# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



# Object Oriented Java Programming (23CS3PCOOJ)

on

Submitted by

Ariz Ejaz Khan (1BM23CS051)

in partial fulfillment for the award of the degree of BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



# 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 **Ariz Ejaz Khan (1BM23CS051)**, 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.

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Github Link:

https://github.com/Arizbms/Java\_Lab

Program 1

Implement Quadratic Equation.

Algorithm:

Algorithm:	
C3 - 10 - 2 H	PAGE MA.)
os bevelop a jova program that prints all real solutions to the quadratic equation as +	else if (d>0) & Ouble 41 = (4) + (Math. squf (d)))/(24);
bx+c=0. Read in a,b,c and use the	double 72 = (Fb) - (Math. sqrst (d))) /(2+a);
quadratic formula. It discriminate is negative, display a message stating	System - out . println ("41=" + 41+" "+"42=
that there are no real solutions.	2 takh a Mara
import gava.util. * ?	else & System out printly ("Roots are imaginary");
class quadratic &	39 Tem Dorr paining thosas are imaginary,
double a, b, C;	3
Scanner S = New Scanner (System-In);	System. out. println ("Name: Ariz Egoz Whan USN: 1BM 23 CS OSI");
System. out. print In ("Enter a, b, c=");	2
b = s- next Souble ();	Olp
c= s- next bouble to;	Enter a, b, c=
if (a = -0) (	3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -
System out println ("not avadratic")	2
ehe [	g1 = -1.0, 12=2.0
double d = b*b-4 + a *C;	Name: Ariz Esaz khan USN: 18m23c3081
if (d = =0) {     double 7 = -b/(2*a);	M
System out brint In (" Equal roots, 81=	La Ota toma a stay of the
32 = " + 18);	

# Code:

import java.util.\*;

class quadratic{
public static void main(String args[]){
float a,b,c;
Scanner s=new Scanner(System.in);
System.out.println("Enter a,b,c:");
a=s.nextFloat();
b=s.nextFloat();

```
if(a==0){
System.out.println("Not quadratic");
else{
float d=b*b-4*a*c;
if(d==0){
float r=-b/(2*a);
System.out.println("Equal roots.r1=r2="+r);
else if(d>0){
float r1=((-b)+(Math.sqrt(d)))/(2*a);
float r2=((-b)-(Math.sqrt(d)))/(2*a);
System.out.println("r1="+r1+" "+"r2="+r2);
}
else{
System.out.println("Roots are imaginary");
}
System.out.println("Name:Ariz Ejaz Khan USN:1BM23CS051");
}
 C:\Ariz>javac quadratic.java
 C:\Ariz>java quadratic
  Enter a,b,c:
  1
  3
 r1=-1.0 r2=-2.0
  Name: Ariz Ejaz khan USN: 1BM23CS051
 C:\Ariz>
```

c=s.nextFloat();

```
C:\Ariz>javac quadratic.java

C:\Ariz>java quadratic
Enter a,b,c:
4
-4
1
Equal roots.r1=r2=0.5
Name:Ariz Ejaz khan USN:1BM23CS051

C:\Ariz>
```

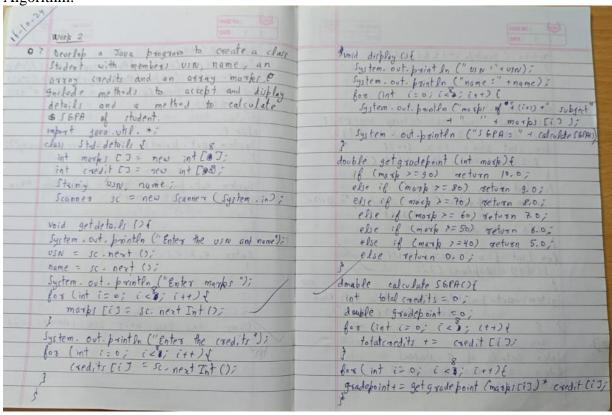
```
C:\Ariz>javac quadratic.java

C:\Ariz>java quadratic
Enter a,b,c:
-1
-10
-30
Roots are imaginary
Name:Ariz Ejaz khan USN:1BM23CS051

C:\Ariz>
```

# Program 2

Implement Student class with display details and SGPA function.



110	PAGE NO	, yes	PAGE NO.	
	1.			
	return (gradepoint / to tol credit);		Asman	
	3		Enter the manks	
	I some the same that the same		65	
	The state of the s		75	
	class student t		86	
	public static void main (Straing args CD) {		Enter the credits	
	Stud - details s 2= new Stud-detail (0)		3	
	for (int 1=0; 1 < 3; 1+1){		3	
	s 1 (1) = new . Stud-details ();		3	
	Jane de la		USN = 18m23 (5001	
	for lint j= 0; 1<3; 1+1)(		name : A sman	
	System - out-println ("Enter details of" (0+1)+		marks of 1 subject 65	
	" student");		marks of 2 subject 75	
	52857. get details Or		marks of 3 subject 85	
	}		SEPA = 8.0 Danises no banks	
	for lint j=0 ; j <3 ; j++){		Отте при	
	1 52 (1) display ();		Name : Adiz Esiz khon UN: 1 Bm 23 (505:	1
	31 (3) r display C/2	100	For 8 subjects	
	1 to a 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Enter details of 2 student	
	System. out. paintln ("Name: Axiz Egas than USN: 18M 23 CS 05 1");		Enter the USN and name	
	0310 21817 23 63 03 177		18m 23 Cf 001	
	3 )	1	Agman	
12	3.8 3 sub4	-/		
	Enter details of 1 student	4	Enter the marks	
	Enter the USN and name	-	60	
	26M23CS001	_	67	
			6 t	

```
56
  38
  5 6
  77
   82
  Enter the conditi
  3
  3
  3
  3
 3
  3
  3
USN : 1 892361001
name = Asman
morps of I subjects
                      60
        2 subject
                     67
morph of 3 subject
                     67
morely of 4 subject
                     56
     of 5 subject
marks of 6 subject
                     56
marks of 7 subject
                     77
moster of & subject
                     82
SEPA 17,25
Name : Arry Esis Whan Usu=18m23cso51
```

```
import java.util.*;
class Stud_details{
int marks[]=new int[8];
int credit[]=new int[8];
String usn,name;
Scanner sc = new Scanner(System.in);

void getdetails(){
    System.out.println("Enter the usn and name");
    usn=sc.next();
    name=sc.next();
    System.out.println("Enter the marks");
    for(int i=0;i<8;i++){
    marks[i]=sc.nextInt();
}</pre>
```

```
System.out.println("Enter the credits");
for(int i=0;i<8;i++)
credit[i]=sc.nextInt();
}
void display(){
System.out.println("usn:"+usn);
System.out.println("name:"+name);
for(int i=0; i<8; i++){
System.out.println("marks of "+(i+1)+" subject"+" "+marks[i]);
System.out.println("SGPA:"+calculateSGPA());
double getgradepoint(int mark){
if(mark>=90) return 10.0;
else if(mark>=80) return 9.0;
else if(mark>=70) return 8.0;
else if(mark>=60) return 7.0;
else if(mark>=50) return 6.0;
else if(mark>=40) return 5.0;
else return 0.0;
double calculateSGPA(){
int totalcredits=0;
double gradepoint=0;
for(int i=0;i<8;i++)
totalcredits+=credit[i];
for(int i=0; i<8; i++){
gradepoint+=getgradepoint(marks[i])*credit[i];
return (gradepoint/totalcredits);
}
class student{
public static void main(String args[]){
Stud_details s1[]=new Stud_details[3];
for(int j=0; j<3; j++){
s1[j]=new Stud_details();
```

```
D:\java>javac student.java
D:\java>java student
Enter details of 1 student
Enter the usn and name
1BM23CS001
Arman
Enter the marks
60
67
67
56
78
56
77
82
Enter the credits
30 00 00 00 00 00
Enter details of 2 student
Enter the usn and name
1BM23CS002
Arya
Enter the marks
86
66
75
67
56
77
90
Enter the credits
```

```
3
3
3
3
3
3
Enter details of 3 student Enter the usn and name 1BM23CS003
Akash Enter the marks
77
88
87
84
56
78
98
92
Enter the credits
3
3
3
3
3
3
usn:1BM23CS001
name:Arman
marks of 1 subject 60
marks of 2 subject 67
marks of 4 subject 56
marks of 5 subject 78
marks of 6 subject 56
marks of 6 subject 56
marks of 7 subject 78
marks of 8 subject 82
SGPA:7.25
```

```
usn:1BM23CS002
name:Arya
marks of 1 subject 87 marks of 2 subject 86
marks of 3 subject 66
marks of 4 subject 75
marks of 5 subject 67
marks of 6 subject 56
marks of 7 subject 77
marks of 8 subject 90
SGPA:8.0
usn:1BM23CS003
name:Akash
marks of 1 subject 77
marks of 2 subject 88
marks of 3 subject 87
marks of 4 subject 84
marks of 5 subject 56
marks of 6 subject 78
marks of 7 subject 98
marks of 8 subject 92
SGPA:8.625
Name: Ariz Ejaz Khan USN: 1BM23CS051
D:\java>
```

Program 3 Implement Book class with set and display details and to String function.

Algorithn	
6,10%	week 3
9/	
97	Create a class Book which contains four
	members: name, author brice, num-bages, Inclu
	a constructor to set the values for
	members. Include methods to set and not the
	details of the objects. Include a tostrinal)
	method that could display complete details
	of the book, Develop a lova brogram to
	create n book objects.
	100
	import java-util-x
	class Book &
	String name;
	String authori
	String int price:
	int nom-pages;
	Book (string name, string outhor, int price, int
	nom-pages) 2
	this name = name;
	this. author = author;
	this. price = price;
31	this. num-pages = num-pages;
	I make the second of the second
BOT	Void setname (String name) [
	this name = name & this was a last
	this author (Strong author) {
	ay me

```
Void setprice (int price) !
       this poice = price i
                                                              System. out println (" Enter details of book "+ (+++++))
     void set num-pages (int num-page) (
                                                             System. out-println (" Enter name, Author, price
      this - nom -pages = nom-bages is
                                                              no of pages respectively")
     String getname (24
                                                              book fix = new book frame, author, brice from spages
        return name; s
                                                              $ String name = se-next ();
    String author = sc. next ();
                                                              Gerong into price = 10. next Int 10;
   int get price () [
                                                              int nom-boges = se next Int ();
         getorn price; I
                                                             book[i] = new Book (name, author, price nom. page).
for Got i=0; ixn; i+1) ( > systemed brate.
         get nom-pages of
         return num-pages; ?
                                                       Lyden cotprintly (book [i]. to String ());
   @ Overside
   public String to String () 6
                                                             Enter no of books:
     return "name: "+ name + ", author : " + author + " price : " + price + ", no of pages = " +
                                                             Enter name author price and no of
               nom-pages i
                                                              each book respectively:
                                                             Enter details of book 2:
Dasis Frank 250 345
 class bookdetaids &
                                                             Enter details of book 2:
  public static void main (String to args) 1
                                                             Highland Nelson 300 200
  Scanner (c = new Scanner (System.in) =
                                                             Book 1
System, out println ("Enter no of books =
                                                             name = Dasis, guthor = Frank, brice = 250, no of bages = 345
int n = sc. next Int ();
Book [] book = new book En];
                                                            name: Highland, author: Nelson, price: 300, no of pages = 200
                                                                                        USN=18m23csos/
                                                             Name: Adia Ejig Khan
```

```
import java.util.*;
class Book{
String name;
String author;
int price;
int num_pages;
Book(String name,String author,int price,int num_pages){
this.name=name;
this.author=author;
this.price=price;
this.num_pages=num_pages;
}
public String toString(){
return "name:"+name+",author:"+author+",price:"+price+",no of pages:"+num_pages;
}
}
class BookDetails{
public static void main(String[] args){
```

```
Scanner sc=new Scanner(System.in);
System.out.println("Enter no of books:");
int n=sc.nextInt();
Book[] book=new Book[n];
System.out.println("Enter name,author,price and no of pages for each book respectively:");
for(int i=0;i<n;i++){
    System.out.println("Enter details of book "+(i+1)+":");
    String name=sc.next();
    String author=sc.next();
    int price=sc.nextInt();
    int num_pages=sc.nextInt();
    book[i]=new Book(name,author,price,num_pages);
}
for(int i=0;i<n;i++){
    System.out.println("Book "+(i+1)+":");
    System.out.println(book[i].toString());
}
}
}</pre>
```

```
E:\ariz\week3>javac BookDetails.java
E:\ariz\week3>java BookDetails
Enter no of books:
Enter name, author, price and no of pages for each book respectively: Enter details of book 1:
Oasis Ariz 234 432
Enter details of book 2:
Hello Aman 432 550
Enter details of book 3:
Rise Rajesh 330 540
Enter details of book 4:
Interest Mahesh 343 543
Enter details of book 5:
LookUp Thomas 230 331
Enter details of book 6:
Forget Ravi 126 320
Book 1:
name:Oasis,author:Ariz,price:234,no of pages:432
name: Hello, author: Aman, price: 432, no of pages: 550
Book 3:
name:Rise,author:Rajesh,price:330,no of pages:540
Book 4:
name:Interest,author:Mahesh,price:343,no of pages:543
Book 5:
name:LookUp,author:Thomas,price:230,no of pages:331
Book 6:
name:Forget,author:Ravi,price:126,no of pages:320
E:\ariz\week3>Name:Ariz Ejaz Khan USN:1BM23CS051
```

Program 4
Implement abstract class Shape.

# Algorithm:

10-2"		THE MALE STATE OF THE PARTY OF
23 7º Week 4	l and a cook	Serge 1
abstrac	t class nomed shape that	class Trangle extends shope f Triangle (int b, int b) f
Contains	I class homed shape that we integers and an empty	toper (b,h);
elasses	named print A see () - Provide Americansed sectongly By Trainingle	Void point trea () 8
Cttele	such that each one of the classes	System-out brintle ("Area of friendle:"+(double)
classes	the class shept. Each one of the contain only the method partitions	(dim 1 + dim 2 12 )); II elass liscle extends Shape f
that by	into the ages of given chapa	Circle (int 8, int d) (
abstract	class Shape 4	super (4,d);
ant dim	closs Shape 6 2. dim 2;	void print Area () 1
dim 2 =	nt a, int b) £	System. out println ("area of circle: "+ (double) (
dim 2 =		3214 * dim 1 * dim 1 )):
abitment	void paid Asea ():	# 5
	The state of the s	public static used main (String 1) args >1
Chass Recta	ngle extends shape f	Icanner se = new Scanner (System in);
Super U	(int le int b) t	system out printle (" Enter length & width of rectinate)
1 -2		int length = ic. next Int (); and breadth = sc. next Int();
Void printA	rec (2)	System - Dut, potentin (" Enter base & height of
(din1* din	brintly ("area of rectangle:" + (dable)	friangle");"  int base = sc. next Int ();
		500 - 3C 1(2) 1/1 ()/
		- 1
	1st height = sc - next	Int (),
	System out brinton (" &	nter sadios of circle");
_	int radios - se mer	to-les length bread th)-
_	Kectangle &= new Ke	ectangle (length, bread th);
	Triangle + = noul loc	iangle cowy neight
I Collin	Circle c= new C	iscle ( tadius, o);
	8. print Area ();	CELEVICANIE PERMANENT
_		I a late of the second second second
	t. print Area ();	
	c. print Area ();	
	5 3	The state of the s
Olb		
	01 1 11 -1	111 00 - 1 - 00 -
		idth of occtangle:
JA Tirtus	0 20	Testaled the restrict
	Enter base and he	ight of triangle:
	10 2 0	
	Enter radios of	-200-
		Cro (xe -
	12	A DESCRIPTION OF STREET
	area of sectangle	: 200.0
	area of triangle	: 100,0
I Sund on the	9400 01 014500	: 467.150000000000000
	06 61.00	13 2 1 3 9 9 9 1 3 7 9 9 9 9 3 5 5 5 5
	1 Ta	100 - 31 - 110 - 110 - 110 - 110
	Name = Aciz Ejaz Kh	am /
30 1	USN = 1BM 23 CS 05)	allated study and of
		Jalous a series and

```
import java.util.*;
abstract class Shape{
int dim1,dim2;
Shape(int a,int b){
dim1=a;
dim2=b;
abstract void printArea();
class Rectangle extends Shape{
Rectangle(int l,int b){
super(l,b);
void printArea(){
System.out.println("area of rectangle:"+(double)(dim1*dim2));
class Triangle extends Shape{
Triangle(int b,int h){
super(b,h);
}
void printArea(){
System.out.println("area of tringle:"+(double)(dim1*dim2/2));
class Circle extends Shape{
Circle(int r,int d){
super(r,d);
void printArea(){
System.out.println("area of circle:"+(double)(3.14*dim1*dim1));
}
class shapearea{
public static void main(String[] args){
Scanner sc=new Scanner(System.in);
System.out.println("Enter length and width of retangle:");
int length=sc.nextInt();
int breadth=sc.nextInt();
System.out.println("Enter base and height of triangle:");
int base=sc.nextInt();
int height=sc.nextInt();
```

```
System.out.println("Enter radius of circle:");
int radius=sc.nextInt();
Rectangle r=new Rectangle(length,breadth);
Triangle t=new Triangle(base,height);
Circle c=new Circle(radius,0);
r.printArea();
t.printArea();
c.printArea();
System.out.println("\nName:Ariz Ejaz Khan USN:1BM23CS051");
}
```

```
E:\ariz\week4>javac shapearea.java
E:\ariz\week4>java shapearea
Enter length and width of retangle:
10 20
Enter base and height of triangle:
10 20
Enter radius of circle:
12
area of rectangle:200.0
area of tringle:100.0
area of circle:314.0
E:\ariz\week4>javac shapearea.java
E:\ariz\week4>java shapearea
Enter length and width of retangle:
10 20
Enter base and height of triangle:
10 20
Enter radius of circle:
12
area of rectangle:200.0
area of tringle:100.0
area of circle: 452.15999999999997
E:\ariz\week4>Name:Ariz Ejaz Khan USN:1BM23CS051
```

Program 5
Implement class Bank, Account, Cur-acct, Sav-acct.

-4	
10/2	FAGE NO.:
30/00	weeks
80	Develop a java program to reate a class
Bank	that maintains two sourings of correct
400	account. The sovings account provides compound
	interest & withdrawal facilities but no cheque
	book facility. The corner account provides
	cheque book facility but with no interest.
	Consent account holder should main also
	maintain a min belance else, a fine is
	Created
	Create a class Account that stores customer
Jupus +	from this, derive the class (ore-act &
19	Sav-arct to make them more specific to
- Charle	their requirements. Include necessary method
	in order to achieve following tasps:
a:	Accept deposit from customers and update
Luliar !	the balance
li .	display balance
THE .	permit withdrowal lupdate balance
V S	thech for min balance, impose panelty
"Halahyad	il necessary by by ato the balance.
-	Clasi Account &
-/	Straing cato chame;
	int accno;

```
void istered () {
       string acctype
       double balance; int
                                                                         double interest : balance 185
       Account ( string c Name , acc No , acc Type
                                                                         bulance + = interest:
           double & in tial beforce )4
                                                                         System out printly ("Interest added = "+ interest)
           chame = c Name i
           actype = acc No;
                                                                    void withdraw (double amount) {
                                                                           if (amount & balance) &
           balance = in tral balance;
                                                                         System out prontln ("Not enough balance")
                                                                          else x
     void depoint (double amount)
                                                                            balance - = amount:
                                                                          System - out - pointln (" Withdrawn : "+ amount)
         if comount > 0) f
               balance + = amount =
          System out printly ("Deposited:");
else System out printle ("Invalid Deposit);
                                                                   Ness Cur Acit (String automations, At aicht,
  void display Balance () [
                                                                                         double initial balance) [
                                                                         final
        System. out printly ("Current balances" + toloral
                                                                    class (ux tect extend) Lecount &
final double minbalance = 50 00.0,
final double service the igs = 50.
class SaveAcct extends Account &
      find double ir = 0.05%
                                                                       Costeet (Itaing Name, int acc No, double
     Jav Acet (String (Name intace No, acctspedosble initial balance) of super (c Name, ace No, "Savings" initial balance)
                                                                                           initialbalance ) {
                                                                           soper (eName, acono, "corrent", inited below)
                                                                       void check Minimum Balance () L
```

```
System. out. paintle ("In Custont Accord :");
ca. deposit (200);
      if (balance < minbalance) f
             balance - = service decognosic harge;
            System - out println ("service charge imposed due " + service charge )
                                                                            ca. withdraw (800)
                                                                             ca - display Balance (1)
                                                                    0/2
    void
            withdraw ( double amount is
            if (am ound > balance) {
                                                                             Savings account =
            System. out println ("Insufficient Edoxe");
                                                                            Deposited = 500.0
                                                                            Interest added : 125:0
            else 4
                                                                            W, thd rawn = 200,0
             balance - = amount
                                                                            ( + sent Balance = 2425, 0
            system - out print In ("Amount withtrawn " "common)
                                                                            Convert account:
                                                                            Deposited = 200-0
                                                                            Service charge imposed = 50
                                                                                        withdrawn & 800-2
                                                                            Amount
                                                                            (virient Balance = 350
public class Bank f
   public Static word main ( I time args [ ] )
    San Acet sa = new Sav Acet ("Agriz", 101, 2000);

Cor Acet ca = new CorrAcet ("Segil", 102, 1000);

System , out sprendly ("Savings Account =");

Saving sa deposit (500);

Sa git Interest ();

Sa withdraw (200);

Sa withdraw (200);
                                                                              Name : Axiz Ejaz Khon
                                                                              UJN: 18M23C5051
```

```
String cname;
  int accno;
  String acctype;
  double balance;
  Account(String cName,int accNo,String accType,double initialbalance){
    cname=cName;
    accno=accNo;
    acctype=accType;
    balance=initialbalance;
  void deposit(double amount){
    if(amount>0){
       balance+=amount;
       System.out.println("Deposited:"+amount);
     }
    else{
       System.out.println("Invalid Deposit");
     }
  void displayBalance(){
    System.out.println("Current Balance:"+balance);
}
class SavAcct extends Account{
  final double ir=0.05;
  SavAcct(String cName,int accNo,double initialbalance){
     super( cName, accNo, "Savings", initialbalance);
  void getInterest(){
    double interest=balance*ir:
    balance+=interest;
    System.out.println("Interest added:"+interest);
  void withdraw(double amount){
    if(amount>balance){
       System.out.println("Not enough balance");
     }
    else{
       balance-=amount;
       System.out.println("Withdrawn:"+amount);
  }
}
class CurAcct extends Account{
  final double minbalance=500.0;
```

```
final double serviceCharge=50.0;
  CurAcct(String cName,int accNo,double initialbalance){
     super( cName, accNo,"Current",initialbalance);
  void checkMinimumBalance(){
    if(balance<minbalance){</pre>
       balance-=serviceCharge;
       System.out.println("Service charge imposed:"+serviceCharge);
     }
  void withdraw(double amount){
    if(amount>balance){
       System.out.println("Insuffecient balance");
     }
    else{
       balance-=amount;
       checkMinimumBalance();
       System.out.println("Amount withdrawn:"+amount);
  }
}
public class Bank{
  public static void main(String args[]){
    SavAcct sa=new SavAcct("Ariz",101,2000);
    CurAcct ca=new CurAcct("Sejil",102,1000);
    System.out.println("Savings account:");
    sa.deposit(500);
    sa.getInterest();;
    sa.withdraw(200);
    sa.displayBalance();
    System.out.println("\nCurrent account:");
    ca.deposit(200);
    ca.withdraw(800);
    ca.displayBalance();
  }
}
```

# D:\java>javac bank.java D:\java>java Bank Savings account: Deposited:500.0 Interest added:125.0 Withdrawn:200.0 Current Balance:2425.0 Current account: Deposited:200.0 Service charge imposed:50.0 Amount withdrawn:800.0 Current Balance:350.0

D:\java> Name:Ariz Ejaz khan USN:1BM23CS051

Program 6
Implement packages CIE and SEE.

15-11-22 Wee p- 6	PART NO.
Or Create a perpege CJF which has two classes - student d internals. The char	public void diffley (19 System out frintles ("USN: "+ you + ", name="
Student has members life us no name son.  The class interbals derived from Student has an array that storm the internel	* name + ", sem = " + sem ),
marked scored in five courses of the	public class Internals ( public int [] images;  public Internals (int [] marks) +
another parkage SPE which has the class External which is a derived class of student. This class has an array	if (marks. length !=5) { Nead System eat frontly !")
courses of the correct semester of student	this imorps = morps:
enfort the two pockerges in a file that declare, the final moreks of a student, in all five courses	poblic void diployimorps () t exit system out pointly ("Respective a morks :").
backage CIE;	System out print (fmork) [i) + ");
public dass Student of public String word us no: bublic String nome;	System out printen ();
public student (String us N String name introm)	water the hadapen to the title and the
this. USN = USN; this. nome = roome; this sem = sem;	package SEE; import CIE. ADD +; bublic class External extend Student &
3	Provide 14813 pare title estimates

acti t		DATE: 1
bublic int [] émures:		public static void main (String E) args ) 2
bublic External (String us in strong name intrent		Scanned Sc= new Scanner Clystem in);
solece ( User tram F. Jens 49		system out position (" how many students: ");
int (J omarks) (		int n = sc-next Int ();
super (usn, name, sem);		External [] stodayts = new External [n];
il (murlet. length != 5.12		Internal C7 newmarks = new Internal [n];
System out printly ("Need 5 marks 1")		for Ont is of ixniit)
The state of the s	THOM	Sitem out println (" Enter usin, nome, sem :")
else f		String usin'= sc. next ();
Smarks = marks;	73.7	Staing none = IC next ().
		int Hairy sem = sc. next int ();
		System out printly ("Enter internals marks :")
public void displays marchs () (		int [] I marks = new int [5]
System. out . p. inten ("Respective SEE morps:");		for 6nt 9=0; 125; 1+1) {
for (int i=0; ics ; i+1){		Imarks [1] = sc. nort Int ()
System out print (smerks [i] + " ")	-	I to the to the total destination
3	- /	system out printly ("Enter external maybes: ")
System, aut-pointly 17;	-	int Imarks C7 = new int [57]
2.3	-	for (int Koo; KKS; K++) ( Emarks [K ] = sc next Int();
		}
Throad 1		new morks [i] = new Internal (I morps).
impost CIE- #; impost CIE. gaterond		sto dents [i] = new External (usin, nome, len,
import IEE - 4 External		Emerky );
import sovo otil +,		1
poblic class Main E		

```
System out printly (" Student retails : In o").
for (int iso; ich; i++)?
                                                    VIN = 2 name = Anizy sem = 7
        sto dends (i) - dupley ():
                                                    Respective CIF marks =
        ranewmorps [i ] . display imorks ();
                                                    44 45 43 46 47
        students (1) duplay emorps (1)
     System aut paintly ("Find marks :"
                                                    Respective SEE marks:
                                                    44 44 36 47 49
Final marks:
      for (int 150, 1 = 5, 3+1) 1 ;
        int final = istnewmorts, Ci2. Imark, [13+1
          stodents [i] · (maxps[3]);
                                                    81 89 79 93 96
       System out- print (" Bedfind + "
                                                    Name - Aria Ejos Khan USN: 18m230/05/
      System. outbrintln ()
 How many students
Enter USW, name sem:
1 Az 3
Entro internal marks;
44 48 43 46 47
Ener esternal morps;
Student details:
```

```
//INTERNAL
```

```
package CIE;
public class Internal{
public int imarks[];
public Internal(int[] marks){
if(marks.length!=5) System.out.println("Need 5 marks!");
else this.imarks=marks;
}
public void displayimarks(){
System.out.println("Respective CIE marks:");
for(int i=0; i<5; i++){
System.out.println(imarks[i]+" ");
System.out.println();
//EXTERNAL
```

package SEE;

```
import CIE.*;
public class External extends Student{
public int[] smarks;
public External(String usn,String name,int sem,int[] marks){
super(usn,name,sem);
if(marks.length!=5) System.out.println("Need 5 marks!");
else this.smarks=marks;
public void displaysmarks(){
System.out.println("Respective SEE marks:");
for(int i=0; i<5; i++){
System.out.println(smarks[i]+" ");
System.out.println();
//STUDENT
package CIE;
public class Student{
public String usn;
public String name;
public int sem;
public Student(String usn,String name,int sem){
this.usn=usn;
this.name=name;
this.sem=sem;
}
public void display(){
System.out.println("USN:"+usn+",name:"+name+",sem:"+sem);
}
//MAIN
import CIE.Student;
import CIE.Internal;
import SEE.External;
import java.util.*;
class MAIN {
  public static void main(String[] args) {
Scanner sc=new Scanner(System.in);
System.out.println("How many students:");
int n=sc.nextInt();
External[] students=new External[n];
```

```
Internal[] newmarks=new Internal[n];
for(int i=0;i< n;i++)
System.out.println("Enter usn,name,sem:");
String usn=sc.next();
String name=sc.next();
int sem=sc.nextInt();
System.out.println("Enter internal marks:");
int[] Imarks=new int[5];
for(int j=0; j<5; j++){
Imarks[j]=sc.nextInt();
System.out.println("Enter external marks:");
int[] Emarks=new int[5];
for(int j=0; j<5; j++){
Emarks[j]=sc.nextInt();
newmarks[i]=new Internal(Imarks);
students[i]=new External(usn,name,sem,Emarks);
System.out.println("Student details:\n:");
for(int i=0; i< n; i++){
students[i].display();
newmarks[i].displayimarks();
students[i].displaysmarks();
System.out.println("Final marks:");
for(int j=0; j<5; j++){
int finalm=newmarks[i].imarks[j]+students[i].smarks[j];
System.out.println(finalm+" ");
System.out.println();
}
}
```

```
D:\Ariz>java MAIN
 How many students:
 Enter usn, name, sem:
 1 Ariz 3
Enter internal marks:
44 45 43 46 47
 Enter external marks:
44 44 36 47 49
 Enter usn, name, sem:
 2 Aman 3
Enter internal marks:
34 34 45 41 40
 Enter external marks:
23 45 43 42 44
 Student details:
 USN:1,name:Ariz,sem:3
Respective CIE marks:
 44
 45
 43
 46
 47
 Respective SEE marks:
 44
 44
 36
 47
 49
 Final marks:
 88
 89
 79
 93
 96
 USN:2,name:Aman,sem:3
Respective CIE marks:
 34
 34
 45
 41
USN:2, name: Aman, sem:3
Respective CIE marks:
34
34
45
41
40
Respective SEE marks:
23
45
43
42
44
Final marks:
57
79
88
83
84
Name-Ariz Ejaz Khan, USN-1BM23CS051
D:\Ariz>
```

Program 7
Implement handling of exceptions in inheritance tree using class Father and class Son.

0>	WAP that demonstrates hardling of exception	
	am max demonstrates northing of the spirity	this - age = age;
	in inheritance stong tree ( reste "	The part of the state of the st
	class can bather & a op child	this age = age;  public int got Age acc
	class son which extends have class	detern age;
	In lathers class implement a constitutor which takes the age and therews the	detern age;
	which takes the age and throws the	TOTAL TOTAL TOTAL TOTAL
	less than o (Ege < p). In son less	class Son Age E extends Exception (
	less than o (8ge <p). class<="" in="" son)="" td=""><td>public SonAge E (String m) of</td></p).>	public SonAge E (String m) of
	implement a contractor that uses both	sober (m);
	bathers & son age & throws	6 6
	an exception if soni age & fathers	soper (m);
	0.90	class Son extends Father 9
	import your util - +;	private int son Age:
	class wrong Aget extends Exception d	public son (int fatherAge, int sonAge)
	public wrong AgeE (String m) &	throw, wrong Age E. son Age E. Y
	(oher (m)	Super Chathertge);
	sopes (m);	if (sonAge > = fether Age ) &
		throw new sondget C'sons age show
	class Father &	be less than fothers age");
- #	private int age:  public Father (int age) the out  wrong Agent	?
	private in age	this. son Age = sontge;
	poblic same (in age) and sol	A Sensige Sensige
	w a ong ha got i	Little int cat contact DE
- 1	1 (age to) f	public int getsonage (19
- 112	threw new Wrong Age ("Waring	2 A SPANGE,
	age");	

public class Father Sere &  problic static void main (string [] args) {  while (trud) {  Scanner se= new Scanner (system in);  System-out println ("Enter Jathers age;");  int fage = sc_next Int();  System out println ("Enter low) age;");  int sage = sc_next Int();  try i  Son son = new son (fage; sage);  fystem out println ("Accepted");  I catch (wrong Age [De)(  System out println [e. get Message());  I catch (son Age e) { System out printly (e.get Message()); }  System, out println ("Reconsidered Enter cle tails  again (Y/n); ");  String input = sc_next ();  if (input equals Ignore case ("n")) {  break;	Enter Jethers Age:  Sy Enter Son's Age: 4  Accepted  Enter details ogain: (YIn)  Y  Enter Jon's Age: 21  Accepted  Enter details again: (YIn)  Enter Jon's Age: 21  Accepted  Enter Jon's Age: 21  Accepted  Enter details again: (YIn)  Enter Jon's age: N6  Son's age should be less than fathers  age  Bnter details again: (YIn)  Name: A siz Ejaz Khan USN: 180723 CSOSI
if (input equal tanoxe case ("n"))	Name: A siz Ejaz Khan USN=18m23CSOSI

```
import java.util.Scanner;
class WrongAgeE extends Exception {
  public WrongAgeE(String m) {
     super(m);
}
class SonAgeE extends Exception {
  public SonAgeE(String m) {
    super(m);
  }
}
class Father {
  private int age;
  public Father(int age) throws WrongAgeE {
    if (age < 0) {
       throw new WrongAgeE("Wrong age");
    this.age = age;
  public int getAge() {
    return age;
  }
}
class Son extends Father {
  private int sonAge;
  public Son(int fatherAge, int sonAge) throws WrongAgeE, SonAgeE {
     super(fatherAge);
    if (sonAge >= fatherAge) {
       throw new SonAgeE("Son's age should be less than father's age");
    this.sonAge = sonAge;
  public int getSonAge() {
    return sonAge;
public class FatherSon{
  public static void main(String[] args) {
    while(true){
       Scanner sc = new Scanner(System.in);
       System.out.println("Enter Father's Age: ");
```

```
int fage = sc.nextInt();
   System.out.print("Enter Son's Age: ");
   int sage = sc.nextInt();
   try {
     Son son = new Son(fage, sage);
     System.out.println("Accepted");
   catch (WrongAgeE e) {
     System.out.println(e.getMessage());
   catch (SonAgeE e) {
     System.out.println(e.getMessage());
   System.out.println("Enter details again:(Y/n)");
   String input = sc.next();
   if (input.equalsIgnoreCase("n")) {
     break;
   }
 }
}
D:\>cd Ariz
D:\Ariz>javac FatherSon.java
D:\Ariz>java FatherSon
Enter Father's Age:
34
Enter Son's Age: 4
Accepted
Enter details again: (Y/n)
Enter Father's Age:
54
Enter Son's Age: 21
Accepted
Enter details again: (Y/n)
Enter Father's Age:
45
Enter Son's Age: 46
Son's age should be less than father's age
Enter details again:(Y/n)
```

D:\Ariz>Name:Ariz Ejaz Khan USN:1BM23CS051

# **Program 8**

Implement two Threads.

Algorithm:

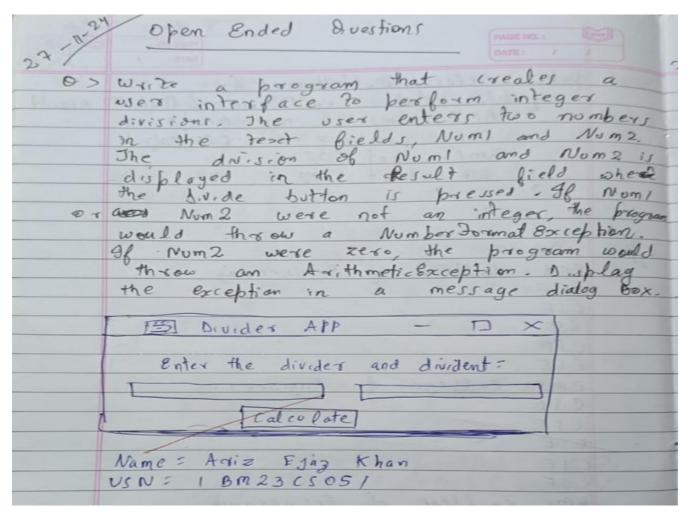
```
week 8 5
with which westers two threads; one thread displaying "BMS college of Engineering" brice every too seconds and another
                                                         public class Multithread of
                                                             public static vaid main ( Stong E) arguld
                                                                BMS bms = new Bms;
display, my
             CSE once every 700 seconds
                                                                CIE ese = new CIE ().
                                                                bms . steef ();
class BMS extends Threed dop of
                                                                cse-stant co;
  public void for Of
      tryt
        while (true) a
           System out printle ("BM) college of
                                                  Olp
                                                         BMS
                                                                          of Engineering
                                                         USE
      ratch (Interrupted Exception e) (]
                                                         ESE
                                                         CJE
                                                         CSE
      CSE extends Thropad (
                                                         BMS College of
                                                                               Engineering
    public void oun of
             while (trup) of
              System. eut. println (" CSE")
                                                        CSE
             Th read . sleep ( 2000);
                                                        CJE
                                                         BMS to blege of
                                                                              Engineering
    catch Conterrupted Exception e ) & S
                                                                                    UIN: 19 m 23 c5 051
                                                         Name: Asiz Ejoz Khan
```

```
D:\ariz2>java Multithread
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
^C
D:\ariz2>Name:Ariz Ejaz Khan USN:1BM23CS051
```

<u>Program 9</u>
Implement the creation of a User Interface for integer divisions with exceptions handling.

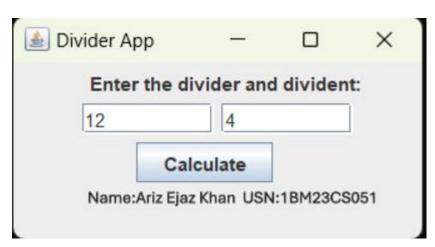
. 24	
11/	
54	week 9,
	Code (VI creation)
	import youar-swing. +;
	impost java. aut. +;
	import jour ent. evert. +;
	class Swing bemod
	Swing Demo Cof
	3 From = new J France ("Sivider App");
	16 rm- set size ( 275,150);
1	I from set layout ( new How Layout ());
"Kina to	If m. set default close Operation ( Strame-EXIT.
3.74	ON- (LOSE)
	Carlot to the second
	JLabel glab = new JLabel (" Enfer divider &
	devedent")-
	JTex + Field ats1 = new Jtext Field (8);
	Jtext Field byth = new Stext Field (8);
	TR 11 1 11 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	J Button button = new JButton ("Calculate")
1	T. 1 A
	Thatel err = new shapell;
- 1	Thobel alab = new J Label ();
	Jeabel blab = new Jeabel ();
	Slabel anslub = new Jlabel ();
	\$ 18-5m. add (c-15);

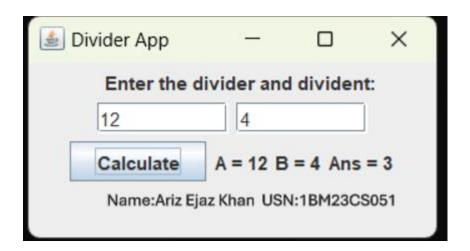
1 frm. add (glah);	blab-set Test ("InB="+b);
If im add (att) i	ansleb - refter f ("In Any = "+ ans.);
1 Rum. add (3/16);	f. A sale
offen - buffon edd (buffon);	Catch ( Number Toymal Exception ) of
of rem add (alab).	alab. set Text ("");
Il am - add (blab);	blab. set Text ("");
If rm. add (anslob);	implab- jet Text ("+);
The thirty that the well-	ear set Text ("Enter Integers only 1")
ActionListener I = new ActionListener () {	3 I was a second of advantage of the
be blic used action Performed ( Action Event ext)	catch (Asithmetic & Scroption e) Y
System out printly then event from a	alab. set Text ("");
text field"?;	bleb. set Text ("");
the state of the s	ans Rab-set Test ("")-
3 7	ex. set Text (" & should be NON zero! ");
agth - add Action Listener (I);	The state of the s
biff, add to tion Listener (I);	15.
	3);
botton- add Action Listener Cnew Action Listener CIC	10 11 11 CI N
bublic roid action Performed (Action Event ent)	I form set Visible (true);
try	public static roid main (strong orgs 19)4
int a = Integer pare Int (agtl-get Text ())	swing Utilities. invoke Later Crew Rusnable Of
int b = Integer - parvedit (byth. get Text ());	public void for CIY
int any = a/b;	new Swing Demo ()
1.60	100
adab-setText ("InA = "+ a);	12

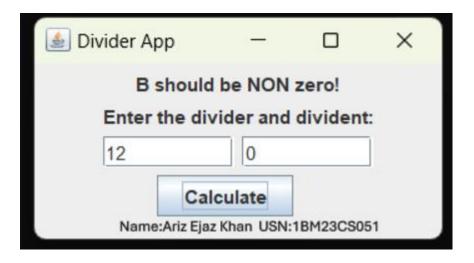


```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
class SwingDemo{
SwingDemo(){
// create iframe container
JFrame jfrm = new JFrame("Divider App");
jfrm.setSize(275, 150);
ifrm.setLayout(new FlowLayout());
// to terminate on close
jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
// text label
JLabel jlab = new JLabel("Enter the divider and divident:");
// add text field for both numbers
JTextField aitf = new JTextField(8):
JTextField bitf = new JTextField(8);
// calc button
JButton button = new JButton("Calculate");
// labels
JLabel err = new JLabel();
JLabel alab = new JLabel();
JLabel blab = new JLabel();
JLabel anslab = new JLabel();
// add in order :)
jfrm.add(err); // to display error bois
ifrm.add(ilab);
ifrm.add(ajtf);
ifrm.add(bitf);
ifrm.add(button);
ifrm.add(alab);
jfrm.add(blab);
ifrm.add(anslab);
ActionListener l = new ActionListener() {
public void actionPerformed(ActionEvent evt) {
System.out.println("Action event from a text field");
};
ajtf.addActionListener(l);
bjtf.addActionListener(l);
button.addActionListener(new ActionListener() {
public void actionPerformed(ActionEvent evt) {
try{
int a = Integer.parseInt(ajtf.getText());
int b = Integer.parseInt(bjtf.getText());
```

```
int ans = a/b;
alab.setText("\nA = " + a);
blab.setText("\nB = " + b);
anslab.setText("\nAns = "+ ans);
catch(NumberFormatException e){
alab.setText("");
blab.setText("");
anslab.setText("");
err.setText("Enter Only Integers!");
catch(ArithmeticException e){
alab.setText("");
blab.setText("");
anslab.setText("");
err.setText("B should be NON zero!");
});
// display frame
jfrm.setVisible(true);
public static void main(String args[]){
// create frame on event dispatching thread
SwingUtilities.invokeLater(new Runnable(){
public void run(){
new SwingDemo();
});
```







Program 10
Demonstrate IPC and Deadlock.

Algorithm:

Aigorumii:	
22.11.224 Comments of the comm	10 10 10 10 10 10 10 10 10 10 10 10 10 1
TPC tode	notify ():
int n; boolers valueset= fidse;	class freducer suplements Reproble 1  By 9; Producer (By 1) 1
synchron and int get () ( while (: value Set)  try (	this, q = 0; new Ihread (othis, "Producer"). stort();
System-out printly ("In Consumer waiting In"); wait ()	public void you cr f
Jetch (InterreptedException e) + Jystem out-printle ("InterreptedException cought"); 30 System alpendin ("InterreptedException cought");	while e iz 15){ q. but (iee)i
Spectrosized bed bot (int n) & Reduceron to the pot (int n) & notify (); while (valueset)	class Consumer implements Runnoble &
Try & System, out fruith ("In Readuces washing ("")	(onjumer (o, 4) ( #(1, 9 = 4)
System ext printly ("Interrepted Exception e) ( System ext printly ("Interrepted Exception cought "):	new Thread (this, "(onjumer". start ();  boblic word for Oil
this h = n;	int i=0; while (2<15) (
udue (et = tare;  green, out println (" Pot = "+n);	system out printly ("consumed:"+1);
System out println ("In Intiade Commer In")	737

PAGE NO. 1	AND NATE OF THE PARTY OF THE PA
class PCFxed {	Deadlork ' (ode
public static veid main (String args [7]) f	class A &
O q = new & t?;	synchronized void foo (B b) l
new Producer (6);	Storing name = Thread- correct Thread- get Name ();
new Consumer (4);	System. out-printly Chame + "entered Afor");
System out println ("Press Control - C to stape")	forg &
101	Thread-sleep (1000);
	Scatch (Exception e) (
And the second section of the second	System-out println ("A Interrupted");
	1 2 2 2 2 2
Maria Mala	System. out, printly (name + "trying to coll B-last()")
	blost () i
	San Daniel as have it bear in the water
The state of the s	void last O C
	system. out-println ("Inside A last")
10 x 3) x = 100	13
	- In the past of first of the sales
THE RESERVE OF THE PARTY OF THE	class Be
	synchronized usid box (A a) d
- Paris in the state of the sta	Strong name = Thread, content Through (). got Name ();
	System out printly (name + "entered B. bar");
	try t
The second secon	Thread. sleep (1000);
the Marie Waller of the Control of t	trath (Cristien e)4
	System - out-println ("B Interrupted"); J

```
System - out- println (nome + "taying to call
Alast ()");
a-last ();
void last Of
System out printly (" Inside A lost")
Class Deadlock implements Ronnoble 5
 A a = new A O;
  3 b = new B D;
 Deadlock () 1
   Threed. clorend Thread set Nome ("main Threat );
  Thread + = new Thread (this, "Reing Thread");
  t-start ();
  a.foo (b);
  system out printly ("Back in main thread");
public void you () 1
6. bar (a);
  system out println ("Back in other Thread")
 public static roid main (String asgs [ 2)
  new Deadlock ();
```

32/1/24			
3/			
50	bemonstrate diter process Comm	unication	and
	dead lock		
	Interpreses commenter		
DP	Deadlock	1 110	
	Racing Thread entered B. bar		
	MainThread entered Afres		
	Mainthreal Typing to call	B. Sasta	
	Racing Threed trying to call	A-last	()
	Inside A. last		
	Back in other thread		
	Inside Alast		
	Book in main thread		
	Name: Age Ejas Khan Us Nº 181	23 CS 0 5	1
	Interprecess communication		
2/6	The second second		
The same of	Press control- C to stop		
	Pot = 0		
	Antimate consumer		
	Produces waiting		
	Apr 10		
	Intende producer		
	Pet : 1	4410	
	dofinate tomo mer		
	freducer waiting		
	Consumed to		

1 6 5 1	and the second second
Intimate Produce	7
consomed = 1	
Pot = 2	and the state of t
Intimate consume	Alexander de la constitución y a la constituci
Produces waitin	
90+ = 2	
Intimate Produce	
Consomed: 2	This is a storied
Pot = 3	house they died through
Intimate consu	mer the state of t
The state of the s	it amo a time
Produced woiter	og word sales sales amad i
get 53	the and the same shall
Intimate Product	7
(onsumed = 3  Put = 4	A THE LAND
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Name = Aziz Ejūz	Khan USN = 1BM23 CS 051

```
Code:
(IPC)
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 {
Qq;
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++;
}
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>javac PCFixed.java D:\java>java PCFixed Press Control-C to stop. Put: 0 Intimate Consumer Producer waiting Intimate Producer Intimate Consumer Producer waiting consumed:0 Got: 1 Intimate Producer consumed:1 Put: 2 Intimate Consumer Producer waiting Intimate Producer consumed:2 Put: 3 Intimate Consumer Producer waiting Got: 3 Intimate Producer consumed:3 Put: 4 Intimate Consumer Producer waiting

Producer waiting

Intimate Producer consumed:4 Put: 5 Intimate Consumer

Intimate Producer consumed:5 Put: 6

Intimate Consumer

Producer waiting

Got: 6

Intimate Producer

consumed:6 Put: 7

Intimate Consumer

Producer waiting

Preducer waiting Intimate Producer consumed:7 Put: 8 Intimate Consumer Intimate Producer consumed:8 Put: 9 Intimate Consumer Preducer waiting Intimate Producer consumed:9 Put: 10 Intimate Consumer Preducer waiting Got: 10 Intimate Producer consumed:10 Put: 11 Intimate Consumer Preducer waiting Intimate Producer consumed:11 Put: 12 Intimate Consumer Preducer waiting Intimate Producer consumed:12 Put: 13 Intimate Consumer Preducer waiting Intimate Producer consumed:13 Put: 14 Intimate Consumer Intimate Producer D:\java>Name:Ariz Ejaz Khan USN:18M23CS051

```
(Deadlock)
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 A.last");
class Deadlock implements Runnable
A a = new A();
B b = new B();
Deadlock() {
Thread.currentThread().setName("MainThread");
Thread t = new Thread(this, "RacingThread");
t.start();
a.foo(b);
System.out.println("Back in main thread");
public void run() {
b.bar(a);
System.out.println("Back in other thread");
}
```

```
public static void main(String args[]) {
new Deadlock();
}
```

```
D:\java>javac Deadlock.java

D:\java>java Deadlock
RacingThread entered B.bar
MainThread entered A.foo
MainThread trying to call B.last()
Inside A.last
Back in main thread
RacingThread trying to call A.last()
Inside A.last
Back in other thread

D:\java>Name:Ariz Ejaz Khan USN:1BM23CS051
```