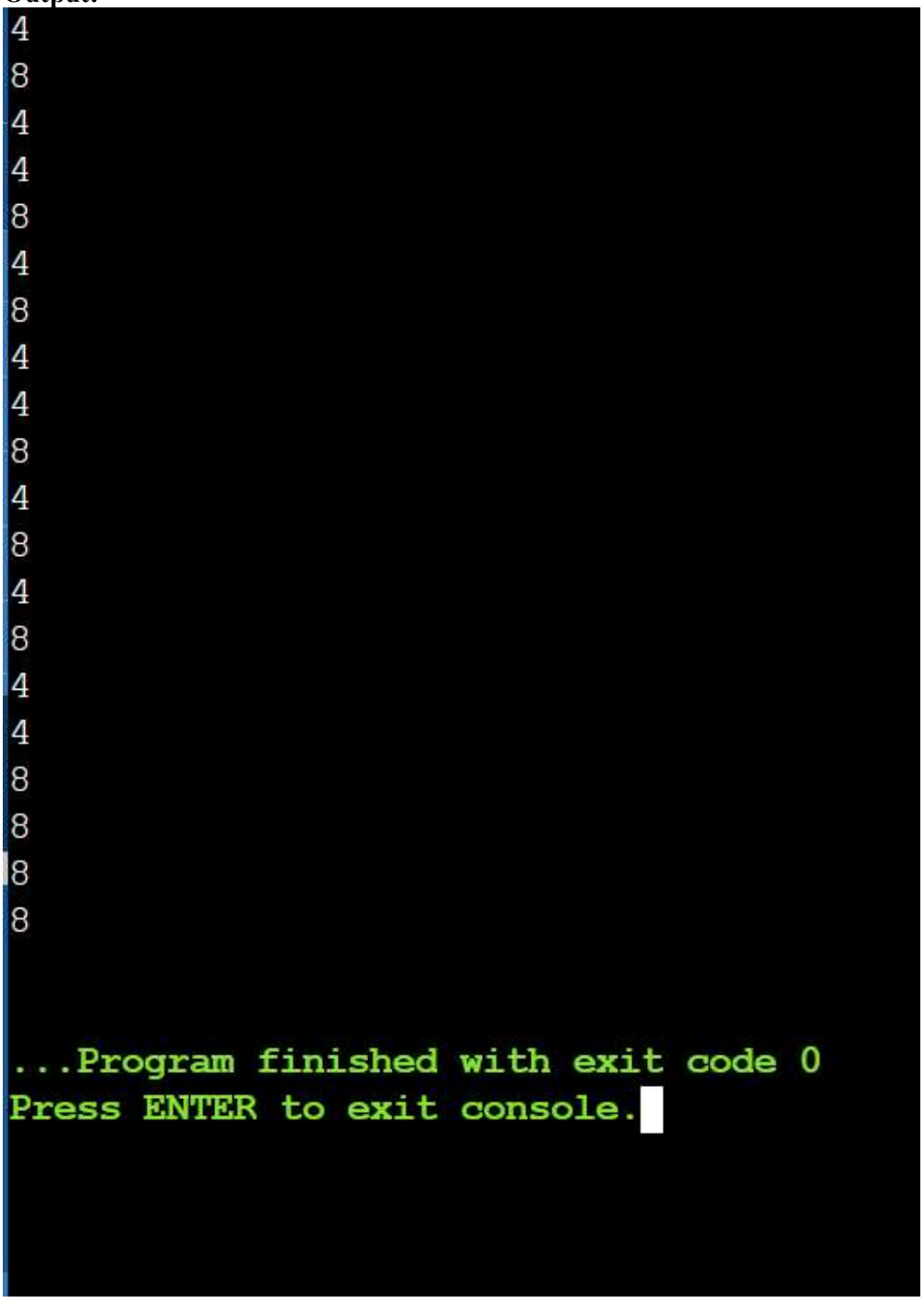
10. Create a thread that display area of square and another thread to display volume of cuboid 10 times for every 2 and 3 seconds respectively

Program:

```
class Test extends Thread{
   public void run(){
      int n=2;
      for(int i=0;i<10;i++){
         try{
            Thread.sleep(2000);
         }
         catch(Exception e){
            System.out.println("Area exception");
         }
         System.out.println(n*n);
      }
   }
}
class Test1 extends Thread{
   public void run(){
      int n=2;
      for(int j=0;j<10;j++){
         try{
            Thread.sleep(3000);
         }
         catch(Exception e){
            System.out.println("Volume exception");
         }
         System.out.println(n*n*n);
      }
   }

}
public class Main{
   public static void main(String args[]){
      Test t1=new Test();
      Test1 t2=new Test1();
      t1.start();
      t2.start();
```

```
    }
}
```

Output:



11. Create multiple threads for the following cases:
a. Create four threads that prints even numbers, odd numbers, prime numbers, natural numbers upto that number
b. Assign Priorities to the program

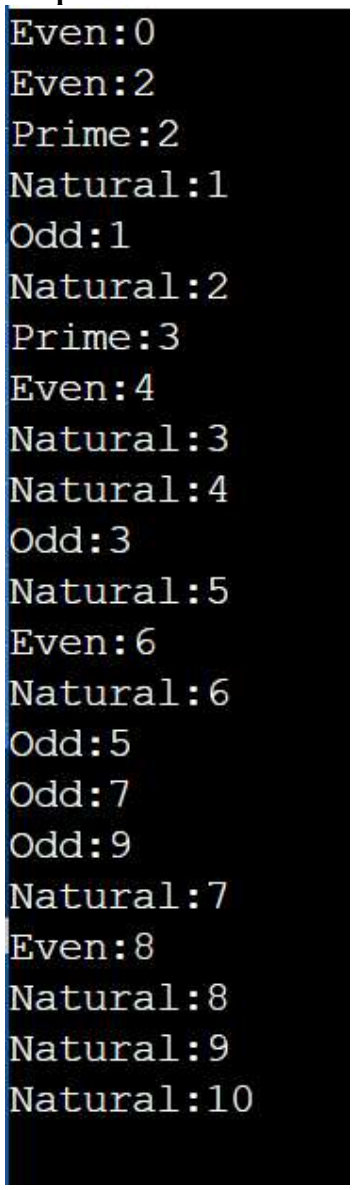
Program:

a.)

```
class Test1 extends Thread{
   public void run(){
      for(int i=0;i<10;i++){
         if(i%2==0){
            System.out.println("Even:"+i);
         }
      }
   }
}
class Test2 extends Thread{
   public void run(){
      for(int i=0;i<10;i++){
         if(i%2!=0){
            System.out.println("Odd:"+i);
         }
      }
   }
}
class Test3 extends Thread{
   public void run(){
      int count=0;
      for(int i=2;i<10;i++){
         for(int j=2;j<i;j++){
            if(i%j==0){
               count+=1;
            }
         }
         if(count==0){
            System.out.println("Prime:"+i);
         }
      }
   }
}
class Test4 extends Thread{
   public void run(){
      for(int i=1;i<=10;i++){
         System.out.println("Natural:"+i);
      }
   }
}
public class Main{
   public static void main(String args[]){
      Test1 t1=new Test1();
      Test2 t2=new Test2();
      Test3 t3=new Test3();
      Test4 t4=new Test4();
      t1.start();
      t2.start();
      t3.start();
      t4.start();
```

```
    }
}
```

Output:



b)

```
class Test1 extends Thread{
    public void run(){
        for(int i=0;i<10;i++){
            if(i%2==0){
                System.out.println("Even:"+i);
            }
        }
    }
}
```

```
class Test2 extends Thread{
   public void run(){
      for(int i=0;i<10;i++){
         if(i%2!=0){
            System.out.println("Odd:"+i);
         }
      }
   }
}
class Test3 extends Thread{
   public void run(){
      int count=0;
      for(int i=2;i<10;i++){
         for(int j=2;j<i;j++){
            if(i%j==0){
               count+=1;
            }
         }
         if(count==0){
            System.out.println("Prime:"+i);
         }
      }
   }
}
class Test4 extends Thread{
   public void run(){
      for(int i=1;i<=10;i++){
         System.out.println("Natural:"+i);
      }
   }
}
public class Main{
   public static void main(String args[]){
      Test1 t1=new Test1();
      Test2 t2=new Test2();
      Test3 t3=new Test3();
      Test4 t4=new Test4();
      t1.setPriority(10);
      t2.setPriority(8);
      t3.setPriority(5);
      t4.setPriority(3);
      t1.start();
      t2.start();
      t3.start();
      t4.start();
   }
}
```

Output:

```
Odd:1
Even:0
Natural:1
Natural:2
Natural:3
Natural:4
Prime:2
Natural:5
Even:2
Even:4
Even:6
Even:8
Odd:3
Natural:6
Prime:3
Natural:7
Odd:5
Natural:8
Natural:9
Odd:7
Natural:10
Odd:9
```

12. Sometimes it's better to use dynamic size arrays. Java's Arraylist can provide you this feature. Try to solve this problem using Arraylist.

You are given n lines. In each line there are zero or more integers. You need to answer a few queries where you need to tell the number located in yth position of xth line.
Take your input from System.in.

Program:

```
import java.io.*;
import java.util.*;
```

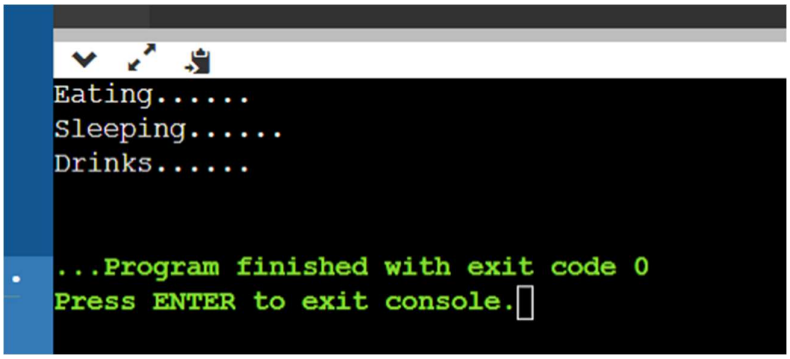
```
public class Solution {

   public static void main(String[] args)
   {
    Scanner scan = new Scanner(System.in);
    ArrayList[] list= new ArrayList[20002];
    int n;
    n=scan.nextInt();
    for(int i=1;i<=n;i++)
    {

       list[i]=new ArrayList();
       int x=scan.nextInt();

       for(int j=1;j<=x;j++)
       {
          int val=scan.nextInt();
          list[i].add(val);

       }
    }
    int q=scan.nextInt();

    for(int i=1;i<=q;i++)
    {
          int x,y;
          x=scan.nextInt();
          y=scan.nextInt();
          try
          {
           System.out.println(list[x].get(y-1));
          }catch(Exception e)
          {
             System.out.println("ERROR!");
          }
    }
   }
}
```

13. A java program to implement multiple inheritance through interface

Program:

```
interface eat{
   void eating();
}
interface sleep{
  void sleeping();
}
class Animal implements eat,sleep{
```

```
    public void eating(){
    System.out.println("Eating......");
    }
     public void sleeping(){
        System.out.println("Sleeping......");
    }
    public void drink(){
        System.out.println("Drinks......");
    }
}
public class Main{
    public static void main(String args[]){
        Animal a= new Animal();
        a.eating();
        a.sleeping();
        a.drink();
    }
}
```

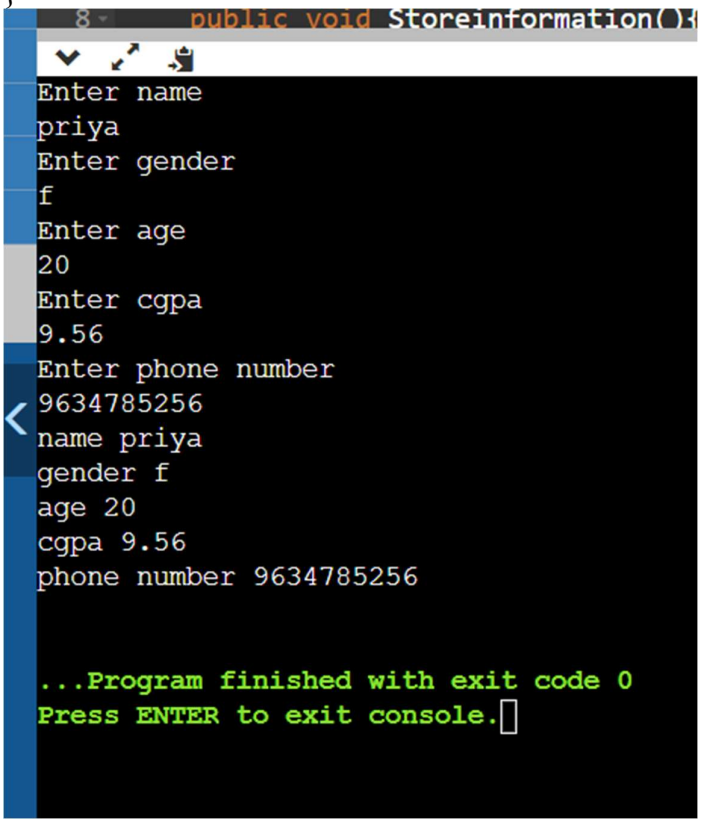


14. Write a Java class InformationExtraction which contains the following information
    Fields: Name, Gender(use char datatype), Age, Mobile number, CGPA
    Create methods storeInformation() and displayInformation() to set and display the fields of information of student.

    Program:

```
import java.util.*;
class informationExtraction{
    String name;
    char gender;
    int age;
    float cgpa;
    long ph_num;
    public void Storeinformation(){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter name");
        name=sc.nextLine();
        System.out.println("Enter gender");
        gender=sc.next().charAt(0);
        System.out.println("Enter age");
        age=sc.nextInt();
```

```
        System.out.println("Enter cgpa");
        cgpa=sc.nextFloat();
        System.out.println("Enter phone number");
        ph_num=sc.nextLong();
    }
    public void displayinformation(){
        System.out.println("name "+name);
        System.out.println("gender "+gender);
        System.out.println("age "+age);
        System.out.println("cgpa "+cgpa);
        System.out.println("phone number "+ph_num);

    }

}
class Main{
    public static void main(String args[]){
        informationExtraction info=new informationExtraction();
        info.Storeinformation();
        info.displayinformation();
    }
}
```



15. Create a class Person with the fields first name and last name. Set the data and print it. Create two subclasses employee and staff with the variables and methods:
    Employee:
    Variables: eno, esal, designation

Methods: setEmployee(int, double, String) and displayEmployee()
Staff:
Variable: sno,experience
Methods:setStaff(int,int) and displayStaff()
Create a class to access the information of all.

Program:

```
class Person{
   String fname,lname;
  void setdata(String a,String b){
     fname=a;
     lname=b;
  }
void display(){
   System.out.println("The name of the person is "+fname+" "+lname);
}
}
class Employee extends Person{
   int eno;
   double esal;
   String Designation;
   void SetEmployee(int a,double b,String c){
      eno=a;
      esal=b;
      Designation=c;
   }
void displayEmployee(){
   System.out.println(eno+" "+esal+" "+Designation);
}
}
class Staff extends Person{
   int sno,experiance;
   void SetStaff(int a,int b){
      sno=a;
      experiance=b;
   }
void displayStaff(){
   System.out.println(sno+" "+experiance);
}
}
public class Main {
   public static void main(String[] args) {
      Staff s=new Staff();
      Employee e=new Employee();
      s.setdata("Manoj","Kumar");
      s.display();
      e.SetEmployee(3,56892,"Manager");
      e.displayEmployee();
      s.SetStaff(1,5);
      s.displayStaff();
   }
}
```

```
The name of the person is Manoj Kumar
3 56892.0 Manager
1 5


...Program finished with exit code 0
Press ENTER to exit console.
```

17. A java program to implement the arraylist by adding elements of string datatype and to display the string at the specific index.

Program:

```
import java.util.*;
public class Main{
   public static void main(String[] args)
   {
      ArrayList<String>al=new ArrayList<String>();
      al.add("Mohan");
      al.add("Ranjit");
      al.add(1,"Kovida");
      al.add("Geethika");
      System.out.println("The element at second position is "+al.get(2));
      for(String s:al)
      {
         System.out.println(s);
      }
   }
}
```

```
The element at second position is Ranjit
Mohan
Kovida
Ranjit
Geethika


...Program finished with exit code 0
Press ENTER to exit console.
```

18. A java program for the implementation of bank interface by using java interface which provides the implementation of Bank interface.

Program:

```
interface Bank
{
   float rateofintrest();
}
class Sbi implements Bank
{
```

```
    public float rateofintrest()
    {
        return 9.15f;
    }
}
class Pnb implements Bank
{
    public float rateofintrest()
    {
        return 12.6f;
    }
}
public class Main{
    public static void main (String[] args) {
        Bank b=new Sbi();
        Bank b1=new Pnb();
        System.out.println("rate of intrest is "+b.rateofintrest()+" and
"+b1.rateofintrest());

    }
}
```