## VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



# Object Oriented Java Programming (23CS3PCOOJ)

Submitted by

Krithika H Kotian (1BM23CS159)

in partial fulfillment for the award of the degree of BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING



#### **B.M.S. COLLEGE OF ENGINEERING**

(Autonomous Institution under VTU)

BENGALURU-560019

Sep-2024 to Jan-2025

## **B.M.S.** College of Engineering,

**Bull Temple Road, Bangalore 560019** 

(Affiliated To Visvesvaraya Technological University, Belgaum)

## **Department of Computer Science and Engineering**



#### **CERTIFICATE**

This is to certify that the Lab work entitled "Object Oriented Java Programming (23CS3PCOOJ)" carried out by Krithika H Kotian(1BM23CS159), who is bonafide student of B.M.S. College of Engineering. It is in partial fulfillment for the award of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belgaum. The Lab report has been approved as it satisfies the academic requirements in respect of an Object Oriented Java Programming (23CS3PCOOJ) work prescribed for the said degree.

Prof. Ambuja	Dr. Jyothi S Nayak
Assistant Professor	Professor & amp; HOD
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## Github Link:

https://github.com/krithikahkotian/java lab

## Program 1

## **Implement Quadratic Equation**

## Algorithm:

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Ampere java long week;
elass Quadratic }
 gul- a, b, c;
 world spine ) }
    Sienna In = new Scanner (System An);
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    a = 90. Aux ( 1 to ( );
    Systement-printh (" Enter the value of b;");
    b=9n-nucl2nt();
    lyster one printer ("Exte the value of c:");
    e : animust Ind 19;
    void displayes?
       double d = dab - 4 each;
       deuble 511,92;
        4 6==0
        3 m1 = (-b) 16.0 da);
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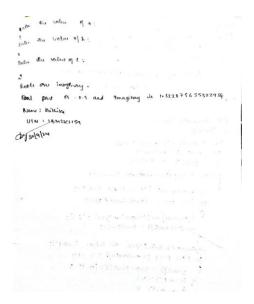
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Name 1 Kerthika

US N: 18 M2345159
```



#### Code:

import java.util.Scanner;

```
class Quadratic {
  int a, b, c;
  void scan() {
     Scanner in = new Scanner(System.in);
     System.out.println("Enter the value of a:");
     a = in.nextInt();
     if (a == 0) {
       System.out.println("Value of a is invalid. Enter a non-zero value:");
       a = in.nextInt();
     }
     System.out.println("Enter the value of b:");
     b = in.nextInt();
     System.out.println("Enter the value of c:");
     c = in.nextInt();
  }
  void display() {
     double d = b * b - 4 * a * c;
     double r1, r2;
     if (d == 0) {
       r1 = (-b) / (2.0 * a);
       System.out.println("Roots are real and equal.");
       System.out.println("Roots are "+r1+" and "+r1);
     } else if (d > 0) {
       r1 = (-b + Math.sqrt(d)) / (2.0 * a);
       r2 = (-b - Math.sqrt(d)) / (2.0 * a);
       System.out.println("Roots are real and distinct.");
       System.out.println("Roots are " + r1 + " and " + r2);
     } else {
       r1 = (-b) / (2.0 * a);
       r2 = Math.sqrt(-d) / (2.0 * a);
```

import java.lang.Math;

```
System.out.println("Roots are imaginary.");

System.out.println("Real part is " + r1 + " and imaginary part is " + r2);

}

public static void main(String[] args) {

Quadratic q = new Quadratic();

q.scan();

q.display();

System.out.println("Name: Krithika");

System.out.println("USN: 1BM23CS159");

}
```

```
Roots are real and equal.
Roots are 2.0 and 2.0
Name: Krithika
USN: 1BM23CS159
D:\1BM23CS159>java Quadratic
Enter the value of a:
Enter the value of b:
Enter the value of c:
-14
Roots are real and distinct.
Roots are 7.0 and -2.0
Name: Krithika
USN: 1BM23CS159
D:\1BM23CS159>java Quadratic
Enter the value of a:
1
Enter the value of b:
Enter the value of c:
Roots are imaginary.
Real part is -0.5 and imaginary part is 1.3228756555322954
Name: Krithika
USN: 1BM23CS159
D:\1BM23CS159>java Quadratic
```

## **Implement SGPA Calculator**

#### Algorithm:

```
Disclop a lown loggin to clink a than Dodord with hunder took a now, an array width and array wast function resident to accept he dayboy details he a bellevel he abustate. Sola of a Studient
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                                                                                                                                                   grade (1) = 0;
                                                                                                                                        7 7
           Subject[6] graph - Subject [1] - Subject, magh /10+1
             educe for goods with 11. 3 to goods with 49.70
                                                                                                                                        class Student ?
                                                                                                                                          String name;
String lush;
double egipa;
· Array of Objects
Impar your, util - Scance;
                                                                                                                                            Subject subject;
elan Subject &
   the subject MARS() = now that (8);
that studing () = now that (8);
that great () = now that (8);
                                                                                                                                            public Student ()
                                                                                                                                             & subject = nav Subject (1);
    public boid-gethunes Anderedite (Scanner 9)
                                                                                                                                            public rood and Stadens Delailed Scanners)
    System. and . publish ("Enter Subject Marker 5");
                                                                                                                                             & system.our-print (" Enter the Noon: ");
         for (that jee; ) is subject touch a soft)
                                                                                                                                                 pame = s. nuctibul);
                                                                                                                                                  System. out. Resist ("Enter OSN:");
          $ System out. pubs ("Suspect" + (j+1) + ":");
                                                                                                                                                  un = S. nuet like ();
             supper Markel [] : S. next Int ();
           Suptime out privale ("Finter the Southjeet (codities");
                                                                                                                                                public raid compute scorn () {
           for ( and ) = 0; ] 1 and to least &; ]++)
           quet (j) - subject trust (j) (10 +1);

of Greet (j) > 10)

& greet (j) > 10
                                                                                                                                                 doubt totalhelits = 0;
                                                                                                                                                  desible total tains = 0;
                                                                                                                                                  for ( feet 1 = 0 ", 1 x 8; )++)
                                                                                                                                                   tetalluorute + = subject. endite(j);
total birds t= subject. grade(j) a subject. enditalj);
                                                                                                                               Enging details to Student 1.5
                                                                                                                              Take to Name & Smithed 1.

Take to Name & Komble

Take the DIN Cleaning 7.
           people relate train by ()
                                                                                                                                Fries the Subject banks.
           System and privates ("Name: "+name);
System and privates ("vove" +von);
System and privates ("vove" +von);
                                                                                                                                Subjet 1: 91
                                                                                                                               Subjet 2 184
               System cont. printle ("serve :, sype);
                                                                                                                                Subject 3: 47
   public class Main f
                                                                                                                                 Subject 75.94
       public static void main (string[] args)
     Scarce Source = new Science ( System to );
student Students [) = new Student (3);
                                                                                                                               budite for Subject 1:4
                                                                                                                               cudets for Subject 2:4
          (6 (9nt 1=0; ( 1 thaten 3; (+1)
                                                                                                                             Condito for simplest 2: 4
Condito for Interpret 4: 3
Condito for Interpret 4: 3
Condito for Interpret 4: 3
Condito for Congret 4: 1
Condition for Congret 4: 1
Condition for Interpret 3: 1
          * Egystem ent printer (* Extense ");
Modern [1] = new Studen [3];
Modern [1] - get Modern Edital (season);
Modern [1] - subject - get modernelistis (season);
Modern [1] - subject - get modernelistis (season);
Modern [1] - modernelistis (season);
                Hider [t). Compute SCIPA (1),
                 gluders (E) die glay ();
                                                                                                                                 Names Krithika
                                                                                                                                   USN 5 L 6M23CS159
                                                                                                                                   Sura : 9.4
                                                                                                                             dya110/24
```

#### Code:

import java.util.Scanner;

```
class Subject {
  int subjectMarks[] = new int[8];
  int credits[] = new int[8];
```

```
int grades[] = new int[8];
  public void getMarksAndCredits(Scanner s) {
     System.out.println("Enter the subject Marks:");
     for (int j = 0; j < 8; j++) {
       System.out.print("Subject" + (j+1) + ":");\\
       subjectMarks[j] = s.nextInt();
     }
     System.out.println("Enter the subject Credits:");
     for (int j = 0; j < 8; j++) {
       System.out.print("Credits \ for \ Subject "+(j+1)+":");
       credits[j] = s.nextInt();
     }
  }
  public void computeGrades() {
     for (int j = 0; j < 8; j++) {
       grades[j] = subjectMarks[j] / 10 + 1;
       if (grades[j] > 10) {
          grades[j] = 10;
       if (grades[j] < 4) {
          grades[j] = 0;
class Student {
  String name;
  String usn;
```

```
double sgpa;
Subject subject;
public Student() {
  subject = new Subject();
}
public void getStudentDetails(Scanner s) {
  System.out.print("Enter the Name: ");
  name =s.nextLine();
  System.out.print("Enter the USN: ");
  usn=s.nextLine();
}
public void computeSGPA() {
  double totalCredits = 0;
  double totalPoints = 0;
  for (int j = 0; j < 8; j++) {
     totalCredits += subject.credits[j];
     totalPoints += subject.grades[j] * subject.credits[j];
   }
  sgpa = totalPoints / totalCredits;
}
public void display() {
  System.out.println("Name: " + name);
  System.out.println("USN: " + usn);
  System.out.println("SGPA: " + sgpa);
}
```

```
public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    Student[] students = new Student[3];
    System.out.println("Name: Krithika H Kotian");
    System.out.println("USN: 1BM23CS159");

for (int i = 0; i < 3; i++) {
        System.out.println("Entering details for Student " + (i + 1) + ":");
        students[i] = new Student();
        students[i].getStudentDetails(sc);
        students[i].subject.getMarksAndCredits(sc);
        students[i].subject.computeGrades();
        students[i].computeSGPA();
        students[i].display();
        System.out.println();
    }
}</pre>
```

```
D:\Java>javac Student.java
D:\Java>java Student
Name: Krithika H Kotian
USN: 1BM23CS159
Entering details for Student 1:
Entering details for Stud
Enter the Name: Krithika
Enter the USN: 1BM23CS159
Enter the subject Marks:
Subject 1: 94
Subject 2:
              86
Subject 3:
              94
Subject 4:
              86
Subject 5: 82
Subject 6: 94
Subject
Subject 8: 76
Enter the subject Credits:
Credits for Subject 1: 4
Credits for Subject 2: 4
Credits for Subject 3: 3
Credits for Subject 4: 3
Credits for Subject 5: 3
Credits for Subject 6:
Credits for Subject 7:
Credits for Subject 8: 1
Name: Krithika
USN: 1BM23CS159
SGPA: 9.4
```

```
Entering details for Student 2:
Enter the Name: Enter the USN: 1BM23CS001
Enter the subject Marks:
Subject 1: 98
Subject 2: 89
Subject 3: 84
Subject 4: 89
Subject 6: 98
Subject 7: 97
Subject 8: 75
Enter the subject Credits:
Credits for Subject 1: 4
Credits for Subject 2: 4
Credits for Subject 3: 3
Credits for Subject 4: 3
Credits for Subject 5: 3
Credits for Subject 6: 1
Credits for Subject 6: 1
Credits for Subject 6: 1
Credits for Subject 8: 1
Name:
USN: 1BM23CS001
SGPA: 9.4
```

```
Entering details for Student 3:
Enter the Name: Enter the USN: 1BMIS900
Enter the subject Marks:
Subject 1: 79
Subject 2: 75
Subject 3: 74
Subject 4: 94
Subject 5: 71
Subject 6: 61
Subject 7: 85
Subject 8: 85
Enter the subject Credits:
Credits for Subject 1: 4
Credits for Subject 2: 4
Credits for Subject 3: 3
Credits for Subject 4: 3
Credits for Subject 5: 4
Credits for Subject 5: 4
Credits for Subject 5: 4
Credits for Subject 6: 2
Credits for Subject 8: 1
Name:
USN: 1BMIS900
SGPA: 8.2727272727272727
```

## **Implement ToString**

#### Algorithm:

```
B. Create a class brook which common to the reacher for spate, stury year. Turneds a constraint to set of god details of the number of sections a best original forested they are proposed conspected detailed of the head. Coveley a house proposed to best of the head. Coveley a house proposed to best of the head. Coveley a house proposed to best of the head. Coveley a house proposed the seasons; then Book of the book object.

They author; the number of the price; the number of the number of
```

```
System out-frontly ("Enter por
 n = 5. med Ind ()
  Books blJ - new Books [n].
 In (Aut to ; ten ; int) }
   Lyster and printer ("known details for book" + (C+1) + ":");
    System out provide ("Nom: );
     Name = S. Nutline();
    Lyslin, out printle (" Author: ");
     with s. restline ();
     Lystem and purtler (" Rrice:");
      picu = sinectIna()
      esystem out printer ("Number of pages:");
      numPages = 8, nextInt();
       b[c) - new books (name, outlind, price, numlayer);
     System.ont. println (*Namu st<del>omerthum ,</del>) kulluska In USN: 18 M25(5159)
    Systement. println ("Book Octable s");
   - System. out purthell;
    In lent izor, ien ; i++1?
    Typian and printly (a Octobe for Book "+ (i+1)+4),
       System and printer (BEi). Asking (1);
   3
```

```
Enter the manber of Books
Enter debate of for book 1
Name:
Rich Dad Pool Dad
Author :
Robera
Price :
Enter detries for Book o:
Think Like Mark
Author
jay Shetty
pieu
 600
 USN: 18M25UIS9
 book Details:
 Octails for book & s
  Public hame: sobut
  Byu 2500 page : 250
```

```
Details for book of.

Rose name : twints like mont
hulbed Name: joy Bathy

Rice: 650
Nounders of pages: 226
Apperiolale

attic | 24
Develop a Jana pagem to create an abortract class named shape
that.
```

```
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() {
     return "Book name: " + this.name + "\n" +
         "Author name: " + this.author + "\n" +
         "Price: " + this.price + "\n" +
         "Number of pages: " + this.numPages + "\n";
  }
}
class BookDemo {
  public static void main(String args[]) {
     Scanner s = new Scanner(System.in);
     int n;
     String name;
     String author;
     int price;
```

```
int numPages;
System.out.println("Enter the number of books:");
n = s.nextInt();
s.nextLine();
Books b[] = new Books[n];
for (int i = 0; i < n; i++) {
  System.out.println("Enter details for book " +(i + 1) + ":");
  System.out.println("Name:");
  name = s.nextLine();
  System.out.println("Author:");
  author = s.nextLine();
  System.out.println("Price:");
  price = s.nextInt();
  System.out.println("Number of pages:");
  numPages = s.nextInt();
  s.nextLine();
  b[i] = new Books(name, author, price, numPages);
}
System.out.println("Name: Krithika\nUSN:1BM23CS159");
System.out.println("Book Details:");
System.out.println();
for (int i = 0; i < n; i++) {
  System.out.println("Details for book " +(i + 1) + ":");
  System.out.println(b[i].toString());
}
```

}

```
D:\1BM23CS159>javac BookDemo.java
D:\1BM23CS159>java BookDemo
Enter the number of books:
2
Enter details for book 1:
Name:
Rich dad Poor Dad
 Author:
robert
Price:
500
Number of pages:
250
Enter details for book 2:
Name:
 Think like monk
Author:
jay Shetty
Price:
650
Number of pages:
245
Name: Krithika
USN:1BM23CS159
Book Details:
Details for book 1:
Book name: Rich dad Poor Dad
Author name: robert
Price: 500
Number of pages: 250
Details for book 2:
Book name: Think like monk
Author name: jay Shetty
Price: 650
Number of pages: 245
```

## **Implement Shape Area**

## Algorithm:

```
Develop a law program to exact an abstract can now the last extracts two integers of an empty cultical narral printing. Friends there can be been the control that the first out of the class exclude the class (Lage Such of fact one of the class contain only the actual print Alan () that prints are of given shapes;
    Surport java util Scanner;
     abstract elevi Stops?
         double asb;
           abstract void printAcm ();
      class hectargle extende Shape }
           Rectangle (double les double br)
                  a: h .
                 b: b;
            void printaria (1)
            double are = a*b;
             System. ont. println ("Area of Rectangle is" + ara);
       class Triangle extends Shape?
      Triangle (doubt to, doubt to) &
     3 = b4;
        a: li;
```

```
rold paintakeal) }
    double are os mans,
    dystem out printly (" thea of tirch is "rara);
class Shape Olemo S
  partic State void man (String S[])}
   Scanner Sc= new Scanner (System. 9m);
   System. and printly ( Name: Kindi to b USW/1642365159 );
    System one printly ("Forth the Dimenson of Redungs");
    double a = sc. nutlooner();
    double b = SC. rust Double U.
     Reitargh r= new Reitargh (a,b);
     System on printle (" Enter the Radius of line");
      a= si nuot Double();
      tirch c = now link (a);
      System endprivates ( render the Obnession of Brings)
       a = Sc. nertDouble();
        be sc. next Combut);
        Triangle t = New Triangle (a16);
          r. quin Aual);
         + print ALa ();
           c. print Arral)
```

```
Shape Shape Serve

Name: Kristicka

Christ Respects 50

Inter the demension of Restangle

3 t

Then the saca Assis of Este

Area of Restangle is 0.0

Area of Tritorga is 5.0

Area of Citle is 156 $46

Again
```

```
import java.util.Scanner;
abstract class Shape {
  double a, b;
  abstract void printArea();
}
class Rectangle extends Shape {
Rectangle(double le, double br) {
     a = le;
     b = br;
  }
  void printArea() {
     double area = a * b;
     System.out.println("Area of Rectangle is " + area);
  }
}
class Triangle extends Shape {
Triangle(double le, double br) {
     a = le;
     b = br;
  void printArea() {
     double area = 0.5 * a * b;
     System.out.println("Area of Triangle is " + area);
  }
}
class Circle extends Shape {
Circle(double le) {
     a = le;
```

```
}
  void printArea() {
     double area = 3.14 * a * a;
     System.out.println("Area of Circle is " + area);
  }
}
class ShapeDemo {
  public static void main(String s[]) {
     Scanner sc = new Scanner(System.in);
     System.out.println("Name:Krithika\nUSN:1BM23CS159");
     System.out.println("Enter the dimensions of Rectangle");
     double a = sc.nextDouble();
     double b = sc.nextDouble();
     Rectangle r = new Rectangle(a, b);
     System.out.println("Enter the dimensions of Triangle");
     a = sc.nextDouble();
     b = sc.nextDouble();
     Triangle t = new Triangle(a, b);
     System.out.println("Enter the radius of Circle");
     a = sc.nextDouble();
     Circle c = new Circle(a);
     r.printArea();
     t.printArea();
     c.printArea();
  }
```

D:\1BM23CS159>java ShapeDemo

Name:Krithika USN:1BM23CS159

Enter the dimensions of Rectangle

Enter the dimensions of Triangle

Enter the radius of Circle

Area of Rectangle is 12.0

Area of Triangle is 9.0 Area of Circle is 153.86

## **Implement Saving and Current Account**

## Algorithm:

```
b. Develop Bank Account
 grapest Jana, well. Scorner;
 class Account }
     String name;
       string acc-type;
       float belance;
       Sunce se = new Scancer (System. tn);
        void suad ()
          dyrlan and presiden (" Ender the name : " );
           name = 8(-neett);
           digitam and paintin ("Ender the Accord number:");
           all no = St. nikt 2ntlls
           Lysten, end private ("Enter the gradual tenteric;"); Relance = Sc. Next & boot ();
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            I bysten out printin (" Deforit next by perint.");
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            System out printly 1" Exter the amount to withdraw "");
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         again and pindh ("heart yet " + acc yet);
Lydra and prodh ("keland" + halom );
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   beid withdraw Dif
      Grown man - rady ( MDL-balance) }
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          katanio == wdi')
          Eysten eat-periodes It withdrawn : "trees);
    y y
```

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class Bank &
    public Hode void nain ( thing angel )}
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     System and printh to cheen assent type (11 sering, 5: lovely)
     and autype & New Intl',
      of (actigal = -1)
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       elle of lacetype == 2)
         ausurt = now aurer (1,
           " Agricument-printle ("toushed an type");
        account rend ();
       while (mu) }
          Septim out print to ( ... . . . . . . . . . . ) ;
          Lysten and product 1. Depost ");
          Reptime and private 1 " 2. Withdraw" );
          lythen east peristricus tempets makest for Loving Accuss
          System out printly "A Distry know Dealing,
          Lynn ort print lainter you choice!");
           my choice . Sc. nort [not U);
            switch (elvier) f
                  c);

System ent. perits ("Enter aspect among.");

flood dipon! = 50. may shoot! 15

acc. accept Oscopt (aspect);
```

```
PRAT J:
           acc - toilldaut 9
            briat;
         Mass 3!
            of face antype == 'santy");
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               grow some = sc. next tool );
                ant num = scand Intil;
               And time Sc. Net Intlij
                (acc. compartential (ration, time);
                Eyelin ord printle ("Not Carry account");
               else
                F pures
                ace displayers
              Rysten . Drd . printle ("Exitity");
              retur;
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               System out. Printle ( " Invalid choice");
 Ny Y
4
A 38 /10/24
```

```
took arroad type
  Krittika
  Intin the account hundres:
  Arter the Account Typel Earling [Acom)
  Sovely
  Enter the Thinkal Balance
  1. Apost
 3. Compared factors for Source Account
4. Objetany Account Acounts
6.11
  Entir you whole 13
  Enter Nate; Hours compared & Hour: 223
  Company Friend 15042-1209
 1. Deposit
2. Whoham
 3. Compacts Entered for Enring Account
 4. Digeny Across Detries
 Entry your chock b
 frond Details
 tothum rom: Kritiske
  Account Name : 189
Acountry : Source
Code:
import java.util.Scanner;
class Account {
   String name;
   int acc_no;
   String acc_type;
   float balance;
   Scanner sc = new Scanner(System.in);
   void read() {
      System.out.println("Enter the name:");
      name = sc.next();
      System.out.println("Enter the Account number:");
      acc_no = sc.nextInt();
      System.out.println("Enter the Account Type (Saving/Current):");
      acc_type = sc.next();
      System.out.println("Enter the initial balance:");
      balance = sc.nextFloat();
```

```
}
  void acceptDeposit(float amount) {
     if (amount > 0) {
       balance += amount;
       System.out.println("Deposited: " + amount);
     } else {
       System.out.println("Deposit amount must be positive.");
  }
  void withdraw() {
     System.out.println("Enter the amount to Withdraw:");
     float wdr = sc.nextFloat();
     if (wdr > balance) {
       System.out.println("Insufficient balance! Can't withdraw.");
     } else {
       balance -= wdr;
       System.out.println("Withdrawn: " + wdr);
  }
  void display() {
     System.out.println("Account Details");
     System.out.println("Customer Name: " + name);
     System.out.println("Account Number: " + acc no);
     System.out.println("Account Type: " + acc type);
     System.out.println("Balance: " + balance);
  }
class Saving extends Account {
```

}

```
void compoundInterest(int rate, int num, int time) {
    float com int = balance * (float) Math.pow(1 + (rate*0.01 / (float) num), num * time);
    System.out.println("Compound Interest: " + com int);
    balance += com int;
  }
}
class Current extends Account {
  private static final float MIN BALANCE = 500;
  void withdraw() {
    System.out.println("Enter the amount to Withdraw:");
    float wdr = sc.nextFloat();
    if (balance - wdr < MIN BALANCE) {
       System.out.println("Minimum balance crossed! Can't withdraw.");
     } else {
       balance -= wdr;
       System.out.println("Withdrawn: " + wdr);
     }
  }
  void display() {
    super.display();
    if (balance < MIN BALANCE) {
       System.out.println("Minimum balance crossed!");
       balance = 50;
    System.out.println("Balance: " + balance);
  }
}
class Bank {
```

```
public static void main(String args[]) {
  Scanner sc = new Scanner(System.in);
  Account account;
  System.out.println("Choose account type (1: Saving, 2: Current): ");
  int accType = sc.nextInt();
  if (accType == 1) {
     account = new Saving();
  } else if (accType == 2) {
     account = new Current();
  } else {
     System.out.println("Invalid account type selected. Exiting...");
    return;
  }
  account.read();
  while (true) {
     System.out.println("----Menu----");
     System.out.println("1. Deposit");
     System.out.println("2. Withdraw");
     System.out.println("3. Compute interest for Saving Account");
     System.out.println("4. Display Account Details");
     System.out.println("5. Exit");
     System.out.print("Enter your choice: ");
     int choice = sc.nextInt();
     switch (choice) {
       case 1:
          System.out.print("Enter deposit amount: ");
          float deposit = sc.nextFloat();
          account.acceptDeposit(deposit);
```

```
break;
       case 2:
          account.withdraw();
          break;
       case 3:
          if (account instanceof Saving) {
            System.out.print("Enter rate, times compounded, and time: ");
            int rate = sc.nextInt();
            int num = sc.nextInt();
            int time = sc.nextInt();
            ((Saving) account).compoundInterest(rate, num, time);
          } else {
            System.out.println("Not a saving account.");
          }
         break;
       case 4:
          account.display();
         break;
       case 5:
          System.out.println("Exiting...");
         return;
       default:
          System.out.println("Invalid choice.");
}
```

```
D:\1BM23CS159>java Bank
Choose account type (1: Saving, 2: Current):
1
Enter the name:
Krithika
Enter the Account number:
Enter the Account Type (Saving/Current):
Saving
Enter the initial balance:
4500
 ----Menu-
1. Deposit
2. Withdraw
3. Compute interest for Saving Account
4. Display Account Details
Enter your choice: 1
Enter deposit amount: 450
Deposited: 450.0
   .
--Menu--
1. Deposit

2. Withdraw
3. Compute interest for Saving Account
4. Display Account Details
5. Exit
Enter your choice: 2
Enter the amount to Withdraw:
200
Withdrawn: 200.0
 ----Menu--
1. Deposit

    Withdraw
    Compute interest for Saving Account

4. Display Account Details
5. Exit
Enter your choice: 3
Enter rate, times compounded, and time: 2 2 3
Compound Interest: 5042.2207
    --Menu-
1. Deposit
2. Withdraw
3. Compute interest for Saving Account
4. Display Account Details
5. Exit
Enter your choice: 4
Account Details
Customer Name: Krithika
Account Number: 159
```

```
D:\1BM23CS159>java Bank
Choose account type (1: Saving, 2: Current):
Enter the name:
Krithika
Enter the Account number:
Enter the Account Type (Saving/Current):
Current
Enter the initial balance:
1300
   --Menu---
1. Deposit
2. Withdraw
3. Compute interest for Saving Account
4. Display Account Details
5. Exit
Enter your choice: 1
Enter deposit amount: 120
Deposited: 120.0
   --Menu--
1. Deposit
2. Withdraw
3. Compute interest for Saving Account
4. Display Account Details
5. Exit
Enter your choice: 2
Enter the amount to Withdraw:
Minimum balance crossed! Can't withdraw.
----Menu--
1. Deposit
2. Withdraw
3. Compute interest for Saving Account
4. Display Account Details
5. Exit
Enter your choice: 4
Account Details
Customer Name: Krithika
Account Number: 159
Account Type: Current
Balance: 1420.0
```

## **Implement Package**

#### Algorithm:

```
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          package c'e;
           Emporet java. util. Scenner;
             public class Studens?
                           protected String can = new String();
protected String name = new String();
protected Sext Sext;
                                 public void Enput Student Octails () }
                                 Scarrer Sc = no Scarcer (Lyctim In),
                                     Lystin out printle ( Enter the 150°);
                                              wsn = Sc. next L);
                                          usn = sc. next ();
System .out. pundln ("Enter the None: ");
                                             name = sconnet()",
                                        otiplen and printly (" Enter the Son" ");
                                                    sun = Sc. nuctint();
                                           public void displayshedoro Detaile ()?
                                                 Lyston.one printin 1" -- Student DETAILS -- "/;
                                                Suptim and punch ("USN 1 "+ Wan)";

Suptim and punch ("Name." "snawl;

Suptim and punch ("Name." + Wan);

Suptim and punch ("Name." + Wan);
```

```
Internal . java
  package tit;
support journalit frances;
 public class Internals Extends Shotoed
 purlitted that havin () - now from (5);
       public and Impeditemental)
        & Scanner Sc - new Scanner (System An);
           System-out-private ! fortin 5 Shiped marks: ");
          for [int its; ixs; its] 
Marks[i] = Sc nectitate)
         public void displayersmanter[]
         Systement printle (" (12 mouts: ")")
         for that is ; iss; in) ?
             Sylamond paintln ("Sunged " 4 (iti) 4";" + Marker(i));
     3
externals. java
package SEE;
 9mpora CIE. Shkurahi;
 Import yours citil Scarner;
public class toterals entends Internals?
      prolected but smarke() = now fix(s) prolected but final model = now fix [5];
   public Setember (15
       superces; 3
    partice soil angual see marke) } have see now Summa (spring th)
```

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Enth the Sem:
                    Strawii) - concellett). I
                      public voit orlightstitulmarket ) $
                     for (see too ; 255; (+) } for (see too ; 255; (+) } for (see too ; 255; (+) } for (see to );
                                                                                                                                                                                                                                                                   Enter 5 Subject CE Marks:
                     public unit calculate in al Market) {
for (Port 60 ", i <5; 1-10)

I for a warte (i) = 4 market(i) > market(i);
                                                                                                                                                                                                                                                                      Enter 5 Subject & market
                puttic boot diplayfinalmount) {
                         display Strature Detrils ();
                                                                                                                                                                                                                                                                    USN: 1BM23(5)59
                           display the ments();

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Applion to the control of the contro
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                                                                                                                                                                                                                                                                    Sen 13
                                                   Internet briggio (280) for , +((+1)+ ,; + fond mustil); CIE marks;
                                                                                                                                                                                                                                                                       Subject 1: 40
                                                                                                                                                                                                                                                                      Subject 2:41
                                                                                                                                                                                                                                                                       Subject 3: 45
 Main java
tupore SEE. externals
                                                                                                                                                                                                                                                                       Subject 4:42
public class main ( main ( strong augn(1))
                                                                                                                                                                                                                                                                       Subject 5:57
                                                                                                                                                                                                                                                                     final Marks:
             & Setwal ex : new Servach ()
                                                                                                                                                                                                                                                          -Stoped 1 175
                            er. August Andurt Details ();
ex. August Citeraris ();
ex. Engrosse Emarks ();
ex. Calculate Final works ();
                                                                                                                                                                                                                                                                         Subject 2: 71
                                                                                                                                                                                                                                                                Subjects: 60
                                                                                                                                                                                                                                                                          Subject 4: 92
                            ex. display forallyanks (1);
                                                                                                                                                                                                                                                                           Subject 5 :84
                                                                                                                                                                                                                                                                           Subject
```

#### Internals.java

```
package CIE;
import java.util.Scanner;
public class Internals extends Student {
  protected int marks[] = new int[5];
  public void inputCIEmarks() {
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter 5 Subject CIE marks: ");
     for (int i = 0; i < 5; i++) {
       marks[i] = sc.nextInt();
     }
  }
     public void displayCIEmarks() {
     System.out.println("CIE Marks: ");
     for (int i = 0; i < 5; i++) {
       System.out.println("Subject" + (i + 1) + ":" + marks[i]);
     }
  }
Externals.java
package SEE;
import CIE.Internals;
import java.util.Scanner;
public class Externals extends Internals {
  protected int smarks[] = new int[5]; // SEE marks
  protected int finalMarks[] = new int[5]; // Final marks (CIE + SEE)
     public Externals() {
     super();
  }
```

```
public void inputSEEmarks() {
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter 5 Subject SEE marks: ");
     for (int i = 0; i < 5; i++) {
       smarks[i] = sc.nextInt(); // Store each subject's SEE marks
     }
  }
     public void calculateFinalMarks() {
     for (int i = 0; i < 5; i++) {
       finalMarks[i] = smarks[i] + marks[i]; // Final marks = CIE marks + SEE marks
     }
  }
    public void displayFinalMarks() {
     displayStudentDetails();
     displayCIEmarks();
     System.out.println("Final Marks: ");
     for (int i = 0; i < 5; i++) {
       System.out.println("Subject " +(i+1) + ": " + finalMarks[i]);
Student.java
package CIE;
import java.util.Scanner;
public class Student {
  protected String usn = new String();
  protected String name = new String();
  protected int sem;
```

```
public void inputStudentDetails() {
   Scanner sc = new Scanner(System.in);
   System.out.println("Enter the USN: ");
   usn = sc.next(); // Read the USN
   System.out.println("Enter the Name: ");
   name = sc.next(); // Read the Name
   System.out.println("Enter the Sem: ");
   sem = sc.nextInt(); // Read the Semester (as an integer)
    }
   public void displayStudentDetails() {
   System.out.println("----STUDENT DETAILS----");
   System.out.println("USN: " + usn);
   System.out.println("Name: " + name);
   System.out.println("Sem: " + sem);
 }
D:\1BM23CS159>java Main
Enter the USN:
1BM23CS159
Enter the Name:
Krithika
Enter the Sem:
Enter 5 Subject CIE marks:
41
45
42
39
Enter 5 Subject SEE marks:
35
35
26
45
    -STUDENT DETAILS-
USN: 1BM23CS159
Name: Krithika
Sem: 3
CIE Marks:
Subject 1: 40
Subject 4: 42
```

## **Implement Age Exception**

## Algorithm:

```
With a frequent that description bundling of exceptions the makes in the class of the court class colds which there class a have then called "trilles " of class of maples or a book a colored the best Class of father class of maples or the comment of the comment
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   contract the Dan Class in range to thronor the excepting
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   throughout when Index agree in Sonctain Influenced a consider
that came both father by son's agree & theorer an exception of
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Systemans printles ( " Section Sours Agri");
  don't age is >= fathers agr.
                                                                                                                                                                                   Jourge . s. penent Ent (1)
- 9mport Jana. notil . Scanner ",
                                                                                                                                                                                  of (somage co)}
       class wrongings extends - Exeption }
                                                                                                                                                                                      -happy new Wrongstop 1 - Age commet be experise Is
                    fustic wrongstone)
                                                                                                                                                                                  of Januage >= fatherAge)?
                    3 super l'age suor ");
                                                                                                                                                                                            durant new Wrong Agy ( ) for any amount in granter
                    furtice Wang Age (Mong mg) }
                                                                                                                                                                                                                                                    than Father's Age");
                          super ( mig);
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                        y
                                                                                                                                                                            4
       y
                                                                                                                                                                                    gubbs void display() }
         rebus father of fatherings;
                                                                                                                                                                                                 dyntament. printh (" Sou's Age: " + Sounge);
                   public father() throws WrongAgel
                         Jeanner J = new Scenner (System . m);
                                                                                                                                                                  public class Agelblidation }
                           objection.ond. printles ["Finter tather" sye: "1;
                                                                                                                                                                           public static boid main (thing () angs) }
                             fatherage = S-next Int (1);
                            of thather Age KODS
                                throw now wrongstyr ("tyl convot be regative");
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                                                                                                                                                                                 exten ( wrong Age, e) }
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    oli
       Entir
                           father's age 125
       Enily
                            Son's age: 35
       Exception : Non's age carnot be grade than of equal to federal
       Enter fathers age 156
       Enter Son's age 1-9
        Exerption: Age cannot be negotive
       ENTER Fathers age :45
       Every con's age 1.15
       falure Age: 45
         Sours Age 715
  西湖
```

```
import java.util.Scanner;
class WrongAge extends Exception {
  public WrongAge() {
     super("Age Error");
  }
  public WrongAge(String message) {
     super(message);
  }
}
class Father {
  protected int fatherAge;
  public Father() throws WrongAge {
     Scanner s = new Scanner(System.in);
     System.out.print("Enter Father's age: ");
     fatherAge = s.nextInt();
     if (fatherAge < 0) {
       throw new WrongAge("Age cannot be negative");
  }
  public void display() {
     System.out.println("Father's Age: " + fatherAge);
  }
}
class Son extends Father {
  private int sonAge;
```

```
public Son() throws WrongAge {
     super();
     Scanner s = new Scanner(System.in);
     System.out.print("Enter Son's age: ");
     sonAge = s.nextInt();
     if (sonAge < 0) {
       throw new WrongAge("Age cannot be negative");
     } else if (sonAge >= fatherAge) {
       throw new WrongAge("Son's age cannot be greater than or equal to father's age");
     }
  }
  public void display() {
     super.display();
     System.out.println("Son's Age: " + sonAge);
  }
public class AgeValid {
  public static void main(String[] args) {
     try {
       System.Out.println("Krithika H Kotian\n1BM23CS159");
       Son son = new Son();
       son.display();
     } catch (WrongAge e) {
       System.out.println("Exception: " + e.getMessage());
     }
```

}

D:\Java>java AgeValid Name: Krithika Kotian USN: 1BM23CS159

Enter Father's age: 55 Enter Son's age: 20 Father's Age: 55

Son's Age: 20

D:\Java>java AgeValid Name: Krithika Kotian

USN: 1BM23CS159

Enter Father's age: 65 Enter Son's age: 67

Exception: Son's age cannot be greater than or equal to father's age

D:\Java>java AgeValid Name: Krithika Kotian

USN: 1BM23CS159

Enter Father's age: 5 Enter Son's age: -25

Exception: Age cannot be negative

## **Implement Threads**

#### Algorithm:

```
write a program which exacts have thread one three disputs. Open tolige of another diggs.
                                                                                 pure class mund Frample
                                                                                  & public static boid main (string args(1))
  " (5" once every two sword.
                                                                                    & tollyeThread et = new ColligiThread (1);
                                                                                        Lyrian. out. printer (" Name: Krikika Estian to USN2 Hurs (1997)
Ficher College Thread extends Thread ?
      public vod runes
                                                                                        Department Thread pdt = new Department mad St ();
       s try s
                                                                                         et. Hout L1:
                                                                                         dt . Hout (1)
             for (9ut 1=0; 124; 1++)
              Lystem ont-periods ("Rms college of engineering");
                                                                                018
                                                                                Name: Kuithika Kotian
            calch { ( interrupted Exception e)
                                                                                USN: 18W220SIFA
                System ont println ("College Thread Interrepted");
         Deportment Thread
       public void rune)
                Thursd . Help (2000);
           catch (Interupled Scription e) {
```

```
class CollegeThread extends Thread {
  public void run() {
    try {
      for(int i=0;i<4;i++){
        System.out.println("BMS College of Engineering");
        Thread.sleep(10000); // Pause for 10 seconds
      }
    } catch (InterruptedException e) {
        System.out.println("CollegeThread interrupted");
    }
}</pre>
```

```
class DepartmentThread extends Thread {
 public void run() {
    try {
      for(int i=0; i<4; i++){
        System.out.println("CSE");
        Thread.sleep(2000); // Pause for 2 seconds
      }
    } catch (InterruptedException e) {
      System.out.println("DepartmentThread interrupted");
  }
}
public class ThreadExample {
  public static void main(String[] args) {
    CollegeThread collegeThread = new CollegeThread();
    System.out.println("Name: Krithika Kotian\nUSN: 1BM23CS159");
    DepartmentThread departmentThread = new DepartmentThread();
    collegeThread.start();
    departmentThread.start();
  }
 D:\Java>Java ThreadExample
 Name: Krithika Kotian
 USN: 1BM23CS159
 CSE
 BMS College of Engineering
 CSE
 CSE
 CSE
 BMS College of Engineering
 BMS College of Engineering
 BMS College of Engineering
```

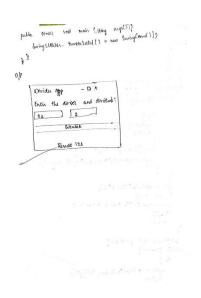
## **Program 9**

# **Implement Swing demo**

## Algorithm

```
Patrick a program that treat a course Relation to profession and assess that the small of the last profession to a course the small of the last profession that the discourse of sound by themed on displayed the Books field than to displayed the Books for the program sound to those a Nowwentena trapper of themed above there is program sounds theme on historial trapper typing the except to the accordance of the program sounds theme on historials trapper typing the except to the accordance of the program sounds.
    Purpose garan-during-e;
   Import java aut. ;
Import java aut. was. ;
    elan SwingDemo ?
           Ewing Demos
           I Trans join: now Itrans ("Distan App");
                 Him. Set Size (300, 200);
                 ifim , set Layons (new brithayons (5,1,5,5));
                 yrn, set Defout Clevel puration ( I frame EXIT-ON-CLOSE);
                 Those just = new Irabell ("Enter the divisor and dividend:");
                 Transfield aff = now treasied (10);
                  Therfuld biff = New Justiel (10);
                 Jeatler butter = new Jeutler ("(alautice");
                  Thatal eva - now Ital 100, songlovarcook (ENTER);
                   thr. selforeground (Cologn RED)5
                   Thathe arman = now "trade ! ", surregular south . ENTER)";
                    ers. settingened tedor. RED);
                    Ifum add [jlan)s
                    I Parel Input Parel - New Marel ( New Flow Legos ( ));
```

```
Injudence and 198);
 Super Buch and (1996); ... Here and (reportance 1)
 Hom. add (batton);
Ham. add (button);
Ham. add (anshb);
   Button, add Action Listener ( new Action Listener ! )
       public troid auton Performed (Action Event ever)
      E try?
             err sitted (" ");
anstab sitted (" ");
             first a = Integer, parsitive (atil), gettlet());
             And b = Integer powered (byth operfect ());
             f (b=-0) 5
                throw how Arithmetic Exception (a airsion countle
              and and +a/bs
             annot ru Text ( Resent 1 + cons)?
           later ( Number formed Exception e) }
              evi. suffert ("Entir valid Entigue")",
           4 catch [priffmatic Exception e)]
              extraction [ Direction count be zero! ");
Humedicada (trial)
```

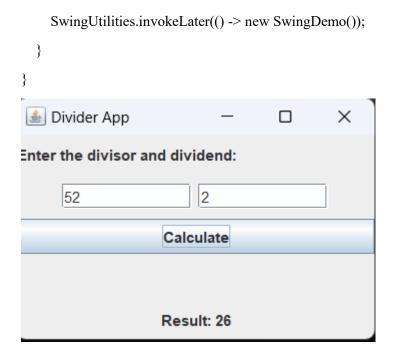


#### Code:

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
class SwingDemo {
  SwingDemo() {
    // Create JFrame container
    JFrame jfrm = new JFrame("Divider App");
    jfrm.setSize(300, 200);
    jfrm.setLayout(new GridLayout(5, 1, 5, 5)); // GridLayout with spacing
    jfrm.setDefaultCloseOperation(JFrame.EXIT ON CLOSE);
    // Create labels and text fields
    JLabel jlab = new JLabel("Enter the divisor and dividend:");
    JTextField aitf = new JTextField(10);
    JTextField bitf = new JTextField(10);
    JButton button = new JButton("Calculate");
    JLabel err = new JLabel("", SwingConstants.CENTER);
    err.setForeground(Color.RED); // Highlight error messages in red
    JLabel anslab = new JLabel("", SwingConstants.CENTER);
    // Add components to the frame
    ifrm.add(jlab);
    JPanel inputPanel = new JPanel(new FlowLayout());
    inputPanel.add(ajtf);
    inputPanel.add(bjtf);
    jfrm.add(inputPanel);
    jfrm.add(button);
    jfrm.add(err);
```

```
jfrm.add(anslab);
  // Add ActionListener to the button
  button.addActionListener(new ActionListener() {
     public void actionPerformed(ActionEvent evt) {
       try {
          err.setText(""); // Clear previous errors
          anslab.setText(""); // Clear previous results
          int a = Integer.parseInt(ajtf.getText());
          int b = Integer.parseInt(bjtf.getText());
          if (b == 0) {
            throw new ArithmeticException("Divisor cannot be zero");
          }
          int ans = a / b;
          anslab.setText("Result: " + ans);
        } catch (NumberFormatException e) {
          err.setText("Enter valid integers!");
        } catch (ArithmeticException e) {
          err.setText("Divisor cannot be zero!");
  });
  // Display frame
  jfrm.setVisible(true);
public static void main(String[] args) {
  // Create frame on event dispatching thread
```

}



## **Program 10**

# A. Implement PCFixed

## Algorithm:

```
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                   System one prints ("Inkrapes Eugen cayet");
                                                                                        new Consum (g)
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    10
    Post : 1
    Crot : 1
    Put 12
    got 12
   Art: 3
   Get 3
   Red: 4
   yot;4
   Put 16
   Got 15
```

### **Code:**

class Q {

```
int n;
boolean valueSet = false;
synchronized int get() {
  while (!valueSet) {
     try {
       System.out.println("\nConsumer waiting\n");
       wait();
     } catch (InterruptedException e) {
       System.out.println("InterruptedException caught");
     }
  }
  System.out.println("Got: " + n);
  valueSet = false;
  System.out.println("\nIntimate Producer\n");
  notify();
  return n;
}
synchronized void put(int n) {
  while (valueSet) {
     try {
       System.out.println("\nProducer waiting\n");
       wait();
     } catch (InterruptedException e) {
       System.out.println("InterruptedException caught");
     }
  }
  this.n = n;
  valueSet = true;
  System.out.println("Put: " + n);
  System.out.println("\nIntimate Consumer\n");
```

```
notify();
  }
}
class Producer implements Runnable {
  Q q;
  Producer(Q q) {
    this.q = q;
     new Thread(this, "Producer").start();
  }
  public void run() {
     int i = 0;
    while (i < 15) {
       q.put(i++);
  }
}
class Consumer implements Runnable {
  Qq;
  Consumer(Q q) {
     this.q = q;
    new Thread(this, "Consumer").start();
  }
  public void run() {
     int i = 0;
    while (i < 15) {
       int r = q.get();
```

```
System.out.println("Consumed: " + r);

i++;

}

public class PCFixed {

public static void main(String args[]) {

Q q = new Q();

new Producer(q);

new Consumer(q);

System.out.println("Press Control-C to stop.");

}
```

```
D:\Java>Java PCFixed
Press Control-C to stop.
Put: 0

Intimate Consumer

Producer waiting
Got: 0

Intimate Producer
Put: 1

Intimate Consumer

Producer waiting
Consumed: 0
Got: 1

Intimate Producer
Consumed: 1
Put: 2

Intimate Consumer

Producer waiting
Got: 2

Intimate Producer
Consumed: 0
Foot: 2

Intimate Consumer
```

```
Intimate Consumer

Producer waiting

Got: 3

Intimate Producer

Consumed: 3

Put: 4

Intimate Consumer

Producer waiting

Got: 4

Intimate Producer

Consumed: 4

Put: 5

Intimate Consumer

Producer waiting

Got: 5

Intimate Producer

Consumed: 5

Intimate Producer

Consumed: 5

Intimate Consumer
```

```
Producer waiting
Got: 11
Intimate Producer
Consumed: 11
Put: 12
Intimate Consumer

Producer waiting
Got: 12
Intimate Producer
Consumed: 12
Put: 13
Intimate Consumer

Producer waiting
Got: 13
Intimate Producer
Consumed: 13
Put: 14
Intimate Consumer
Got: 14
Intimate Producer
```

# B. ImplementDeadLock

## Algorithm:

```
boid land 17
h) Dendlock for
                                                                                         System and printers ( " found bland");
  clau a ?
     syretnested bold po(b b)
        String name = thread-currentthread +) getermine 1;
                                                                                    class Devollack Implements Runnell
       Sylamont parally (name + "entrul kgoo");
                                                                                         A a - Now ALIS
                                                                                         B B = New 5();
       try? Throat step (1000);
                                                                                         Deadlockery
      (with (troughin a) 2 hydrom ont prints ("A Sin knuppled");
                                                                                           Thread. euroraThread () Cothemil "main Threal");
                                                                                           Thread to nor Thread I thing though throady;
         System out println I name + trying to well & but! !!
                                                                                          1. Startli;
                                                                                           n.foo(b)",
        void but()?
           System and private (" Involve A. Lard");
    4
                                                                                          System , out . printer (Back In other Bread);
 dan 8%
    synchosized void box (A a) }
                                                                                      public static hald main (shery angl))
         String Name = Thurad . www. Thurad () . gothone();
         systemone private (name + "endered . & tom");
                                                                                           New Dendlader
          419 3
           Thread sup(1000); 4 (atch (Supplion e))
            System out purtly (" & Sherupa");
                                                                                  Rating Thread entered Blen
                                                                                   evainthread trying to call b. bot ();
                                                                                   Inside Alex
           A-GOAL)
 Rocky Throad trying to coul A. Latt ()
  Thuide Alast
  back on other thread.
d-243/12/24
```

### **Code:**

```
class A {
    synchronized void foo(B b) {
        String name = Thread.currentThread().getName();
        System.out.println(name + " entered A.foo");
        try {
            Thread.sleep(1000);
        }
}
```

```
} catch (Exception e) {
       System.out.println("A Interrupted");
     }
     System.out.println(name + " trying to call B.last()");
     b.last();
  }
  void last() {
     System.out.println("Inside A.last");
  }
}
class B {
  synchronized void bar(A a) {
     String name = Thread.currentThread().getName();
     System.out.println(name + " entered B.bar");
     try {
       Thread.sleep(1000);
     } catch (Exception e) {
       System.out.println("B Interrupted");
     }
     System.out.println(name + " trying to call A.last()");
     a.last();
  }
  void last() {
     System.out.println("Inside B.last");
  }
}
class Deadlock implements Runnable {
  A a = new A();
  B b = new B();
  Deadlock() {
     Thread.currentThread().setName("MainThread");
```

```
// Create a new thread and start it
   Thread t = new Thread(this, "RacingThread");
   t.start();
   // Main thread locks object A
   a.foo(b);
   System.out.println("Back in main thread");
 }
 public void run() {
   // Other thread locks object B
   b.bar(a);
   System.out.println("Back in other thread");
 }
 public static void main(String args[]) {
   new Deadlock();
 }
D:\Java>Java Deadlock
MainThread entered A.foo
RacingThread entered B.bar
RacingThread trying to call A.last()
Inside A.last
Back in other thread
```

MainThread trying to call B.last()

Inside B.last

Back in main thread