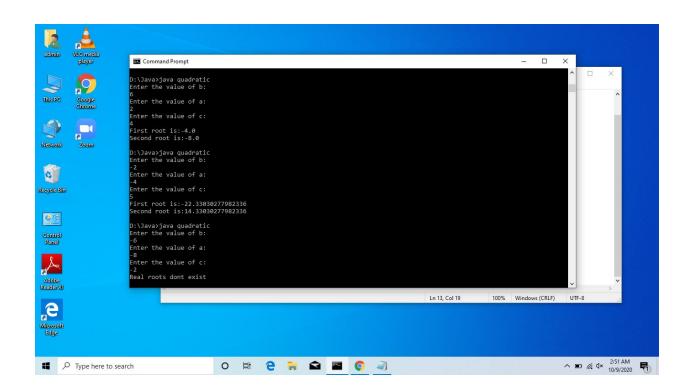
Ooj lab programs

Vakamalla keerthi priya (1BM19CS176)

1.Develop a Java program that prints all real solutions to the quadratic equation ax2 +bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
class quadratic {
public static void main(String[] args) {
double a, b, c, root1, root2;
double det;
Scanner sc= new Scanner(System.in);
System.out.println("Enter the value of b:");
b = sc.nextDouble();
System.out.println("Enter the value of a:");
a = sc.nextDouble();
System.out.println("Enter the value of c:");
c = sc.nextDouble();
det = b*b - 4*a*c;
if (det > 0)
root1 = (-b + Math.sqrt(b*b - 4*a*c))/2*a;
root2 = (-b - Math.sqrt(b*b - 4*a*c))/2*a;
System.out.println("First root is:" +root1);
System.out.println("Second root is:" +root2);
else if ( det == 0)
root1 = -b/(2*a);
System.out.println("Both roots are same and are equal to:" +root1);
else if (det < 0)
System.out.println("Real roots dont exist");
}
```



VAKAMALLA

KEERTHI

PRIYA

1 BM 19 C S 1 7 G

DI BATCH

Develop a Java program that prints all real rollitors to the quadratic equation $ax^2+bx+c=0$ Read in a,b,c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a memage stating that there are no real solutions.

```
- import java. util. scanner;
      class quadratic ?
   public mair (string[] ags) {
    double a, b, c, 200+1, 200+2',
    double du;
    Scarmer oc = new scarmer(system.in);
    System. out printly ("Enter the value of b:");
     b= &c. NextDouble();
     System.out.println("Enter the value of a:");
     a: Ac. next paubicl);
      System out println ("enter the value of c:");
     C = Ac. MAR Double ();
     det = 6 % b - 4 * a * c;
      if (det >0)
       200+1=(-6+ Hath sqr (b 6-4 a*c))/2*a;
       200+2 = (-6 + - Hath . 595+(6*6-4*a*c))/2*a;
       Sylum. och. println ("First root is:" +rooti);
       System. out. printly ("second root is: " + root2);
       els y ( det == 0)
```

system. out. println ("Both root are same and equal to:

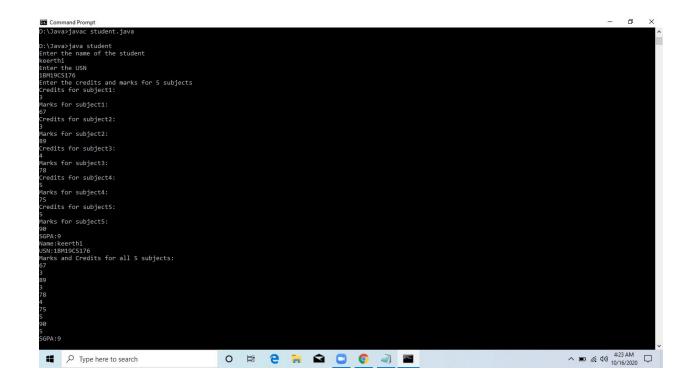
"tron

"

and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

```
import java.util.*;
class student
  String name;
  String usn;
  int marks[]=new int[5];
  int credits[]=new int[5];
  int tot=0;
  int i;
  int grade=0;
  void read_data()
     Scanner obj=new Scanner(System.in);
     System.out.println("Enter the name of the student");
     name=obj.next();
     System.out.println("Enter the USN");
     usn=obj.next();
     System.out.println("Enter the credits and marks for 5 subjects");
     for(i=0;i<5;i++)
       System.out.println("Credits for subject"+(i+1)+":");
       credits[i]=obj.nextInt();
       System.out.println("Marks for subject"+(i+1)+": ");
       marks[i]=obj.nextInt();
    }
  }
  void calc_SGPA()
     for(i=0;i<5;i++)
       if(marks[i]>=90&&marks[i]<=100)
       grade=10;
       else if(marks[i]>=75&&marks[i]<90)
       grade=9;
       else if(marks[i]>=60&&marks[i]<75)
       grade=8;
       else if(marks[i]>=50&&marks[i]<60)
       grade=7;
```

```
else if(marks[i]>=45&&marks[i]<50)
       grade=6;
       else if(marks[i]>=40&&marks[i]<45)
       grade=5;
       else if(marks[i]<40)
       grade=0;
       tot=tot+grade*credits[i];
     tot=tot/20;
    System.out.println("SGPA:"+tot);
  }
     void details()
     System.out.println("Name:"+name);
     System.out.println("USN:"+usn);
     System.out.println("Marks and Credits for all 5 subjects:");
     for(i=0;i<5;i++)
        System.out.println(marks[i]);
        System.out.println(credits[i]);
     calc_SGPA();
public static void main(String args[])
  student obj=new student();
  obj.read_data();
  obj.calc_SGPA();
  obj.details();
```



16/10²⁰ DI BATCH.

VAKAHALLA KEGRTHI IBHIACS 176

puelop a Java program to create a clay student with wembers UNN, name, an away, wedit and an away marks. Enclude methods to allept and display details and a method to calculate sarks of a medient.

impat java. util. *;

class student 2

string name; string usn;

int marks [] = newint[5];

int creditit = new int[s];

int tot=0; in+i;

aint grade = 0;

void read_data()

Scamer obj = new Scanner (system.in); System. out. printly ("Enter the name of the

itudini");

name = obj. nest (1;

syntem.out. printly ("Enter the USN"): war UNY = Obj. Next ();

```
system. out println ("Enter the cudits and marks
                    for 5 subjects");
for(i=0; i<5; i++)
 System out println ("credit for subject"+(i+1)+":");
 credit [i] = obj. next Intl);
System. out prints ("Harks for Subject"+ (i+1) +":");
 marks[i]= obj. nex+[n+1);
3
void calc_supA()
  for(i=0; i25; i++)
1 (marks[i]>=9028 marks[i]<=100)
   grade = 10',
  elsif (marks[i] = 7522 marks[i] < 90)
  grade = 9;
  elleif (marki [i] >= 60 el marki [i] < 75)
  grade = 8;
  else if (marks[i]>= 50 el marks[i]<60)
   grade =7;
   elu if (maks [i]>=4522 mary [i]<50)
   Grade = 6;
   eluij (marks [i] > 24022 marks [i] 245)
    grade = 5,
```

```
elu if (marks[i]<40)

Grade =0;
      tot: tot + grade * credit [1];
   tot = tot /20;
System. out. printly ("sapa: "+tot);
       syrum. out. privile ("warre". "+vame);
       system. out println ("USN:"+UIN);
       System. out. println (" Hearly and wealth
      for (1=0; 125, 1++)

System. out. printly (marks [i]);
    (ale_supal);
Public Maric void main (string augn[1)

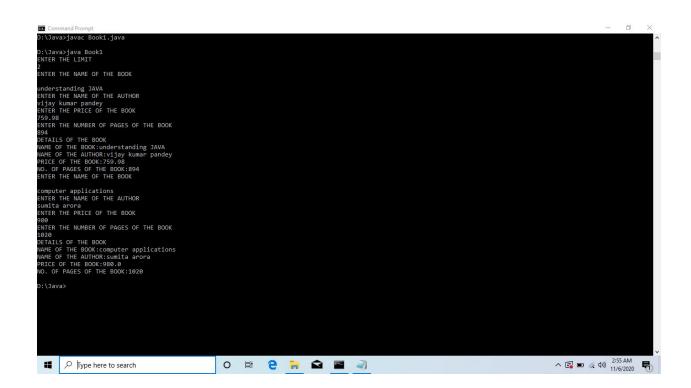
Student obj = new Mudent (1)
     Obj. calc_SUPAL).
    obj. detain ()
```

3. Create a class Book which contains four members: name, author, price, num_pages. Include a constructor to set the values for the members. Include methods to set and get the details of

the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

```
import java.util.*;
class Book1
  String name, author;
  double price;
  int num_pages;
   public Book1()
    {
    this.name="";
    this.author="";
    this.price=0.0;
    this.num_pages=0;
   }
    public void DETAILS()
    Scanner ob=new Scanner(System.in);
    System.out.println("ENTER THE NAME OF THE BOOK\n");
    name=ob.nextLine();
    System.out.println("ENTER THE NAME OF THE AUTHOR");
    author=ob.nextLine();
    System.out.println("ENTER THE PRICE OF THE BOOK");
    price=ob.nextDouble();
    System.out.println("ENTER THE NUMBER OF PAGES OF THE BOOK");
    num pages=ob.nextInt();
   public void ToString()
   System.out.println("DETAILS OF THE BOOK");
   System.out.println("NAME OF THE BOOK:"+name);
   System.out.println("NAME OF THE AUTHOR:"+author);
   System.out.println("PRICE OF THE BOOK:"+price);
   System.out.println("NO. OF PAGES OF THE BOOK:"+num_pages);
   public static void main(String args[])
```

```
int i=0,n;
Book1 obj=new Book1();
Scanner ob1=new Scanner(System.in);
System.out.println("ENTER THE LIMIT");
n=ob1.nextInt();
for(i=1;i<=n;i++)
{
    obj.DETAILS();
    obj.ToString();
}
}</pre>
```



VAKAMALLA KECRIHI PRIYA (IBH19CS176)

Lab program - \$3

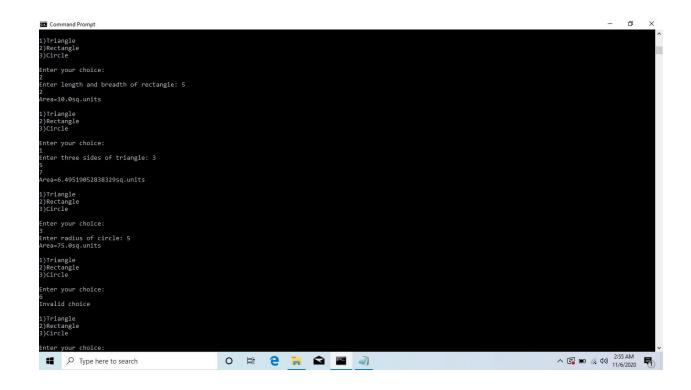
```
Import java. wil. ..
 clay Book
   String name, author;
    double price;
     int num_pager;
  public Book ()
   this name =" "
   this author = "
   this price = 0.0;
   this. num_page=0;
   public word DETAILS ()
   Scanner ob = new Scanner (system in);
   System. out. printly ("Enter ENTER THE NAME OF THE BOOK \n");
   name = ob nextline ();
   System. out. printly ("ENTER THE NAME OF THE AUTHOR");
   author = ob. next line ();
```

```
System. out. println ("ENTER THE PRICE OF THE BOOK");
     Price = ob. neur Double ();
   Sylum. OUT. PRINTIN (" ENTER THE NUMBER OF PAGES OF
     num_pagu=ob.nesuInt();
  public void Tosning()
Ł
  System. out println ("DETAILS OF THE BOOK"):
 Sylum.out. println("NAME OF THE BOOK! + name),
 System. out . println (" NAME OF THE AUTHOR: "+ author).
 System. out . println(" price of the Books" + price);
 Sylum out printin ("No of PAGES OF THE BOOK: "+ num-page).
  public static void wain(string agr())
   int 1=0, n;
   BOOK Obj = New Book ();
  Scanner obl = new scanner(systemin),
  Symm.out. printly ("ENTER THE LIHIT");
   n = obl. nextIn+();
  for (i=1', i <= N; i++)
   Obj. DETAILS();
   obj. Tosting ();
```

4.Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
import java.util.*;
import java.lang.Math.*;
abstract class shape{
     public int a;
     public int b;
     abstract public void printArea();
     Scanner s=new Scanner(System.in);
}
class rectangle extends shape{
     public void printArea(){
          System.out.print("Enter length and breadth of rectangle: ");
          float a=s.nextFloat();
          float b=s.nextFloat();
          float area=a*b;
          System.out.println("Area="+area+"sq.units");
     }
}
class triangle extends shape{
     public void printArea(){
          System.out.print("Enter three sides of triangle: ");
          float a=s.nextFloat();
          float b=s.nextFloat();
          float c=s.nextFloat();
          float d=(a+b+c)/2;
          double area=Math.sqrt(d*(d-a)*(d-b)*(d-c));
          System.out.println("Area="+area+"sq.units");
     }
}
class circle extends shape{
     public void printArea(){
          System.out.print("Enter radius of circle: ");
          float a=s.nextFloat();
          float area=22/7*a*a;
          System.out.println("Area="+area+"sq.units");
```

```
}
}
class shapedemo{
     public static void main(String args[]){
          shape r=new rectangle();
          shape t=new triangle();
          shape c=new circle();
          for(int i=0;i<100;i++){
          System.out.println("\n1)Triangle\n2)Rectangle\n3)Circle\n");
          System.out.println("Enter your choice: ");
          Scanner s=new Scanner(System.in);
          int ch=s.nextInt();
          switch(ch){
               case 1: t.printArea();
                    break;
               case 2: r.printArea();
                    break;
               case 3: c.printArea();
                    break;
                    default:
               System.out.println("Invalid choice");
          }
     }
}
```



LAB program - 4

```
import java. wil. *;
import lava. lang. Harn. *;
abitract class shape &
     public int a;
      public intb',
      abitalt public word printly ();
      Scanners = new Scanner (system. in);
   class rectangle exceeds shape t
                public wid printarally
         System.out.print ("Enter length and breadth of
                                                  ouchangle: ");
        float a= s.next Float ();
        float b= S. nestfloat();
        float area = a*b',
      System. out. printin ("Aua = "+ ara+" sq. unit");
     class hiange extends thape &
       public wid printAva() {
      Syrum. out. print ("Enter three rides of hiange:");
       float a = s. next Float 1;
       float b: s. neutfloat();
```

```
float c: s. nort float 1);
    float d = (a+b+c)/2;
  double ava = Hath. Sqrt (d*(d-a)*(d-b)*(d-c));
  Sylum. Out. prinkn (" Ma="+area+" sq. wih");
4
clay circle extends shape &
  public word print Aual 15
         system. out. print (" ones radius of circle: ");
     floor a=s. nesur Floar [);
     floce area = 22/7 a 4.
  System. out. printin ("Area="+area+" sq. unit");
· class op shapedemo &
         public stasic void main (string agris);
              thape or = new rectange 11;
         shape &= new hiangk ();
         mape = new circk 1);
        ber (in+i=0; 1<100; i++) {
 System.out. privaln ("\n1) Triangle \n2) Rectangle \n3) willing)
System. out. println (" Enter your choice:");
Scanner s = new Scanner (syxxm.in);
```

int th = 5. next | n+1);

Switch (cn) {

(ant: 6. pint Anal);

buck;

cauz: N. print Anal);

buck;

caus: c. print Anal);

buck;

dufant:

System. out. printly("[malid choice").

3

3

5.Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account

provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

- a) Accept deposit from customer and update the balance.
- b) Display the balance.
- c) Compute and deposit interest
- d) Permit withdrawal and update the balance

Check for the minimum balance, impose penalty if necessary and update the balance.

```
import java.util.*;
class Account
{
     String name, type;
     int acc_no;
     double amount;
     Scanner in=new Scanner(System.in);
     void type(int choice)
    {
         if(choice==1)
              type="Savings Account";
         if(choice==2)
              type="Current Account";
     }
     void input()
         System.out.println("Enter the Name, Account number and Balance:");
         name=in.next();
         acc_no=in.nextInt();
         amount=in.nextDouble();
     void deposit()
         System.out.println("Enter the amount to be deposited:");
         double x=in.nextDouble();
         amount=amount+x;
     void display()
         System.out.println("Name:"+name);
```

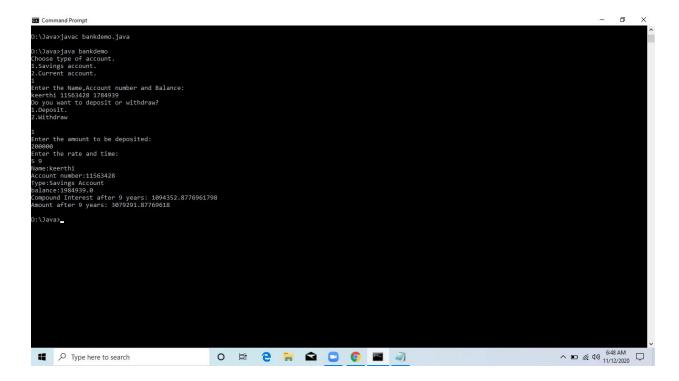
```
System.out.println("Account number:"+acc_no);
          System.out.println("Type:"+type);
          System.out.println("balance:"+amount);
     }
}
class Savings_acc extends Account
{
     double a,cinterest;
     int r.t:
     Scanner in=new Scanner(System.in);
     void withdrawal()
     {
          System.out.println("Enter amount to be withdrawn:");
          double amtw=in.nextDouble();
          if(amtw<=amount)
               amount=amount-amtw;
          else
               System.out.println("Invalid amount");
     void cmp_interest()
          System.out.println("Enter the rate and time:");
          r=in.nextInt();
          t=in.nextInt();
          a=amount^* Math.pow(1 + (r *0.01),t);
          cinterest= a - amount;
     void display()
          super.display();
          System.out.println("Compound Interest after " + t + " years: "+cinterest);
          System.out.println("Amount after " + t + " years: "+a);
    }
class Current_acc extends Account
     double min=10000;
     void input()
          super.input();
     void service_charge()
```

```
if(amount<min)
          amount=amount-500;
     void display()
     {
          super.display();
     }
}
class bankdemo
     public static void main(String args[])
     {
          Scanner in=new Scanner(System.in);
          System.out.println("Choose type of account.");
          System.out.println("1.Savings account.");
          System.out.println("2.Current account.");
          int choice=in.nextInt();
          if(choice==1)
          {
               Savings_acc b=new Savings_acc();
               b.type(choice);
               b.input();
               System.out.println("Do you want to deposit or
withdraw?\n1.Deposit.\n2.Withdraw\n");
               int ch=in.nextInt();
               if(ch==1)
               b.deposit();
               else if(ch==2)
               b.withdrawal();
               else
               System.out.println("Invalid choice");
               b.cmp_interest();
               b.display();
          else if(choice==2)
               Current_acc b=new Current_acc();
               b.type(choice);
               b.input();
               b.deposit();
               b.service_charge();
               b.display();
          }
```

```
else
```

System.out.println("Invalid choice");

```
}
```



```
VAKAMALLA KEERTHI
                    OUT LAB
  30 rection
                                                        PRIYA
                     DI- BATCH
                                         1BM1915176
                   Lab program 5
import java. util. * :
 clay Account
 2
  string name, type;
  int acc_no;
  double amount;
  Scanner in : new scanner ( system. in);
  void type (int choice)
    if (choice == 1)
           type: "sawing Account";
     if (dioice == 2)
type="current Account";
  4
  void input ()
  4.
   system. out. println ("Enter the name, telount number
                                            and Balanie: ");
   name = in. nesul);
   acc_no=in. nesethat();
   amount = in. vestDouble ();
   void deposit()
    System. out. printin ("Enter the amount to be deposited.").
     double x=in. next Elouble(),
     amount = bandout books amount + of;
```

```
word displays)
1
  Syrum. out. println ("Name: "+name);
  System. Out. println ("Account number: "+ acc_no);
 Syrum, out. printly ("Type: "+ type);
  Syrum out printin ("Balance" + amount);
 4
class savings-are extendy Account
2
  double a, cinterrest,
   int of;
  Scanner in: New Scanner ( Syrum. in).
  word withdrawal ()
  {
    Syrum. out. printin ("Enter amount to be withdrawn:").
 double amous in next Double ();
  if (amtw <= amount)
           amount = amount - amtw;
    else
       Symm.out.println("Invalid amount");
 uoid (mp_interut!)
7
 System. out. println ("onter the rate and time:");
   on= in . mout In+ ();
   t=in. moutinth;
```

```
a: amount * Hatter powe(1+ (1+0101), +);
     Cinterest = a - amount;
  noid display!)
  super. d'apray ();
 Sylum. out. printy ("Compound interest apter"+ E+ "year;
 Synum. out. printly ["Amount after"+ ++ "years: "+a);
 3
3
class current - acc estench Account
   double min = 10000;
    void input ()
     if (amount < min)
     amount = amount - Sou
 void display()?
super display();
```

```
Clay donas barreduno
   ٤
      public Hatic word main (String args (5)
     Scanner in: new Scanner (System. in);
    System. out. println ("choon type of account.");
     Syrkm. out. println("1. sawings account.");
    System. out. println("2. www. account.");
    int choice in nestantly
     if (choice == 1)
     Savings_acc b = new Savings_acc ();
      b. type(choice);
      b. input();
     System. out. printh ("bo you want to deposit a
                            withdraw? \n! deposit.\n2. withdraw
    int unzin usulmili;
      if (on==1)
      b. depost ();
      elleig (ch == 2)
      b. withdrawal ();
     System. out- printin ("Invalid choice");
     b. (mp-interest(1);
     b. display ();
  3 else if (choice==2)
& wrent-acc b= new (when+-accl);
   b. type (unite),
   b. in peut (),
   b. in pert (), b. remice-uncorge(); b. display(); 3 else syrum.out.putting.
```