Graphic Era HILL UNIVERSITY

Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)

Term Work

On

Java Programming Language

(PCS 408)

Submitted to:

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GRAPHIC ERA HILL UNIVERSITY, DEHRADUN

Graphic Era HILL UNIVERSITY

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2	Write a Java Program to demonstrate the working of a banking-system **Instance variables:** name, account_no, amount **Instance methods:** deposit(), withdraw(), checkBalance(), insert() and display(). Here we can deposit and withdraw amount from our account using deposit() and withdraw() methods respectively. The insert() method is to initialize state and display() method is to display state values.	
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11	Create a class “Shape” having area() method to calculate area. Overload the area() method for shapes like triangle, rectangle and circle.	
12	Create a class “Bank” having method getRateOfInterest(). Create child classes as HDFC, SBI and PNB and override getRateOfInterest() and return interest rates as 4.0, 4.5 and 5% correspondingly. **Use concept of Upcasting to implement this scenario.**	
13	Create a package pack1 having one class C1 and one interface I1. Class C1 has two methods int sum(int, int) and int sub(int, int). The I1 has one method int division(int, int). Create another package pack2 having class C2. Reuse C1 and I1 in C2 and show the results. **Note: Use appropriate Access Modifiers as required.**	
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17	Write a program that reads from a text file char by char and writes in some another file. Write this program in an efficient way	
18	Write a program that reads from a text file line by line and writes on console.	

19	Write a program that take your name from keyboard and writes in some text file.	
20	Write a multithreaded program where three threads are there and printing the numbers from 1 to 10 concurrently.	
21	Write a program to set and get the name of threads also set and get the priority of threads.	
22	Write a class Display having void wish(String name) methods that wishes hello to given string name. Between printing hello and provided string name apply delay of 500 milliseconds. Suppose multiple threads are there and they are trying to access this wish() method concurrently on same object then irregular output will be there. Write this application in such a way so that output becomes regular.	
23	Write a class Display having synchronized void wish(String) methods that wishes hello to given string name. Between printing hello and provided string name apply delay of 500 milliseconds. Suppose multiple threads are there and they are trying to access this wish() method concurrently on different objects then irregular output will be there, Write this application in such a way so that output becomes regular.	
24	Write a class Customer having balance as a property and void withdrawal(int amount), and void deposit(int amount) as instance methods. There are two threads, the first thread wants to withdrawal some amount and second thread wants to deposit some amount. Apply inter thread communication where, if withdrawal amount is higher than current balance then first thread will wait for second thread to deposit then resume the withdrawal.	

25	Create a GUI for student's information system. A GUI that asks all the relevant information's related to a student	
26	Create a canvas having smiley face.	
27	Write a JFrame having three textfields. The first two textfields refers to two numbers on which sum or subtraction will happen. The third textfield will show the result. There are two buttons "SUM" and "SUBTRACTION". Once user will click on sum or subtraction buttons then the corresponding result will be displayed in result field.	
28	Write a Java program that interacts with database .	

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DEPARTMENT OF CSE
STUDENT LAB REPORT SHEET

Photograph
Passport Size

Name of Student ..... Mob. No .....

Address Permanent .....

Father's Name ..... Occupation ..... Mob. No .....

Mother's Name ..... Occupation ..... Mob. No .....

Section ..... Branch ..... Semester ..... Class Roll No ..... Grade A B C

Local Address ..... Email ..... Marks 5 3 1

S.No.	Practical	D.O.P.	Date of Submission	Grade (Viva)	Grade (Report File)	Total Marks (out of 10)	Student's Signature	Teacher's Signature
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Name : Vipul Chauhan Roll Number: 62 Section: A

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PRACTICAL 1

Question: 1 - Create a class "Student" having following instance variables and methods.
Instance variables: ID, Name, Branch and university
Method: setDetails() and showDetails().
The setDetails() method sets the values of ID, Name, Branch and University.
And showDetails() method shows the value of each field.

Source Code:

```
import java.util.*;
public class Student
{
	String Name,Branch,University;
	int Id;
	void setDetails(String Name,int Id,String University,String Branch)
	{
		this.Name=Name;
		this.Id=Id;
		this.University=University;
		this.Branch=Branch;
	}
	void showDetails()
	{
		System.out.println();
		System.out.println();
		System.out.println("Name : "+Name);
		System.out.println("Student Id :"+Id);
		System.out.println("Branch : "+Branch);
		System.out.println("University : "+University);
	}
	public static void main(String args[])
	{
		String Name,Branch,University;
		int Id;
		Scanner in=new Scanner(System.in);

		System.out.print("Enter the Student Id : ");
		Id=in.nextInt();
```

```
            in.nextLine();

            System.out.print("Enter the University name : ");
            University=in.nextLine();

            System.out.print("Enter the name of the student: ");
            Name=in.nextLine();

            System.out.print("Enter the Branch : ");
            Branch=in.nextLine();


            Student a=new Student();
            a.setDetails(Name,Id,University,Branch);
            a.showDetails();
        }
}
```

OUTPUT : -

Question-01 — -zsh — 88×24
Last login: Thu Apr 14 08:41:04 on console
vipulchauhan@Vipuls-MacBook Question-01 % javac Student.java
vipulchauhan@Vipuls-MacBook Question-01 % java Student
Enter the Student Id : 20011016
Enter the University name : Graphic Era Hill University
Enter the name of the student: Vipul Chauhan
Enter the Branch : B.tech(CSE)
Name : Vipul Chauhan
Student Id :20011016
Branch : B.tech(CSE)
University : Graphic Era Hill University
vipulchauhan@Vipuls-MacBook Question-01 %

Question: 2 - Write a Java Program to demonstrate the working of a banking-system

Instance variables: name, account_no, amount

Instance methods: deposit(), withdraw(), checkBalance(), insert() and display().

Here we can deposit and withdraw amount from our account using deposit() and withdraw() methods respectively.

The insert() method is to initialize state and display() method is to display state values.

Source Code:

```
import java.util.*;
public class Account
{
	int account_no;
	String name;
	float amount;
	void insert(int account_no,String name,float amount)
	{
		this.account_no=account_no;
		this.name=name;
		this.amount=amount;
	}
	void withdraw(float amount)
	{
		if(this.amount<amount)
		{
			System.out.println("Insufficient balance.");
		}
		else
		{
			this.amount-=amount;
			System.out.println("New balance = "+this.amount);
		}
	}
	void deposit(float amount)
	{
		this.amount+=amount;
	}
	void display()
	{
```

```
            System.out.println("Account Number = "+account_no);
            System.out.println("Name = "+name);
            System.out.println("Amount = "+amount);
        }
        void checkBalance()
        {
            System.out.println("Balance = "+this.amount);

        }
        public static void main(String args[])
        {
            Scanner in=new Scanner(System.in);
            int account_no;
            String name;
            float amount,amount2;
            System.out.print("Enter the account number : ");
            account_no=in.nextInt();
            in.nextLine();

            System.out.print("Enter the name of the person : ");
            name=in.nextLine();

            System.out.print("Enter the amount in the bank : ");
            amount=in.nextFloat();

            Account a=new Account();
            a.insert(account_no,name,amount);

            System.out.print("Enter the amount you want to withdraw : ");
            amount2=in.nextFloat();

            a.withdraw(amount2);

            System.out.print("Enter the amount you want to deposit in the bank : ");
            amount2=in.nextFloat();
            a.deposit(amount2);

            a.checkBalance();
            a.display();
        }
}
```

OUTPUT -

```
Question-02 — -zsh — 88×24
Last login: Fri Apr 15 11:55:15 on ttys000
vipulchauhan@Vipuls-MacBook Question-02 % javac Account.java
vipulchauhan@Vipuls-MacBook Question-02 % java Account
Enter the account number : 20011016
Enter the name of the person : Vipul Chauhan
Enter the amount in the bank : 2000
Enter the amount you want to withdraw : 100
New balance = 1900.0
Enter the amount you want to deposit in the bank : 200
Balance = 2100.0
Account Number = 20011016
Name = Vipul Chauhan
Amount = 2100.0
vipulchauhan@Vipuls-MacBook Question-02 %
```

Question: 3 - Write a program to sum two numbers. Here inputs are provided through command line argument.

Source Code:

```
import java.util.*;
public class Sum
{
	public static void main(String args[])
	{
		int a=Integer.parseInt(args[0]);
		int b=Integer.parseInt(args[1]);
		System.out.println(a+" + "+b+" = "+(a+b));
	}
}
```

OUTPUT -

Question-03 — -zsh — 80×24
Last login: Fri Apr 15 12:01:17 on ttys000
vipulchauhan@Vipuls-MacBook Question-03 % javac Sum.java
vipulchauhan@Vipuls-MacBook Question-03 % java Sum 14 15
14 + 15 = 29
vipulchauhan@Vipuls-MacBook Question-03 %

Question: 4 - Create class Employee with following attributes and methods ID, name, department and salary.
The setDetails() method sets the values of ID, name, department and salary.
And showDetails() method shows the value of each field.
Note: (i) Values must be entered through Scanner class.
(ii) Use proper constructor
(iii) Use "this" reference variable to avoid ambiguity.

Source Code:

```
import java.util.*;
public class Employee
{
	int ID;
	String name,department;
	double salary;
	Employee()
	{
		ID=0;
		name="";
		department="";
		salary=0;
	}
	void setDetails(int ID,String name,String department,double salary)
	{
		this.ID=ID;
		this.name=name;
		this.department=department;
		this.salary=salary;
	}
	void showDetails()
	{
		System.out.println("ID : "+ID);
		System.out.println("Name : "+name);
		System.out.println("Department : "+department);
		System.out.println("Salary : "+salary);
	}
```

```
    public static void main(String args[])
    {
        Scanner in=new Scanner(System.in);
        int ID;
        String name,department;
        double salary;
        System.out.print("Enter the name of the employee : ");
        name=in.nextLine();
        System.out.print("Enter the id of the employee : ");
        ID=in.nextInt();
        in.nextLine();
        System.out.print("Enter the department of the employee : ");
        department=in.nextLine();
        System.out.print("Enter the salary of the employee : ");
        salary=in.nextDouble();

        Employee a=new Employee();
        a.setDetails(ID,name,department,salary);
        a.showDetails();
    }
}
```

OUTPUT -

Question-04 — -zsh — 80×24
Last login: Fri Apr 15 12:01:56 on ttys000
vipulchauhan@Vipuls-MacBook Question-04 % javac Employee.java
vipulchauhan@Vipuls-MacBook Question-04 % java Employee
Enter the name of the employee : Vipul Chauhan
Enter the id of the employee : 20011016
Enter the department of the employee : Computer Science
Enter the salary of the employee : 200000
ID : 20011016
Name : Vipul Chauhan
Department : Computer Science
Salary : 200000.0
vipulchauhan@Vipuls-MacBook Question-04 %

Question: 5 - Re-write program 1 with better memory management approach.
Note: use of static keyword

Source Code:

```
import java.util.*;
public class Student
{
        String Name,Branch;
        int Id;
        static String University;
        Student()
        {
        }
        Student(String University)
        {
                this.University=University;
        }
        void setDetails(String Name,int Id,String Branch)
        {
                this.Name=Name;
                this.Id=Id;
                this.Branch=Branch;
        }
        void showDetails()
        {
                System.out.println();
                System.out.println();
                System.out.println("Name : "+Name);
                System.out.println("Student Id :"+Id);
                System.out.println("Branch : "+Branch);
                System.out.println("University : "+University);
        }
        public static void main(String args[])
        {
                String Name,Branch,University;
                int Id;
```

```
        Scanner in=new Scanner(System.in);

        System.out.print("Enter the Student Id : ");
        Id=in.nextInt();
        in.nextLine();

        System.out.print("Enter the University name : ");
        University=in.nextLine();

        System.out.print("Enter the name of the student: ");
        Name=in.nextLine();

        System.out.print("Enter the Branch : ");
        Branch=in.nextLine();


        Student a=new Student(University);
        a.setDetails(Name,Id,Branch);
        a.showDetails();

        Student b=new Student();
        b.setDetails(Name,Id,Branch);
        b.showDetails();
    }
}
```

OUTPUT –

```
Question-05 — -zsh — 80×24
Last login: Fri Apr 15 12:02:32 on ttys000
vipulchauhan@Vipuls-MacBook Question-05 % javac Student.java
vipulchauhan@Vipuls-MacBook Question-05 % java Student
Enter the Student Id : 20011016
Enter the University name : Graphic Era Hill University
Enter the name of the student: Vipul Chauhan
Enter the Branch : B.tech(CSE)


Name : Vipul Chauhan
Student Id :20011016
Branch : B.tech(CSE)
University : Graphic Era Hill University


Name : Vipul Chauhan
Student Id :20011016
Branch : B.tech(CSE)
University : Graphic Era Hill University
vipulchauhan@Vipuls-MacBook Question-05 %
```

Question: 6 - Apply following functions on the String "Java".
(i) Try to concat "Welcome" and write down your observation.
(ii) Find character at index 1
(iii) Find index of first 'a'.
(iv) Find index of second 'a'
(v) Compare "Java" to "JAVA"
(vi) Compare "Java" to "JAVA" ignoring the case
(vii) Find the index of first 'a' from last

Source Code:

```
import java.util.*;
public class StringLiterals
{
        public static void main(String args[])
        {
                String s1="Java";
                String s2="JAVA";
        //(i) Try to concat "Welcome" and write down your observation.
                 System.out.println(s1.concat(" Welcome"));        //Java Welcome
                System.out.println(s1);                             //Java
       /* The string s1 does not get changed, even though it is invoking the
method concat(),as it is immutable.
       It only creates another copy of s1 and concat on it and once it it done the
copy it deleted by the java garbage collector*/

        //(ii) Find character at index 1
                System.out.println(s1.charAt(1));
        //character at index 1 is 'a'

        //(iii) Find index of first 'a'.
                System.out.println(s1.indexOf('a'));              //index of first 'a' = 1

        //(iv) Find index of second 'a'
                System.out.println(s1.indexOf('a',s1.indexOf('a')+1));
        //index of second 'a' = 3

        //(v) Compare "Java" to "JAVA"
```

```
            System.out.println(s1.equals(s2));                    //false

        //(vi) Compare "Java" to "JAVA" ignoring the case
            System.out.println(s1.equalsIgnoreCase(s2));          //true

        //(vii) Find the index of first 'a' from last
            System.out.println(s1.lastIndexOf('a'));
       //index of first 'a' from last = 3
        }
}
```

OUTPUT -

Question-06 — -zsh — 80×24
Last login: Fri Apr 15 12:05:03 on ttys000
vipulchauhan@Vipuls-MacBook Question-06 % javac StringLiterals.java
vipulchauhan@Vipuls-MacBook Question-06 % java StringLiterals
Java Welcome
Java
a
1
3
false
true
3
vipulchauhan@Vipuls-MacBook Question-06 %

Question: 7 - Apply following functions on StringBuffer object "HELLO"
(i) Append "Java"
(ii) Insert "Java" at index 1
(iii) Replace with "Java" with characters between index 1 to 2
(iv) Delete characters between index 1 and 2
(v) Reverse the string "HELLO"

Source Code:

```
import java.util.*;
public class StringBuff
{
        public static void main(String args[])
        {
                StringBuffer s=new StringBuffer("HELLO ");
                 StringBuffer s1=new StringBuffer("HELLO");

      //(i) Append "Java"
              s.append("Java");                          //HELLO Java
               System.out.println(s);

      //(ii) Insert "Java" at index 1
              s.insert(1,"Java");                         //HJavaELLO Java
              System.out.println(s);

      //(iii) Replace with "Java" with characters between index 1 to 2
              s.replace(1,2,"Java");                     //HJavaavaELLO Java
              System.out.println(s);

      //(iv) Delete characters between index 1 and 2
              s.delete(1,2);                             //HavaavaELLO Java
              System.out.println(s);

      //(v) Reverse the string "HELLO"
              s1.reverse();                              //OLLEH
              System.out.println(s1);
        }
}
```

OUTPUT –

Question-07 — -zsh — 80×24
Last login: Fri Apr 15 12:06:30 on ttys000
vipulchauhan@Vipuls-MacBook Question-07 % javac StringBuff.java
vipulchauhan@Vipuls-MacBook Question-07 % java StringBuff
HELLO Java
HJavaELLO Java
HJavaavaELLO Java
HavaavaELLO Java
OLLEH
vipulchauhan@Vipuls-MacBook Question-07 %

Question: 8 - Create a class "Student" having following instance variables and methods.
Instance variables: ID, Name, Branch, city and university
While creating constructors with one, two, three, four and five arguments reuse the constructors by **construction chaining**

Source Code:

```
import java.util.*;
public class Student
{
   int ID;
   String Name,Branch,city,university;
   Student(int ID)
   {
      this.ID=ID;
   }
   Student(int ID,String Name)
   {
      this(ID);
      this.Name=Name;
   }
   Student(int ID,String Name,String Branch)
   {
      this(ID,Name);
      this.Branch=Branch;
   }
   Student(int ID,String Name,String Branch,String city)
   {
      this(ID,Name,Branch);
      this.city=city;
   }
   Student(int ID,String Name,String Branch,String city,String university)
   {
      this(ID,Name,Branch,city);
      this.university=university;
   }
   void show()
```

```
    {
        System.out.println("ID : "+ID);
        System.out.println("Name : "+Name);
        System.out.println("Branch : "+Branch);
        System.out.println("City : "+city);
        System.out.println("University : "+university);
    }
    public static void main(String args[])
    {
        Scanner in=new Scanner(System.in);
        int ID;
        String Name,Branch,city,university;
        System.out.print("Enter the ID of the Student : ");
        ID=in.nextInt();
        in.nextLine();
        System.out.print("Enter the Name of the Student : ");
        Name=in.nextLine();
        System.out.print("Enter the Branch of the Student : ");
        Branch=in.nextLine();
        System.out.print("Enter the City of the Student : ");
        city=in.nextLine();
        System.out.print("Enter the University of the Student : ");
        university=in.nextLine();
        Student a=new Student(ID, Name, Branch, city, university);
        a.show();
    }
}
```

OUTPUT –

Question-08 — -zsh — 80×24
Last login: Fri Apr 15 12:07:30 on ttys000
vipulchauhan@Vipuls-MacBook Question-08 % javac Student.java
vipulchauhan@Vipuls-MacBook Question-08 % java Student
Enter the ID of the Student : 20011016
Enter the Name of the Student : Vipul Chauhan
Enter the Branch of the Student : B.tech(CSE)
Enter the City of the Student : Dehradun
Enter the University of the Student : Graphic Era Hill University
ID : 20011016
Name : Vipul Chauhan
Branch : B.tech(CSE)
City : Dehradun
University : Graphic Era Hill University
vipulchauhan@Vipuls-MacBook Question-08 %

Question: 9 - Create two dimensional integer array and insert, search and traverse this array.
Note: Use Scanner class to insert data.

Source Code:

```
import java.util.*;
public class Array
{
	public static void main(String args[])
	{
		Scanner in=new Scanner(System.in);
		int n,m,find,count=0;
		System.out.print("Enter the number of rows in an array : ");
		n=in.nextInt();
		System.out.print("Enter the number of columns in an array : ");
		m=in.nextInt();
		int arr[][]=new int[n][m];
		System.out.println("Enter "+(n*m)+" elements of an array :");
		for(int i=0;i<arr.length;i++)
		{
			for(int j=0;j<arr[i].length;j++)
			{
				arr[i][j]=in.nextInt();
			}
		}
		System.out.print("Enter the element you want to find in  array: ");
		find=in.nextInt();
		for(int i=0;i<arr.length;i++)
		{
			for(int j=0;j<arr[i].length;j++)
			{
				if(arr[i][j]==find)
				{
					count=1;
				}
```

```
                }
            }
            if(count==0)
            {
                System.out.println("Element not found.");
            }
            else
            {
                System.out.println("Element found.");
            }
            System.out.println("The array is : ");
            for(int i=0;i<arr.length;i++)
            {
                for(int j=0;j<arr[i].length;j++)
                {
                    System.out.print(arr[i][j]+" ");
                }
                System.out.println();
            }
        }
}
```

OUTPUT -

Question-09 — -zsh — 80×24
Last login: Fri Apr 15 12:08:09 on ttys000
vipulchauhan@Vipuls-MacBook Question-09 % javac Array.java
vipulchauhan@Vipuls-MacBook Question-09 % java Array
Enter the number of rows in an array : 3
Enter the number of columns in an array : 3
Enter 9 elements of an array :
1 2 3
4 5 6
7 8 9
Enter the element you want to find in an array : 7
Element found.
The array is :
1 2 3
4 5 6
7 8 9
vipulchauhan@Vipuls-MacBook Question-09 %

Question: 10 - Create a jagged array having three rows. Where 1st row contains 3 columns, 2nd row contains 4 columns and 3rd row contains 2 columns. Insert and traverse it.

Source Code:

```
import java.util.*;
public class JaggedArray
{
	public static void main(String args[])
	{
		Scanner in=new Scanner(System.in);
		int n,m;
		System.out.print("Enter the number of rows in an array : ");
		n=in.nextInt();
		int arr[][]=new int[n][];
		for(int i=0;i<arr.length;i++)
		{
			System.out.print("Enter the number of columns in row
"+(i+1)+" :");
			m=in.nextInt();
			arr[i]=new int[m];
			System.out.print("Enter "+m+" elements in row "+(i+1)+" :");
			for(int j=0;j<arr[i].length;j++)
			{
				arr[i][j]=in.nextInt();
			}
		}
		System.out.println("The array is : ");
		for(int i=0;i<arr.length;i++)
		{
			for(int j=0;j<arr[i].length;j++)
			{
				System.out.print(arr[i][j]+" ");
			}
			System.out.println();
		}
	}
}
```

OUTPUT –

Question-10 — -zsh — 80×24
Last login: Fri Apr 15 12:09:53 on ttys000
vipulchauhan@Vipuls-MacBook Question-10 % javac JaggedArray.java
vipulchauhan@Vipuls-MacBook Question-10 % java JaggedArray
Enter the number of rows in an array : 3
Enter the number of columns in row 1 :3
Enter 3 elements in row 1 :1 2 3
Enter the number of columns in row 2 :4
Enter 4 elements in row 2 :4 5 6 7
Enter the number of columns in row 3 :2
Enter 2 elements in row 3 :8 9
The array is :
1 2 3
4 5 6 7
8 9
vipulchauhan@Vipuls-MacBook Question-10 %

Question: 11 - Create a class "Shape" having area() method to calculate area. Overload the area() method for shapes like triangle, rectangle and circle.

Source Code:

```
import java.util.*;
public class Shape
{
	int Area(int x) //square
	{
		return x*x;
	}
	double Area(int x,int y,int z) //triangle
	{
		int s=(x+y+z)/2;
		return Math.sqrt(s*(s-x)*(s-y)*(s-z));
	}
	double Area(double x,double y)//rectangle
	{
		return x*y;
	}
	double Area(double x)//circle
	{
		return x*x*3.14;
	}
	public static void main(String args[])
	{
		int n,x,y,z;
		double x1,y1;
		Scanner in=new Scanner(System.in);
		Shape a=new Shape();
		System.out.print("Enter \n1-To calculate the area of Square \n2-To
		calculate the area of triangle \n3-To calculate the area of rectangle
		\n4-To calculate the area of circle \nEnter your choice : ");
		n=in.nextInt();
		switch(n)
		{
```

```
                case 1:
                        System.out.print("Enter the side of the Square : ");
                        x=in.nextInt();
                        System.out.println("Area of the Square is =
                        "+a.Area(x));
                        break;
                case 2:
                        System.out.print("Enter the side of the sides of the
                        triangle : ");
                        x=in.nextInt();
                        y=in.nextInt();
                        z=in.nextInt();
                        System.out.println("Area of the Triangle is =
                        "+a.Area(x,y,z));
                        break;
                case 3:
                        System.out.print("Enter the side of the length and
                        breadth of the rectangle : ");
                        x1=in.nextDouble();
                        y1=in.nextDouble();
                        System.out.println("Area of the Rectangle is =
                        "+a.Area(x1,y1));
                        break;
                case 4:
                        System.out.print("Enter the radius of the circle : ");
                        x1=in.nextDouble();
                        System.out.println("Area of the Circle is =
                        "+a.Area(x1));
                        break;
                default:
                        System.out.println("You entered the wrong choice. ");
            }
        }
}
```

OUTPUT -

```
Question-11 — -zsh — 72×43
Last login: Fri Apr 15 12:11:29 on ttys000
vipulchauhan@Vipuls-MacBook Question-11 % javac Shape.java
vipulchauhan@Vipuls-MacBook Question-11 % java Shape
Enter
1-To calculate the area of Square
2-To calculate the area of triangle
3-To calculate the area of rectangle
4-To calculate the area of circle
Enter your choice : 1
Enter the side of the Square : 5
Area of the Square is = 25
vipulchauhan@Vipuls-MacBook Question-11 % java Shape
Enter
1-To calculate the area of Square
2-To calculate the area of triangle
3-To calculate the area of rectangle
4-To calculate the area of circle
Enter your choice : 2
Enter the side of the sides of the triangle : 7 5 10
Area of the Triangle is = 16.24807680927192
vipulchauhan@Vipuls-MacBook Question-11 % java Shape
Enter
1-To calculate the area of Square
2-To calculate the area of triangle
3-To calculate the area of rectangle
4-To calculate the area of circle
Enter your choice : 3
Enter the side of the length and breadth of the rectangle : 5 4
Area of the Rectangle is = 20.0
vipulchauhan@Vipuls-MacBook Question-11 % java Shape
Enter
1-To calculate the area of Square
2-To calculate the area of triangle
3-To calculate the area of rectangle
4-To calculate the area of circle
Enter your choice : 4
Enter the radius of the circle : 5
Area of the Circle is = 78.5
vipulchauhan@Vipuls-MacBook Question-11 %
```

Question: 12 - Create a class "Bank" having method getRateOfInterest(). Create child classes as HDFC, SBI and PNB and override getRateOfInterest() and return interest rates as 4.0, 4.5 and 5% correspondingly.
Use concept of Upcasting to implement this scenario.

Source Code:

```
//upcasting
import java.util.*;
public class Bank
{
	double getROI()
	{
		return 2.0;
	}
	public static void main(String args[])
	{
		Bank a=new Bank();
		System.out.println("Bank ROI : "+a.getROI());
		a=new Hdfc();
		System.out.println("Hdfc ROI : "+a.getROI());
		a=new Sbi();
		System.out.println("Sbi ROI : "+a.getROI());
		a=new Pnb();
		System.out.println("Pnb : "+a.getROI());
	}
}
class Hdfc extends Bank
{
	double getROI()
	{
		return 4.0;
	}
}
class Sbi extends Bank
{
	double getROI()
```

```
        {
                return 4.5;
        }
}
class Pnb extends Bank
{
        double getROI()
        {
                return 5;
        }
}
```

OUTPUT -

Question-12 — -zsh — 80×19
Last login: Fri Apr 15 12:21:20 on ttys000
vipulchauhan@Vipuls-MacBook Question-12 % javac Bank.java
vipulchauhan@Vipuls-MacBook Question-12 % java Bank
Bank ROI : 2.0
Hdfc ROI : 4.0
Sbi ROI : 4.5
Pnb : 5.0
vipulchauhan@Vipuls-MacBook Question-12 %

Question: 13 - Create a package pack1 having one class C1 and one interface I1. Class C1 has two methods int sum(int, int) and int sub(int, int). The I1 has one method int division(int, int). Create another package pack2 having class C2. Reuse C1 and I1 in C2 and show the results. Note: Use appropriate Access Modifiers as required.

Source Code:

C1.java :-

```
package P1;
public class C1
{
                        public int sum(int a,int b)
                        {
                                return a+b;
                        }
                        public int sub(int a,int b)
                        {
                                return a-b;
                        }
}
```

I1.java :-

```
package P1;
public interface I1
{
                        public int division(int a,int b);
}
```

C2.java :-

```
package P2;
import java.util.*;
import P1.*;
public class C2 implements I1
{
        public int division(int a,int b)
        {
                return a/b;
        }
        public static void main(String args[])
        {
                Scanner in=new Scanner(System.in);
                C2 c=new C2();
                C1 d=new C1();
                System.out.print("Enter first numbers : ");
                int a=in.nextInt();
                System.out.print("Enter second numbers : ");
                int b=in.nextInt();
                System.out.println("Sum = "+d.sum(a,b));
                System.out.println("Subtract = "+d.sub(a,b));
                System.out.println("Division= "+c.division(a,b));
        }
}
```

OUTPUT -

Question-13 — -zsh — 80×24
Last login: Sun Jun 19 07:57:31 on ttys000
vipulchauhan@Vipuls-MacBook Question-13 % javac -d . C1.java
vipulchauhan@Vipuls-MacBook Question-13 % javac -d . I1.java
vipulchauhan@Vipuls-MacBook Question-13 % javac -d . C2.java
vipulchauhan@Vipuls-MacBook Question-13 % java P2.C2
Enter first numbers : 12
Enter second numbers : 3
Sum = 15
Subtract = 9
Division = 4
vipulchauhan@Vipuls-MacBook Question-13 %

Question: 14 - Write a program to divide two numbers with proper exception handlers.

Source Code:

```
import java.util.*;
public class Division
{
   public static void main(String args[])
   {
      Scanner in=new Scanner(System.in);
      System.out.print("Enter the first number : ");
      float a=in.nextFloat();
      System.out.print("Enter the Second number : ");
      float b=in.nextFloat();
      try
      {
         float c=a/b;
         System.out.println("Division is = "+c);
      }
      catch(ArithmeticException e)
      {
         System.out.println("Can not divide the number by zero");
      }

   }
}
```

OUTPUT -

Question-14 — -zsh — 80×24
Last login: Sun Jun 19 13:08:49 on ttys000
vipulchauhan@Vipuls-MacBook Question-14 % javac Division.java
vipulchauhan@Vipuls-MacBook Question-14 % java Division
Enter the first number : 12
Enter the Second number : 0
Division is = Infinity
vipulchauhan@Vipuls-MacBook Question-14 % java Division
Enter the first number : 12
Enter the Second number : 3
Division is = 4.0
vipulchauhan@Vipuls-MacBook Question-14 %

Question: 15 - Create LowBalanceException that occurs when user tries to withdraw some amount that is greater than his current bank balance. To withdraw you must write a void withdrawal (int amount) method.

Source Code:

```
import java.util.*;
public class LowBalanceException extends Exception
{
        int account_no;
        String name;
        float amount;
        public LowBalanceException(String s)
        {
                super(s);
        }
        public LowBalanceException()
        {
                account_no=0;
                name="";
                amount=0;
        }
        void insert(int account_no,String name,float amount)
        {
                this.account_no=account_no;
                this.name=name;
                this.amount=amount;
        }
        void withdraw(float amount)
        {
      try{

         if(this.amount<amount)
         {
            throw new LowBalanceException("Insufficient balance.");
         }
         else
```

```
    {
        this.amount-=amount;
        System.out.println("New balance = "+this.amount);
    }
}
catch(LowBalanceException e)
{
    System.out.println(e);
}
  }
  void deposit(float amount)
  {
        this.amount+=amount;
  }
  void display()
  {
        System.out.println("Account Number = "+account_no);
        System.out.println("Name = "+name);
        System.out.println("Amount = "+amount);
  }
  void checkBalance()
  {
        System.out.println("Balance = "+this.amount);

  }
  public static void main(String args[])
  {
        Scanner in=new Scanner(System.in);
        int account_no;
        String name;
        float amount,amount2;
        System.out.print("Enter the account number : ");
        account_no=in.nextInt();
        in.nextLine();

        System.out.print("Enter the name of the person : ");
        name=in.nextLine();
```

```
            System.out.print("Enter the amount in the bank : ");
            amount=in.nextFloat();

            LowBalanceException a=new LowBalanceException();
            a.insert(account_no,name,amount);

            System.out.print("Enter the amount you want to withdraw : ");
            amount2=in.nextFloat();

            a.withdraw(amount2);

            System.out.print("Enter the amount you want to deposit in the
bank : ");
            amount2=in.nextFloat();
            a.deposit(amount2);

            a.checkBalance();
            a.display();
        }
}
```

OUTPUT -

```
Question-15 — -zsh — 80×24
Last login: Sun Jun 19 13:11:32 on ttys000
vipulchauhan@Vipuls-MacBook Question-15 % javac LowBalanceException.java
vipulchauhan@Vipuls-MacBook Question-15 % java LowBalanceException
Enter the account number : 20011016
Enter the name of the person : Vipul Chauhan
Enter the amount in the bank : 2000
Enter the amount you want to withdraw : 3000
LowBalanceException: Insufficient balance.
Enter the amount you want to deposit in the bank : 2000
Balance = 4000.0
Account Number = 20011016
Name = Vipul Chauhan
Amount = 4000.0
vipulchauhan@Vipuls-MacBook Question-15 %
```

Question: 16 - Write a program that reads from a text file byte by byte and writes in some another file. Write this program in an efficient way.

Source Code:

```
import java.io.*;
public class FileReadWrite
{
        public static void main(String args[]) throws IOException
        {
                FileInputStream fis=new FileInputStream("file1.txt");
                BufferedInputStream bis=new BufferedInputStream(fis);
                FileOutputStream fos=new FileOutputStream("file2.txt");
                BufferedOutputStream bos=new BufferedOutputStream(fos);
                int x;
                while((x=bis.read())!=-1)
                {
                        bos.write(x);
                }
                bos.close();
                bis.close();
                fos.close();
                fis.close();
        }
}
```

OUTPUT -

Question-16 — -zsh — 80×24
Last login: Sun Jun 19 13:15:19 on ttys000
vipulchauhan@Vipuls-MacBook Question-16 % javac FileReadWrite.java
vipulchauhan@Vipuls-MacBook Question-16 % java FileReadWrite
vipulchauhan@Vipuls-MacBook Question-16 %
file1.txt
This text is to be copied in the another file byte by byte
file2.txt
This text is to be copied in the another file byte by byte

Question: 17 - Write a program that reads from a text file char by char and writes in some another file. Write this program in an efficient way.

Source Code:

```
import java.io.*;
public class FileReaderWriter
{
	public static void main(String args[]) throws IOException
	{
		FileReader fr=new FileReader("file1.txt");
		BufferedReader br=new BufferedReader(fr);
		FileWriter fw=new FileWriter("file2.txt");
		BufferedWriter bw=new BufferedWriter(fw);
		int x;
		while((x=br.read())!=-1)
		{
			bw.write((char)x);
		}
		br.close();
		bw.close();
		fr.close();
		fw.close();
	}
}
```

OUTPUT –

Question-17 — -zsh — 80×24
Last login: Sun Jun 19 13:39:51 on ttys000
vipulchauhan@Vipuls-MacBook Question-17 % javac FileReaderWriter.java
vipulchauhan@Vipuls-MacBook Question-17 % java FileReaderWriter
vipulchauhan@Vipuls-MacBook Question-17 %
file1.txt
This text is to be copied in the another file char by char
file2.txt
This text is to be copied in the another file char by char

Question: 18 - Write a program that reads from a text file line by line and writes on console.

Source Code:

```
import java.io.*;
public class ReadLineByLine
{
	public static void main(String args[]) throws IOException
	{
		FileReader fr=new FileReader("file1.txt");
		BufferedReader br=new BufferedReader(fr);
		String s;
		int i=1;
		while((s=br.readLine())!=null)
		{
			System.out.println("Line "+i+" : "+s);
			i++;
		}
		br.close();
		fr.close();
	}
}
```

OUTPUT -

Question-18 — -zsh — 80×24
Last login: Sun Jun 19 13:40:36 on ttys000
vipulchauhan@Vipuls-MacBook Question-18 % javac ReadLineByLine.java
vipulchauhan@Vipuls-MacBook Question-18 % java ReadLineByLine
Line 1 : This text is to be copied on console.
Line 2 : line by line.
vipulchauhan@Vipuls-MacBook Question-18 %
file1.txt
This text is to be copied on console.
line by line.

Question: 19 - Write a program that take your name from keyboard and writes in some text file.

Source Code:

```
import java.util.*;
import java.io.*;
public class Input
{
   public static void main(String args[]) throws IOException
   {
      Scanner in=new Scanner(System.in);
      FileWriter fw=new FileWriter("file1.txt");
      BufferedWriter bw=new BufferedWriter(fw);
      System.out.print("Enter your name : ");
      String s=in.nextLine();
      int n=s.length();
      for(int i=0;i<n;i++)
      {
         bw.write(s.charAt(i));
      }
      bw.close();
      fw.close();
   }
}
```

OUTPUT -

Question-19 — -zsh — 80×24
Last login: Sun Jun 19 13:43:00 on ttys001
vipulchauhan@Vipuls-MacBook Question-19 % javac Input.java
vipulchauhan@Vipuls-MacBook Question-19 % java Input
Enter your name : Vipul Chauhan
vipulchauhan@Vipuls-MacBook Question-19 %
file1.txt
Vipul Chauhan

Question: 20 - Write a multithreaded program where three threads are there and printing the numbers from 1 to 10 concurrently.

Source Code:

```
class A extends Thread
{
	public void run()
	{
		for(int i=1;i<=10;i++)
		{
			System.out.println("From thread A : "+i);
		}
	}
}
class B extends Thread
{
	public void run()
	{
		for(int i=1;i<=10;i++)
		{
			System.out.println("From thread B : "+i);
		}
	}
}
class C extends Thread
{
	public void run()
	{
		for(int i=1;i<=10;i++)
		{
			System.out.println("From thread C : "+i);
		}
	}
}
public class Mythread
{
```

```
        public static void main(String args[])
        {
                A a=new A();
                B b=new B();
                C c=new C();
                try
                {
                        a.join();
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
                a.start();
                b.start();
                c.start();
        }
}
```

OUTPUT -

```
Question-20 — -zsh — 80×37
Last login: Sun Jun 19 13:49:28 on ttys000
vipulchauhan@Vipuls-MacBook Question-20 % javac Mythread.java
vipulchauhan@Vipuls-MacBook Question-20 % java Mythread
From thread A : 1
From thread B : 1
From thread C : 1
From thread B : 2
From thread B : 3
From thread A : 2
From thread B : 4
From thread C : 2
From thread B : 5
From thread B : 6
From thread A : 3
From thread B : 7
From thread B : 8
From thread C : 3
From thread B : 9
From thread A : 4
From thread B : 10
From thread C : 4
From thread A : 5
From thread A : 6
From thread C : 5
From thread A : 7
From thread C : 6
From thread A : 8
From thread C : 7
From thread A : 9
From thread C : 8
From thread A : 10
From thread C : 9
From thread C : 10
vipulchauhan@Vipuls-MacBook Question-20 %
```

Question: 21 - Write a program to set and get the name of threads also set and get the priority of threads.

Source Code:

```
public class Mythread extends Thread
{
   public void run()
   {
      System.out.println("This is the thread.");
   }
   public static void main(String args[])
   {
      Mythread a=new Mythread();
      System.out.println("Before setting name : "+a.getName());
      a.setName("MYTHREAD");
      System.out.println("After setting name : "+a.getName());
      System.out.println("Before setting priority : "+a.getPriority());
      a.setPriority(9);
      System.out.println("After setting priority : "+a.getPriority());
      a.start();
   }
}
```

OUTPUT -

Question-21 — -zsh — 80×24
Last login: Sun Jun 19 13:52:24 on ttys000
vipulchauhan@Vipuls-MacBook Question-21 % javac Mythread.java
vipulchauhan@Vipuls-MacBook Question-21 % java Mythread
Before setting name : Thread-0
After setting name : MYTHREAD
Before setting priority : 5
After setting priority : 9
This is the thread.
vipulchauhan@Vipuls-MacBook Question-21 %

Question: 22 – Write a class Display having void wish(String name) methods that wishes hello to given string name. Between printing hello and provided string name apply delay of 500 milliseconds. Suppose multiple threads are there and they are trying to access this wish() method concurrently on same object then irregular output will be there. Write this application in such a way so that output becomes regular.

Source Code:

```
class Display
{
	public synchronized void wish(String s)
	{
		for(int i=0;i<10;i++)
		{
			System.out.print("Hello :");
			try
			{
				Thread.sleep(500);
			}
			catch(Exception e)
			{
				System.out.println(e);
			}
			System.out.println(s);
		}
	}
}
class Mythread extends Thread
{
	Display a;
	String name;
	Mythread(Display a,String name)
	{
		this.a=a;
		this.name=name;
	}
```

```
        public void run()
        {
                a.wish(name);
        }
}
public class Sync
{
        public static void main(String args[])
        {
                Display d=new Display();
                Mythread t=new Mythread(d,"Vipul");
                t.start();
                Mythread t1=new Mythread(d,"Rahul");
                t1.start();
        }
}
```

OUTPUT -

```
Question-22 — -zsh — 80×24
Last login: Sun Jun 19 13:53:47 on ttys000
vipulchauhan@Vipuls-MacBook Question-22 % javac Sync.java
vipulchauhan@Vipuls-MacBook Question-22 % java Sync
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
vipulchauhan@Vipuls-MacBook Question-22 %
```

Question: 23 - Write a class Display having synchronized void wish(String) methods that wishes hello to given string name. Between printing hello and provided string name apply delay of 500 milliseconds. Suppose multiple threads are there and they are trying to access this wish() method concurrently on different objects then irregular output will be there. Write this application in such a way so that output becomes regular.

Source Code:

```
class Display
{
                    public static synchronized void wish(String s)
                    {
                        for(int i=0;i<10;i++)
                        {
                            System.out.print("Hello :");
                            try
                            {
                                Thread.sleep(500);
                            }
                            catch(Exception e)
                            {
                                System.out.println(e);
                            }
                            System.out.println(s);
                        }
                    }
}
class Mythread extends Thread
{
                    Display a;
                    String name;
                    Mythread(Display a,String name)
                    {
                        this.a=a;
                        this.name=name;
                    }
```

```
                public void run()
                {
                        a.wish(name);
                }
}
public class StartSync
{
                public static void main(String args[])
                {
                        Display d=new Display();
                        Display d1=new Display();
                        Mythread t=new Mythread(d,"Vipul");
                        t.start();
                        Mythread t1=new Mythread(d1,"Rahul");
                        t1.start();
                }
}
```

OUTPUT -

```
Question-23 — -zsh — 80×25
Last login: Sun Jun 19 13:54:26 on ttys001
vipulchauhan@Vipuls-MacBook Question-23 % javac StatSync.java
vipulchauhan@Vipuls-MacBook Question-23 % java StatSync
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Vipul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
Hello :Rahul
vipulchauhan@Vipuls-MacBook Question-23 %
```

Question: 24 - Write a class Customer having balance as a property and void withdrawal(int amount), and void deposit(int amount) as instance methods. There are two threads, the first thread wants to withdrawal some amount and second thread wants to deposit some amount. Apply inter thread communication where, if withdrawal amount is higher than current balance then first thread will wait for second thread to deposit then resume the withdrawal.

Source Code:

```
class Customer
{
	int balance=0;
	public synchronized void withdrawl(int amount)
	{
		System.out.println("Going to withdraw : ");
		if(balance<amount)
		{
			System.out.println("Low balance..... kindly Wait.....");
			try
			{
				wait();
			}
			catch(Exception e)
			{
				System.out.println(e);
			}
		}
		balance-=amount;
		System.out.println("New balance : "+balance);
	}
	public synchronized void deposit(int balance)
	{
		System.out.println("Going to Deposit...");
		this.balance+=balance;
		System.out.println("Balance : "+this.balance);
		notify();
	}
```

```
}
class Mythread extends Thread
{
        Customer a;
        Mythread(Customer a)
        {
                this.a=a;
        }
        public void run()
        {
                a.withdrawl(1000);
        }
}
class Mythread1 extends Thread
{
        Customer a;
        Mythread1(Customer a)
        {
                this.a=a;
        }
        public void run()
        {
                a.deposit(2000);
        }
}
public class ThreadComm
{
        public static void main(String args[])
        {
                Customer d=new Customer();
                Mythread t=new Mythread(d);
                t.start();
                Mythread1 t1=new Mythread1(d);
                t1.start();
        }
}
```

OUTPUT -

Question-24 — -zsh — 80×24
Last login: Sun Jun 19 13:55:40 on ttys000
vipulchauhan@Vipuls-MacBook Question-24 % javac ThreadComm.java
vipulchauhan@Vipuls-MacBook Question-24 % java ThreadComm
Going to withdraw :
Low balance..... kindly Wait.....
Going to Deposit...
Balance : 2000
New balance : 1000
vipulchauhan@Vipuls-MacBook Question-24 %

Question: 25 - Create a GUI for student's information system. A GUI that asks all the relevant information's related to a student.

Source Code:

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class Student extends JFrame implements ActionListener
{
   JTextArea ta;
   JTextField tf1,tf2,tf3,tf4;
   JRadioButton rb1,rb2;
   Student()
   {
      super("Student Information");
      JLabel l1=new JLabel("Name : ");
      JLabel l2=new JLabel("Student Id : ");
      JLabel l3=new JLabel("Section : ");
      JLabel l4=new JLabel("Gender : ");
      JLabel l5=new JLabel("Course : ");
      tf1=new JTextField(20);
      tf2=new JTextField(20);
      tf3=new JTextField(20);
      tf4=new JTextField(20);
      ta=new JTextArea(15,25);
      rb1=new JRadioButton("Male");
      rb2=new JRadioButton("Female");
      JButton b1=new JButton("Print");
      ButtonGroup b=new ButtonGroup();
      b.add(rb1);
      b.add(rb2);
      setLayout(new FlowLayout());
      add(l1);
      add(tf1);
      add(l2);
      add(tf2);
      add(l3);
      add(tf3);
      add(l4);
```

```
        add(rb1);
        add(rb2);
        add(l5);
        add(tf4);
        add(b1);
        add(ta);
        b1.addActionListener(this);
        ta.setLineWrap(true);
    }
    public void actionPerformed(ActionEvent e)
    {
        if(rb1.isSelected())
        {
            ta.setText("Name : "+tf1.getText()+",  Student Id : "+tf2.getText()+",
Section : "+tf3.getText()+",  Gender : Male"+",  Course : "+tf4.getText());
        }
        else if(rb2.isSelected())
        {
            ta.setText("Name : "+tf1.getText()+",  Student Id : "+tf2.getText()+",
Section : "+tf3.getText()+",  Gender : Female"+",  Course : "+tf4.getText());
        }
    }
    public static void main(String args[])
    {
        Student a=new Student();
        a.setSize(340,500);
        a.setVisible(true);
        a.addWindowListener(new WindowAdapter()
        {
            public void windowClosing(WindowEvent e)
            {
                System.exit(0);
            }
        });
    }
}
```

OUTPUT –

Student Information
Name :
Vipul Chauhan
Student Id :
20011016
Section :
A
Gender :
Male
Female
Course :
B.tech(CSE)
Print
Name : Vipul Chauhan, Student Id : 20011016, Section : A, Gender : Male, Course : B.tech(CSE)

Question: 26 - Create a canvas having smiley face.

Source Code:

```
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;
class Smiley extends Canvas
{
                public void paint(Graphics g)
                {
                        g.setColor(Color.yellow);
                        g.fillOval(90,100,200,200);
                        g.setColor(Color.black);
                        g.fillOval(140,165,30,30);
                        g.fillOval(210,165,30,30);
                        for(int i=165;i<170;i++)
                        {
                                g.drawArc(145,i,90,90,-30,-120);
                        }
                }
                public static void main(String args[])
                {
                        B d=new B();
                        JFrame f=new JFrame();
                        f.setSize(500,500);
                        f.setVisible(true);
                        f.add(d);
                        f.addWindowListener(new WindowAdapter(){
                                public void windowClosing(WindowEvent e)
                                {
                                        System.exit(0);
                                }
                        });
                }
}
```

OUTPUT -

Question: 27 – Write a JFrame having three textfields. The first two textfields refers to two numbers on which sum or subtraction will happen. The third textfield will show the result. There are two buttons “SUM” and “SUBTRACTION”. Once user will click on sum or subtraction buttons then the corresponding result will be displayed in result field.

Source Code:

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class Calculator extends JFrame implements ActionListener
{
   JTextField tf1,tf2,tf3;
   Calculator()
   {
      super("Calculator");
      JLabel l1=new JLabel("First Number ");
      JLabel l2=new JLabel("Second Number ");
      JLabel l3=new JLabel("Result ");
      tf1=new JTextField(20);
      tf2=new JTextField(20);
      tf3=new JTextField(20);
      JButton b1=new JButton("Sum");
      JButton b2=new JButton("Subtract");
      JButton b3=new JButton("Exit");
      setLayout(new FlowLayout());
      add(l1);
      add(tf1);
      add(l2);
      add(tf2);
      add(b1);
      add(b2);
      add(b3);
      add(l3);
      add(tf3);
      b1.addActionListener(this);
      b2.addActionListener(this);
      b3.addActionListener(this);
```

```
    }
    public void actionPerformed(ActionEvent e)
    {
        String s1=tf1.getText(),s2=tf2.getText();
        if(s1.isEmpty())
        {
            s1="0";
        }
        if(s2.isEmpty())
        {
            s2="0";
        }
        int num1=Integer.parseInt(s1);
        int num2=Integer.parseInt(s2);
        if(!s1.isEmpty() || !s2.isEmpty())
        {
            if(e.getActionCommand()=="Sum")
            {
                tf3.setText(Integer.toString(num1+num2));
            }
            else if(e.getActionCommand()=="Subtract")
            {
                tf3.setText(Integer.toString(num1-num2));
            }
        }
        if(e.getActionCommand()=="Exit")
        {
            System.exit(0);
        }
    }
    public static void main(String args[])
    {
        Calculator a=new Calculator();
        a.setSize(300,400);
        a.setVisible(true);
    }
}
```

OUTPUT –

Calculator
First Number
12
Second Number
13
Sum
Subtract
Exit
Result
25

Question: 28 - Write a Java program that interacts with database .

Source Code:

```
import java.sql.*;
import javax.swing.*;
import javax.swing.table.DefaultTableModel;

import java.awt.*;
import java.awt.event.*;
public class JDBC extends JFrame implements ActionListener
{
        Connection con=null;
        PreparedStatement ps1=null,ps2=null,ps3=null,ps4=null;
        JTextField tf1,tf2;
        JDBC()
        {
                super("Database");
                tf1=new JTextField(20);
                tf2=new JTextField(20);
                JLabel l1=new JLabel("ID");
                JLabel l2=new JLabel("NAME");
                JButton b1=new JButton("Insert");
                JButton b2=new JButton("Show Table");
                JButton b3=new JButton("Update");
                JButton b4=new JButton("Delete");
                JButton b5=new JButton("Exit");
                SetLayout(new FlowLayout());
                add(l1);
                add(tf1);
                add(l2);
                add(tf2);
                add(b1);
                add(b2);
                add(b3);
                add(b4);
                add(b5);
```

```
            b1.addActionListener(this);
            b2.addActionListener(this);
            b3.addActionListener(this);
            b4.addActionListener(this);
            b5.addActionListener(this);
        }
        public void actionPerformed(ActionEvent e)
        {
            if(e.getActionCommand()=="Insert")
            {
                System.out.println("Submit");
                submit();
            }
            else if(e.getActionCommand()=="Show Table")
            {
                System.out.println("Display");
                display();
            }
            else if(e.getActionCommand()=="Update")
            {
                System.out.println("Update");
                update();
            }
            else if(e.getActionCommand()=="Delete")
            {
                System.out.println("Delete");
                delete();
            }
            else
            {
                System.exit(0);
            }
        }
        public void submit()
        {
            try
            {
```

```
                        ps1=con.prepareStatement("insert into
emp(id,name)values(?,?)");
                        ps1.setInt(1,Integer.parseInt(tf1.getText()));
                        ps1.setString(2,tf2.getText());
                        ps1.executeUpdate();
                        System.out.println("Submited");
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
        }
        public void display()
        {
                String col[]={"id","name"};
                DefaultTableModel tbModel=new DefaultTableModel();
                tbModel.setColumnIdentifiers(col);
                JTable tb=new JTable(tbModel);
                tb.setModel(tbModel);
                JScrollPane scroll=new JScrollPane(tb);
                try
                {
                        ps2=con.prepareStatement("select * from emp");
                        ResultSet rs=ps2.executeQuery();
                        System.out.println("Fetching table from Database");
                        String tr[]={"id","name"};
                        tbModel.addRow(tr);
                        while(rs.next())
                        {
                                String id=String.valueOf(rs.getInt(1));
                                String name=rs.getString(2);
                                String tbData[]={id,name};
                                tbModel.addRow(tbData);
                        }
                        JFrame n=new JFrame("Database Content");
                        n.setSize(700,500);
                        n.setVisible(true);
```

```
                        n.setLayout(new FlowLayout());
                        n.add(scroll);
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
        }
        public void update()
        {
                try
                {
                        ps3=con.prepareStatement("update emp set
name='"+tf2.getText()+"' where id='"+Integer.parseInt(tf1.getText())+"'");
                        ps3.executeUpdate();
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
        }
        public void delete()
        {
                try
                {
                        ps4=con.prepareStatement("delete from emp where
id='"+Integer.parseInt(tf1.getText())+"'");
                        ps4.executeUpdate();
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
        }
        public static void main(String args[])
        {
                JDBC a=new JDBC();
```

```
                a.setSize(300,400);
                a.setVisible(true);
                try
                {
                        Class.forName("com.mysql.jdbc.Driver");
                        System.out.println("Success");
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
                try
                {
                a.con=DriverManager.getConnection("jdbc:mysql://localhos
t:3306/cse1?autoReconnect=true&useSSL=false","root","VipulChauhan");
                        System.out.println("connection established");
                }
                catch(Exception e)
                {
                        System.out.println(e);
                }
        }
}
```

OUTPUT -

Database
ID 2
NAME Rahul
Insert
Show Table
Update
Delete
Exit

Database Content
id name
id name
1 Vipul
2 Rahul