Quadratic Equation

```
import. ~~util~~ java.util. scanner
class Quad
{ int a, b. c;
  double r1, r2, d;
  void input()
  {
    scanner s= newScanner (system.in);
    a=s.nextInt();
    b=s.next Int();
    c=s.nextInt();
  }
 void compute()
 {
   if (a==0)
     println ("Invalid input");
  else
  {
```

```
d= (b*b) - (4*a*c);
if (d==0)
  { r1=r2 = (-b)/(2*a);
    system.out.println ("roots are equal and real");
    system.out.println ("root 1 and root 2 are:"+r1+r2
                                                     ;
  }
else if (d>0)
  { r1 =(((-b)+ (Math.squrt (d)))/double(2*a);
    r2 = (((-b) - (Math.squrt(d)))/double (2*a);
    system.out.println("Real and distinct roots");
    system.out.println("Root1 ="+r1+ "Root2 ="+r2);
  }
else
{
   system.out.println ("Roots are imaginary");
   r1 = (-b)/(2*a);
   r2 = (Math.squrt (-d))/double(2*a);
   system.out.println ("Root1 ="+ r1 +"i" +r2);
   system.out.println("Root2 ="+ r1 + "-i"+ r2);
}

class ~~Main()~~ QuadRun
{
  public static void main(String a[])
  {  Quad q = new Quad();
     q.input();
     q.compute();
  }
}
```

OUTPUT

```
Enter value of a: 1
Enter value of b: 9
Enter value of c: 1
Real and distinct roots
Root 1 = -0.1125    Root 2 = -8.887
```

2) Array of student

```
import java.util.scanner;
class student
{
   String USN;
   String name;
   int marks[] = new int[6]

   void details()
   {
    scanner sc = new Scanner (system.in);
    system.out.println ("Enter USN");
    USN = sc.nextLine();
    system.out.println("enter name");
    name = sc.nextLine();
    system.out.println ("Enter marks of 6 subjects");
    for(int i=0; i<6; i++)
       { marks[i] = sc.nextInt();
       }
}
```

```
void calculatepercentage()
{   int total =0;
    ~~for(int i=0;i<~~
    for(int marks: marks)
       { total += mark ~~+tota~~
       }
 float percentage = (total/600)*100;
}

void display()
{  SOP("USN:" + usn);
   sop("Name:" + name);
   sop("Marks:" + marks[0] + "," + marks[1] + "," +
   marks[2] + "," + marks[3] + "," + marks[4] + "," + marks[5]
   sop("percentage=" + percentage+ "%");
}

class Main
{
  public static void main (string a[])
  {
   scanner sc= new Scanner (system.in);
   sop("Enter no of students:");
   int numStudents = sc.nextInt();
   student[] students = new student[numstudents];
   for(int i=0; i<numstudents; i++)
     {  students[i]= newStudent();
    SOP("Enter student details");
    students[i].details();
    students[i].calculatepercentage();
 }
  SOP("student details:");
  for(student student: students)
      { student display();
      }
}
```

OUTPUT

```
Enter no of students: 2
Enter USN: 1BM22CS001
Enter name: Aadya
Enter marks of 6 subjects:
98
97
88
80
99
85
Enter USN: 1BM22CS005
Enter Name: Aditya
Enter marks of 6 subjects:
99
98
96
94
92
90
```

```
Student details:
USN: 1BM22CS001
Name: Aadya
Marks: 98, 97, 88, 80, 99, 85
Percentage = 91.66%

USN: 1BM22CS005
Name: Aditya
Marks: 99, 98, 96, 94, 92, 90
Percentage: 94.83%
```

22/01/2024

Q Abstract class of shape

```
import java.util.*;
abstract class shape
{ protected int dimension1;
  protected int demension2;

  public Shape(int demension1, int dimension2)
  { this.dimension1 = demension1;
    this. dimension2 = dimension2;
  }
  public abstract void printArea();

}
class Rectangle extends shape
{ public Rectangle(int length, int width)
  { super(length, width);
  }
  public void printArea()
  { int area = dimension1 * dimension2;
    System.out.println("Area of rectangle =" +area);
  }
}
```

```
class Triangle extends shape
{ public triangle (int base, int height)
  { super(base, height);
  }
 public void printArea()
  { double area = 0.5 * demension1 * demension2;
    system.out.println("Area of Triangle =" + area);
  }
}
class Circle extends Shape
{ public Circle (int radius)
  { super(radius,0);
  }
 public void printArea()
  { double area = Math.PI * demension1 * demension2
    system.out.println("Area of Circle =" + area);
  }
}
```

```
public class Main
{ public static void main (string a[])
 { Rectangle r = new Rectangle(4,5);
   r.printArea();
   Triangle t = new Triangle (4,6);
   t.printArea();
   Circle c = new Circle (7);
   c.printArea();
 }
}
```

OUTPUT

```
Area of rectangle = 20
Area of triangle = 12
Area of circle = 153.86
```

Q) Array of books, author name. no of pages price 2|1|23

```
import java.util.Scanner;
class Books
{ String name;
  String author;
  int price;
  int numPages;
  Books(String name, String author, int price, int numPages)
  { this.name = name;
    this.author = author;
    this.price = price;
    this.numPages = numPages;
  }
  public String toString()
  {
    String name, author, price, numPages;
    name = "Book Name: " + this.name + "\n";
    author = "Author Name: " + this.author + "\n";
    price = "Price: " + this.price + "\n";
    numPages = "Number of Pages: " + this.numPages;
    return name + author + price + numPages;
  }
}
```

```
class Maen
{ public static vold main (streng args[])
  {
   scanner s = new Scanner (system.in);
   ent n;
   string name, author;
   ent prece, numPages;
   system.out. prentln("Enter no of books:");
   n= s.nextInt();
   Books b[]=new Books[5];
  for (int i=0; i<n; i++)
  { System.out. println ("Book" + (i+1) + ":");
   system.out.println ("Enter name of book");
   name = s.nextLine();
   system.out. prentln("Enter Author:");
   author = s.nextLine();
   system.out.prentln ("Enter prece");
   prece = s.nextInt();
   system.out. prentln("Enter no of pages:");
   numPages = s.nextInt();
   b[i] = new Books (name, author, prece, numPages);
  }
   for(int i =0; i<n; i++)
    { System.out.prentln("Book"+(i+1)+"\n")+b[i]);
    }
} }
```

OUTPUT

```
Enter no of books: 1
Book 1:
Enter the name of book: Mathematics for Grade 10
Enter the author of book: R.S Agarwal
Enter the price: 500
Enter no of pages: 700

Book 1.
Book name: Mathematics for Grade 10.
Author name: RS Agarwal
Price: 500
Number of Pages: 700
```

26/2/24

Q) Bank (Current and savings Account)

```
class Bank
{ public static void main(string a[])
 {
   savings s = new Savings ("Riyaa", "S01");
   current c = new Current("Manasvini", "S02");
   s.deposit(5000);
   s.display();
   s.computeInterest();
   s.displaybalance();
   s.withdraw(2000);
   s.displaybalance();

   c.deposit(3000);
   c.display();
   c.displaybalance();
 }
}
class Account
{
  protected string customerName;
  protected string customerNumber;
  protected double balance;
}
  public Account(string customerName, string customerNum
{ this.customerName = customerName;
  this.customerNumber = customerNumber;
  this.balance = 0; }
```

```
public void deposit(double amount)
{ balance+ = amount
  sop("deposit of "+ amount + "successful");
}
public void display()
{ sop("Account number:"+ accountNumber+ "\nBalance
    =" + balance);
}
}
class savings Extends Account
{ public savings(string customerName, string customer
                                               Number)
  { super(customerName, customerNumber);
  }
public void computeInterest()
{ double InterestRate=0.05;
  double interest = balance * InterestRate;
  balance + = interest;
  sop("Interest added "+interest);
}
public void withdraw(double amount)
{
  if(balance >= amount)
  { balance - =amount;
    sop("withdrawal - "+amount);
  }
else
{  SOP("Insufficient balance");

}
}
}
class current extends Account
{ private double minimumbalance = 1000;
  public current(sting customerName, String customerNumber)
  {  super(customerName, customerNumber);
  }
  public void withdraw(double amount)
  { if(balance-amount >= minimumbalance)
    {
     balance -=amount;
     SOP("withdrawal ="+amount);
    }
   else
   {
    SOP(" Insufficient balance");
    imposeServiceCharge();
   }
  }
  private void imposeServiceCharge()
  { double serviceCharge=20;
   balance -=servicharge;
   SOP("service charge ="+ servicecharge);
  }}.
thec.balan---
```

SRB 22/1/24

OUTPUT

```
Account number 501
5000 Balance: 5000
Interest added: 5250
Account number 501
Balance: 3250
Account number: 502
Balance: 3000
```

29/01/2021

Packages

Q) Create a package CIE which has two classes - student and Internals. The class student has members like USN, name, sem. The class internals derived from student has an array that stores the internal marks scored in five courses of the current semester of student. Create another package SEE which has the class External which is a derived class of student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the 2 packages in a file that declares the final marks of n students in all five courses.

student.java

```
package CIE
public class Student
{ public string USN, name;
  public int sem;
  public student (string USN, string name, int sem)
   { this.usn = usn;
     this. name = name;
     this. sum = sem;
   }
}
```

Internals.java

```
package CIE
pullic class Internals extends student
{   public int m[] = new int[5];
    public Internals(String USN, string name, int sem,
                                              int[]m)
    {
       super(USN,name,sem);
       this.m=m;
    }
}
```

Externals.java

```
package SEE
import CIE.Student;
public class External extends student
{  public int SM[] = new int[5];
   public External (string USN, String name, int sem,
                                              int[]SM)
   {  super(USN, name, sem);
      this.sm=sm;

   }
 }


{
```

Main class.java

```
import java.util.Scanner;
import CIE.Student;
import CIE.Internals;
import SEE.External;
public class mainClass
{ public static void main(string args[])
 { int n=0;
  scanner in = new Scanner(system.in);
  system.out.println(“Enter no of students”);
  int n=in.nextInt();
  Internals[] im = new Internal [n];
  External [] em = new External[n];
  Student [] stu = new Student [n];
  for(int i=0; i<n; i++)
  { system.out.println(“Enter detail for student”+ (i+1)”);
    system.out.println (“Enter Name:”);
    in.nextLine();
    string name = in.nextLine();
    system.out.println(“Enter USN:”);
    string USN = in.nextLine();
    system.out.println(“Enter sem:”);
    int sem = in.nextInt();
   int[] internal_marks = new int[5];
   int[] external_marks = new int[5];
  system.out.println(“Enter Marks Details”);
for(int j=20; j<5;j+1)
{  sop("Enter enternal marks for course "+ (j+1));
   enternal marks[j] = in.nextInt();
   sop("Enter external marks for course"+ (j+1));
   external -marks[j] = in.nextInt();

 }
stu[i] = new Student (USN, name, sem);
 im [i] = new Internals(USN, name, sem, internal-marks)
 em[i] = new External (USN, name, sem, External-marks)

}
SOP("Final marks Details:");
for(int i=0; i<n; i++)
{  SOP("student"+ (i+1));
   SOP ("Name:" + stu[i].name);
   SOP("USN" + stu[i].usn);
   SOP("sem" + stu[i].sem];
  for(int j=0; j<5; j++)
  {  tm = im [i].m[j]+ em[i].sm[j];
     SOP ("Final marks"+ (i+1) + "= ", tm);

     tm =0;

  }
 }
}
```

OUTPUT

```
Enter no.of students:1
Enter detail for student 1
Enter name: Bhoomika
Enter USN : 001
Enter sem:03
Enter marks detail:
Enter Internal marks for course 1: 49
Enter Externalmarks for Course 1 : 42
Enter Internal marks for Course 2 : 38
Enter External marks for course 2 : 39
Enter Internal marks for course 3 : 40
Enter External marks for Course3 : 41
Enter Internal marks for Course 4 : 42
Enter Exterhal marks for Course 4 : 44
Enter Internal marks for course 5: 50
Enter External marks for Course 5: 42

Final Marks Details:
Student 1
Name: Bhoomika
USN: 001
Sem: 03
Final Marks for Course 1 : 91
Final Marks for Course 2 : 77
Final Marks for Course 3 : 81
Final Marks for Course 4 : 86
Final Marks for Course 5 : 92
```

19/02/2024

① write a program that demonstrates handling of exceptio in inheritence. create a base class 'Father'. and der class 'son' which extends the base class. In father implement a constructer which takes the age and throws an exception wrongAge(). when age<0. and a constructor in son class which throws an exception if father age >= son age.

```
class wrongAge extends Exception
{   public wronAge (String message)
      {  super(message);
      }
}

class Father
{  int age;
   public Father(int age) throws wrongAge
   {  if(age <0)
      {
         throw new wrongAge("Age cannot be negative")
      }
      this. age =age;
   }
}
class son extends father
{
     int sonAge;
   public son(int fatherAge, int sonAge) throws wrongAge
   {  super(fatherAge);
```

```
    if(sonAge>=fatherAge)
    { throw new WrongAge("Son's age cannot be greater
      than or equal to father's age");
    }
    this.sonAge=sonAge;
  }
}
public class InheritenceException
{ public static void main(string args[])
  { try
    { Father father= new Father(-3);
    }
    catch (WrongAge e)
    {
       system.out.println("Wrong Age"+e);
    }

    try
    { ~~Father~~ fa son son=new Son(45,46);
    }
    catch (WrongAge e)
    { system.out.println ("Wrong Age"+e);
    }
  }
}
```

OUTPUT

```
Wrong age
WrongAge: Age cannot be negative

wrong age
wrongAge: son's age cannot be greater than or
equal to Father's age.
```

2 write a program which creates 2 threads one thread displaying "BMS College of Engineering". once every 10 seconds and another displaying "CSE" every 2 seconds.

```
~~public~~ class BMS extends Thread
{   public void run()
    {   try
        {   int i=0;
            while(i<~~100~~5)
            {   Thread.sleep(10000);
                system.out.println("BMS College of
                Engineering");
                i++;
            }
        }
catch (InterruptedExceptione)
 {    system.out.println("Interrupted");
 }
}
~~public~~ class CS extends Thread {
public void run()

{   try
     {  int i=0;
       while(i<100)
       {   Thread.sleep(2000);
           System.out.println("CSE");
       }   i++;
     }
   catch (Interrupted Exception.e)
    {  system.out.println("Interrupted");
    }
}.
}
public class MyThread
{
    public static void main (strings arg[])
    {
        BMS  b1 = new BMS();
        CS   c1 = new CS();
        b1.start();
        c1.start();
    }
}
```

OUTPUT

```
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
```

19/2/24

1) creating label, button and TextField in a Frame using AWT. 26/02/2024

```
import java.awt.*;
import java.awt.event;*;
public class AWTExample extends WindowAdapter
{   Frame f;
    AWTExample()
    {   f =new Frame();
        f.addWindowListener (this);
        Label l= new Label("Employee ID");
        Button b= new Button("submit");
       TextField t =new TextField();
       l.setBounds(20,80,80,30);
       t setBounds (20,100,80,30);
       b.setBounds(100,100,80,30);
    f.add(b);
    f.add(l);
    f.add (t);
    f.setsize(400,300);
    f.setTitle("Employee info:");
    f.setLayout(null);
    f.setVisible(true);
  }
  public void windowClosing (WindowEvent e)
  {   system.exit(0);
  }
```

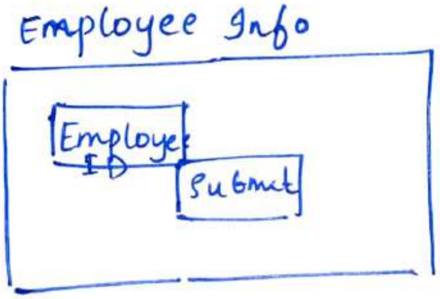
```
    public static void main (String args[])
    { AWTExample awt_obj = new AWTExample();
    }
}
```

2. Create a button and add a action listener for Mouse click.

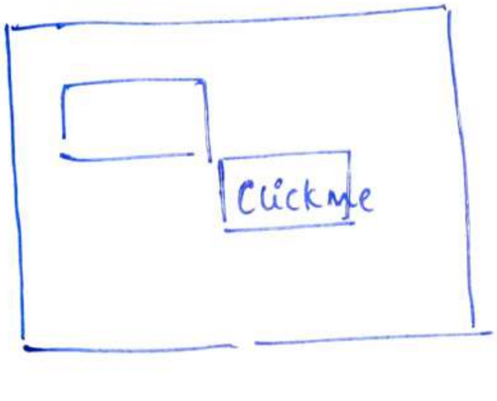
```
import java.awt.*;
import java.awt.event.*;
public class EventHandling extends WindowAdapter
implements ActionListener
 {
   Frame f;
   TextField tf;
   EventHandling ()
   { f = new Frame();
     f.addWindowListener (this);
     tf=new TextField ();
     tf.setBounds( 60,50,170,20);
     Button b = new Button("Click me");
     b.setBounds(100,120,80,30);
     b.addActionListener(this);

     f.add(b); f.(add)(tf);
     f.setSize(300,300); f.setVisible (true);
     f.setLayout (Null);

 }
```

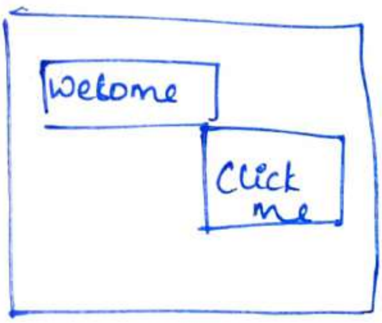
```
    public void actionPermored (ActionEvent e)
  { tf.setText ("Welcome");
  }
  public void windowClosing (WindowEvent e)
  { system.exit (0);
  }
    public static void main (string args[])
    {    new EventHandling();
    }
}
```

OUTPUT for 1)



OUTPUT for 2)





PROGRAMS ON IO

```
1. import java.io.*;
   public class ByteArrayInput
   {  public static void main(string args[]) throws IOExc
      {  byte[] buf = {35,36,37,38};
         ByteArrayInputStream byt = new ByteArrayInput
                                          stream(buf);
         int k=0;
         while ((k= byt.read())!=-1)
         {   char ch = (char)k;
             system.out.println("ASCII value of characte
             is:"+ k + " special character is:" +ch));
         }
      }
   }
```

OUTPUT

```
Ascii value of character is 35 special characteris #
Ascii value of character is 36 special character is $
Ascii value of character is 37 special character is %
Ascii value of character is 38 special characteris &
```

```
2. import java.io.*;
   public class FileEx
   { public static void main(string args[]) throws
                                          IOException
     { FileInputStream fin = new FileInputStream("
                                       Example.txt");
       int content;
       system.out.println("Remaining bytes that can
       be read : " + fin.available());
       content = fin.read();
       system.out.print((char) content + " ");
       system.out.print( content + " ");
       system.out.print("Remaining bytes that can
       be read : "+ fin.available());

       system.out.println("Remaining bytes that can
       be read : " + fin(available()});

     }
   }
```

OUTPUT

~~20~~ Remaining bytes that can be read : 20

A 65

~~19~~ Remaining bytes that can be read : 19

```
3. import java.io.FileInputStream;
   import java.io.IOException;
   public class FileEx2
   { public static void main (String args[]) throws
                                              IOExcept..
     { FileInputStream fin = new FileInputStream
       byte[] bytes=new byte[20];   ("Example.txt");
       int i;
       char c;
       i = fin.read(bytes);
       system.out.println("Number of bytes read ":
       system.out.println("Bytes read:");
       for(byte b:bytes)
       {      c=char(b);
             system.out.print(c);
       }
} }
```

OUTPUT

```
~~5~~ Number of bytes read: 5
~~Hello~~ Bytes read:
      H
      e
      l
      l
      o
```