Hooghly Engineering & Technology College

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Object Oriented Programming Lab

(PCC-CS593)

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Year: 3rd, Semester: 5th

Session: 2021-22

VISION AND MISSION OF THE CSE DEPARTMENT

Vision

Attainment of excellence as a computer engineer so as to prove themselves as outstanding professional with complete expertise and knowledge in Computer Science & Engineering and its applications so that they may prove a valuable resource for industry and society at large, maintaining all moral and ethical values.

Mission

- To excel in professional carrier and higher education by accruing applied knowledge in Mathematics, Computation, Basic Principles of Science Engineering with capable communication.
- To create a strong teaching and research environment through excellent Computer Science & Engineering education.
- To analyze real life problems and projects in developing economically feasible and socially acceptable solutions.

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Assignment 1:-

TITLE: Process of installation and setting up the java environment.

OBJECTIVE:

1) To install java
2) To set up the java compiler buy setting environmental variables.

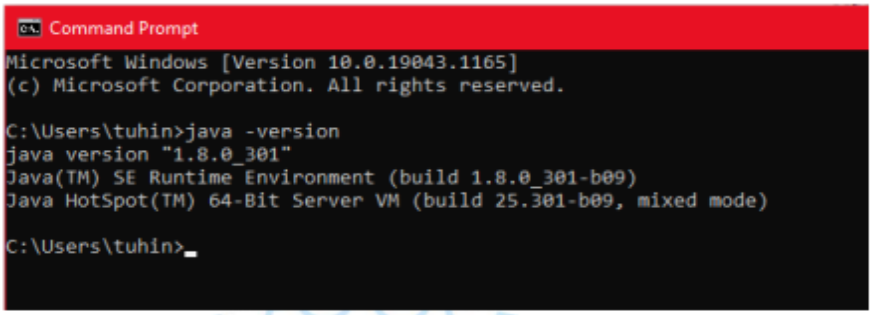
THEORY:

Follow the steps to install java into your system:-

1) Download java software (JDK 1.8) from their website ("https://www.oracle.com/in/java/technologies/javase/javase8-archive-downloads.html ") you may need to open an account in oracle platform the process of downloading JDK.

2) Then run the setup file and complete the installation process of JDK 1.8 into your system.

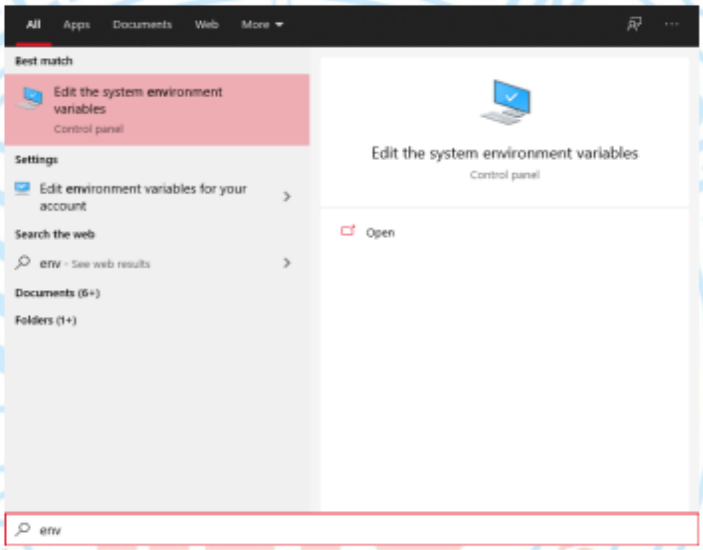
3) Run the command "java –version" and "javac in cmd to check whether the java is installed in your system successfully. If both the commands runs successfully then no need to do anything further.



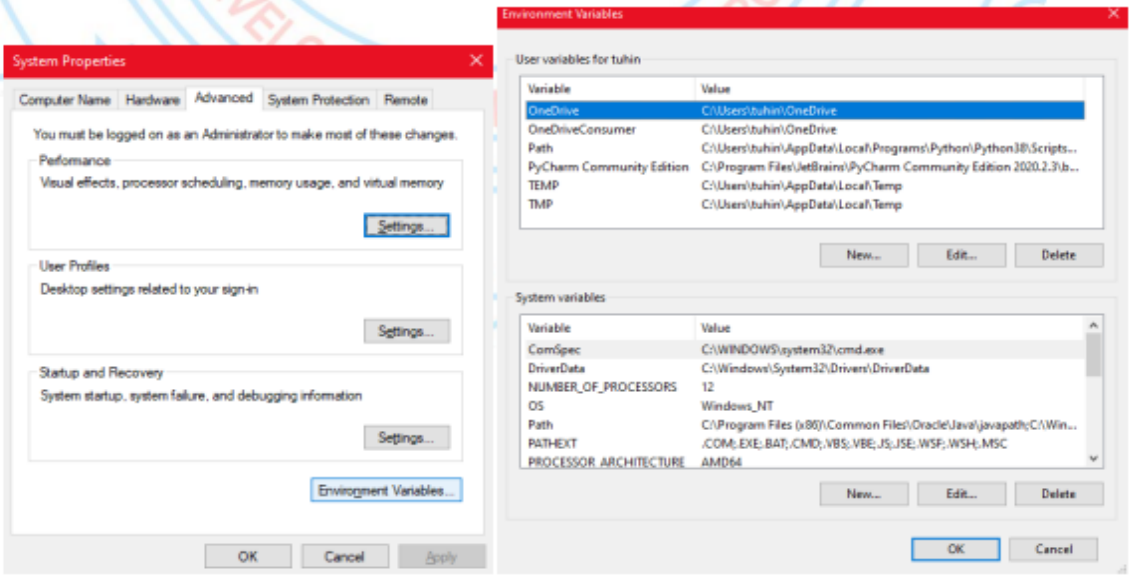
4) If some error occurs then we need to setup the environmental variables of the system.

5) Navigate to "**C:\Program Files\Java\jdk1.8.0_301\bin**" in your system and copy the directory path.

6) Press the windows key and search for "Edit the system environmental variables".



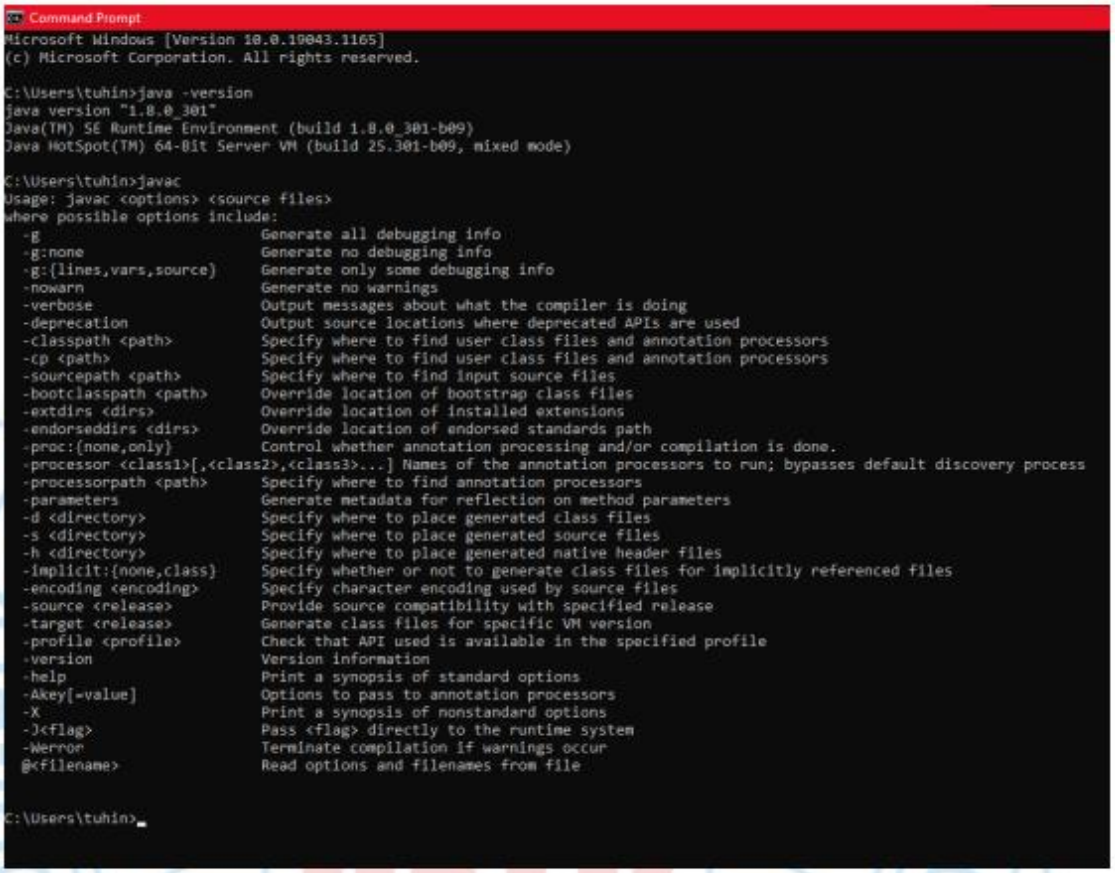
7) Click on "environmental variables" option.



8) Then under system variables double click on "path".

9) Then set a new path there and paste the directory path.

10) Then again try running step 3.



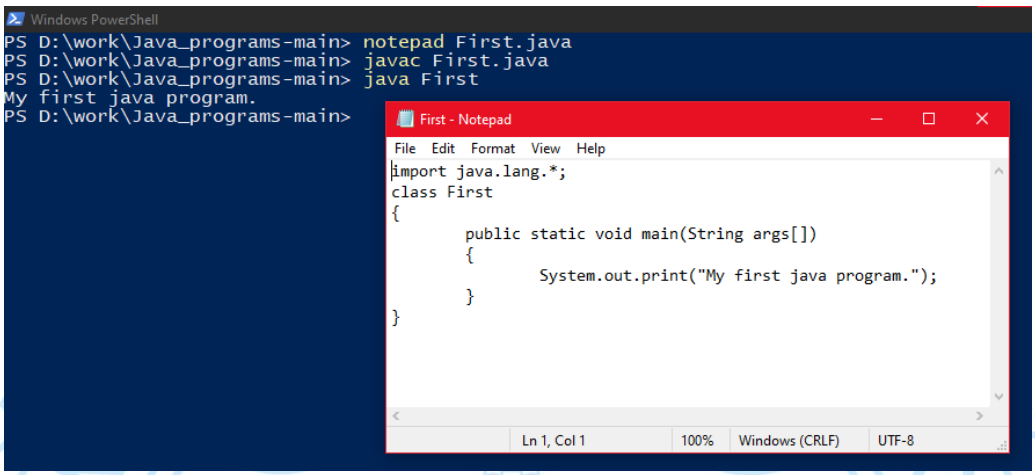
11) End.

CONCLUSION:

Java is successfully installed for all future operations in our system.

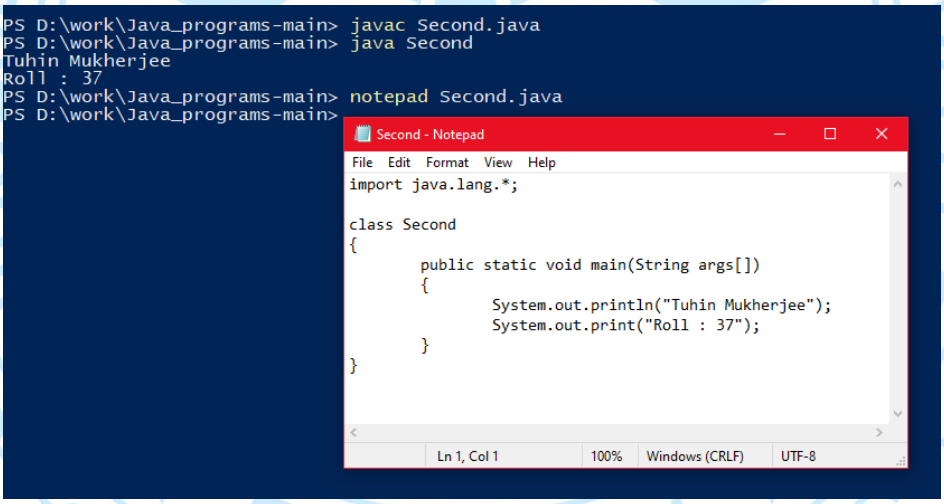
Program 1:

Write a java program to print “My First Program”.



Program 2:

Write a java program to print name and roll number.



Program 3:

Write a java program to print the sum of two integers.

```
PS D:\work\Java_programs-main> notepad sum.java
PS D:\work\Java_programs-main> javac sum.java
PS D:\work\Java_programs-main> java sum
The sum of two integer number = 80
PS D:\work\Java_programs-main>
```

sum - Notepad

File Edit Format View Help

```
import java.lang.*;

class sum
{
        public static void main(String args[])
        {
                int a = 40,b = 40;
                System.out.println("The sum of two integer number = "+(a+b));
        }
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

Program 4:

Write a java program to print the sum of two numbers taking from the user.

```
PS D:\work\Java_programs-main> notepad User_defined.java
PS D:\work\Java_programs-main> javac User_defined.java
PS D:\work\Java_programs-main> java User_defined
Enter a number numbers :
25
Enter another numbers :
25
The sum of the given two numbers = 50
PS D:\work\Java_programs-main>
```

User_defined - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class User_defined
{
        public static void main(String args[])
        {
                Scanner sc = new Scanner(System.in);
                int a,b,total;
                System.out.println("Enter a number numbers : ");
                a=sc.nextInt();
                System.out.println("Enter another numbers : ");
                b=sc.nextInt();
                total=a+b;
                System.out.println("The sum of the given two numbers = "+total);
        }
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

Program 5:

Write a java program using if-else statement.

```
PS D:\work\Java_programs-main> notepad if_else.java
PS D:\work\Java_programs-main> javac if_else.java
PS D:\work\Java_programs-main> java if_else
Pass
PS D:\work\Java_programs-main>
```

if_else - Notepad

File Edit Format View Help

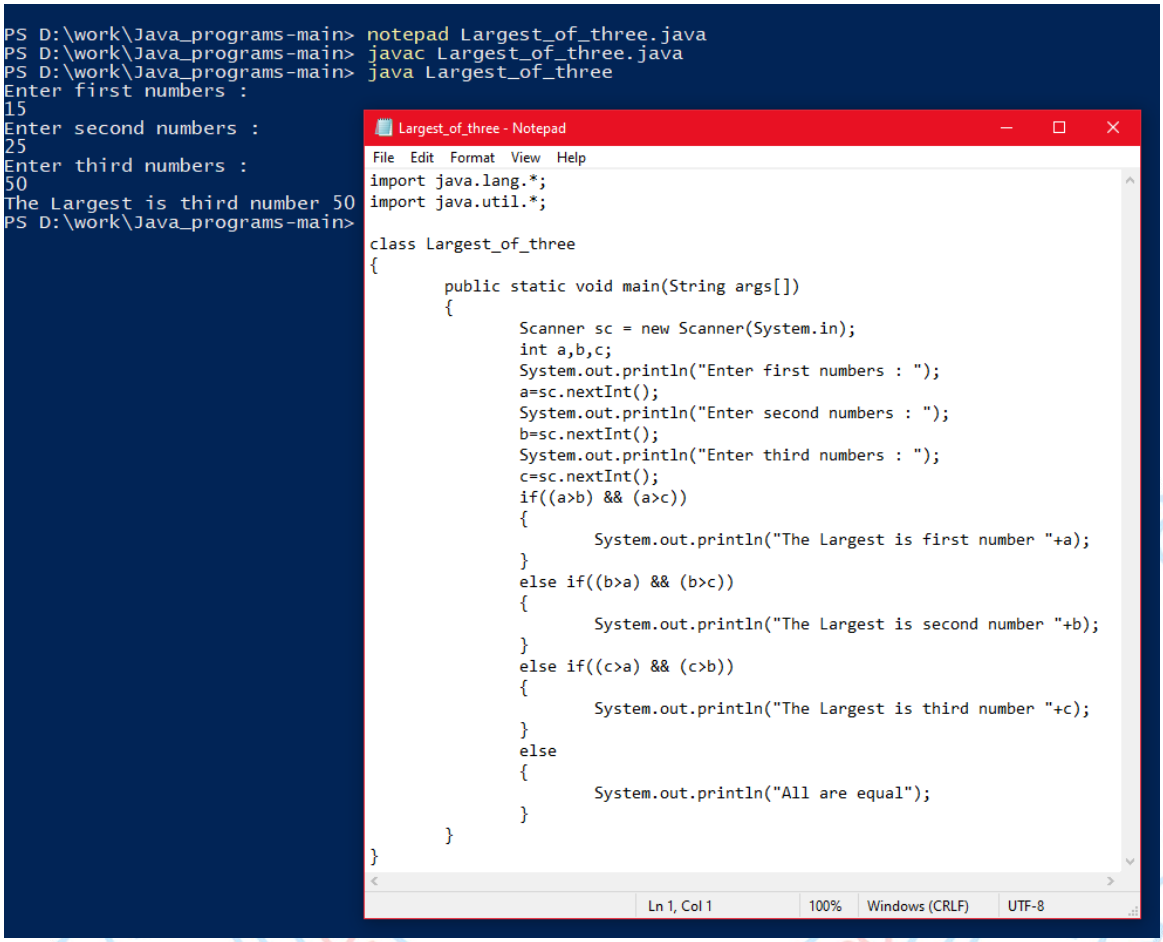
```
import java.lang.*;

class if_else
{
        public static void main(String args[])
        {
                int a = 40,b = 40;
                int c=a+b;
                if(c>40)
                {
                        System.out.println("Pass");
                }
                else
                {
                        System.out.println("Fail");
                }
        }
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

Program 6:

Write a java program to print the largest of the three numbers as given by the user.



```
PS D:\work\Java_programs-main> notepad Largest_of_three.java
PS D:\work\Java_programs-main> javac Largest_of_three.java
PS D:\work\Java_programs-main> java Largest_of_three
Enter first numbers :
15
Enter second numbers :
25
Enter third numbers :
50
The Largest is third number 50
PS D:\work\Java_programs-main>
```

Largest_of_three - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class Largest_of_three
{
        public static void main(String args[])
        {
                Scanner sc = new Scanner(System.in);
                int a,b,c;
                System.out.println("Enter first numbers : ");
                a=sc.nextInt();
                System.out.println("Enter second numbers : ");
                b=sc.nextInt();
                System.out.println("Enter third numbers : ");
                c=sc.nextInt();
                if((a>b) && (a>c))
                {
                        System.out.println("The Largest is first number "+a);
                }
                else if((b>a) && (b>c))
                {
                        System.out.println("The Largest is second number "+b);
                }
                else if((c>a) && (c>b))
                {
                        System.out.println("The Largest is third number "+c);
                }
                else
                {
                        System.out.println("All are equal");
                }
        }
}
```

Ln 1, Col 1 100% Windows (CRLF) UTF-8

Program 7:

Write a java program to print a user given word 5 times using loop.

```
PS D:\work\Java_programs-main> notepad Looops.java
PS D:\work\Java_programs-main> javac Looops.java
PS D:\work\Java_programs-main> java Looops
Enter your name :
Tuhin
Tuhin
Tuhin
Tuhin
Tuhin
Tuhin
PS D:\work\Java_programs-main>
```

Looops - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class Looops
{
        public static void main(String args[])
        {
                Scanner sc = new Scanner(System.in);
                String str;
                System.out.println("Enter your name : ");
                str = sc.nextLine();

                //using for loop

                /*for(int i=1;i<=5;i++)
                {
                        System.out.println(str);
                }*/

                //using do while loop

                /*int i=1;
                do
                {
                        System.out.println(str);
                        i++;
                }
                while(i<5);*/

                //using while loop

                int i = 1;
                while(i<=5)
                {
                        System.out.println(str);
                        i++;
                }
        }
}
```

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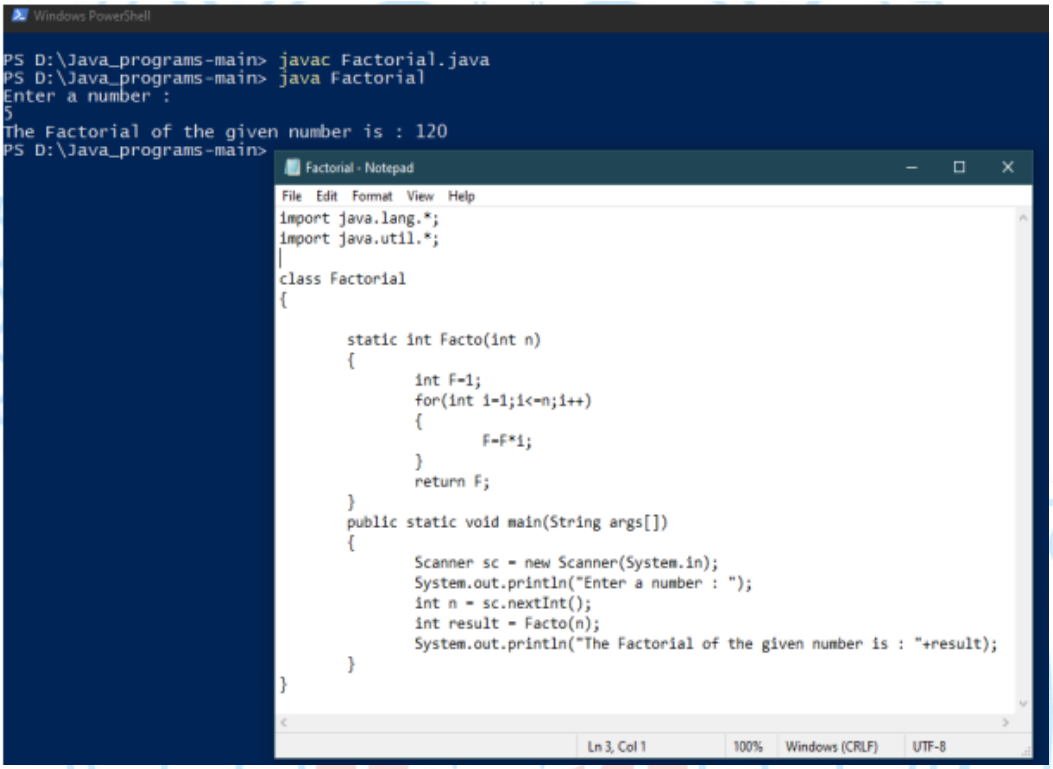
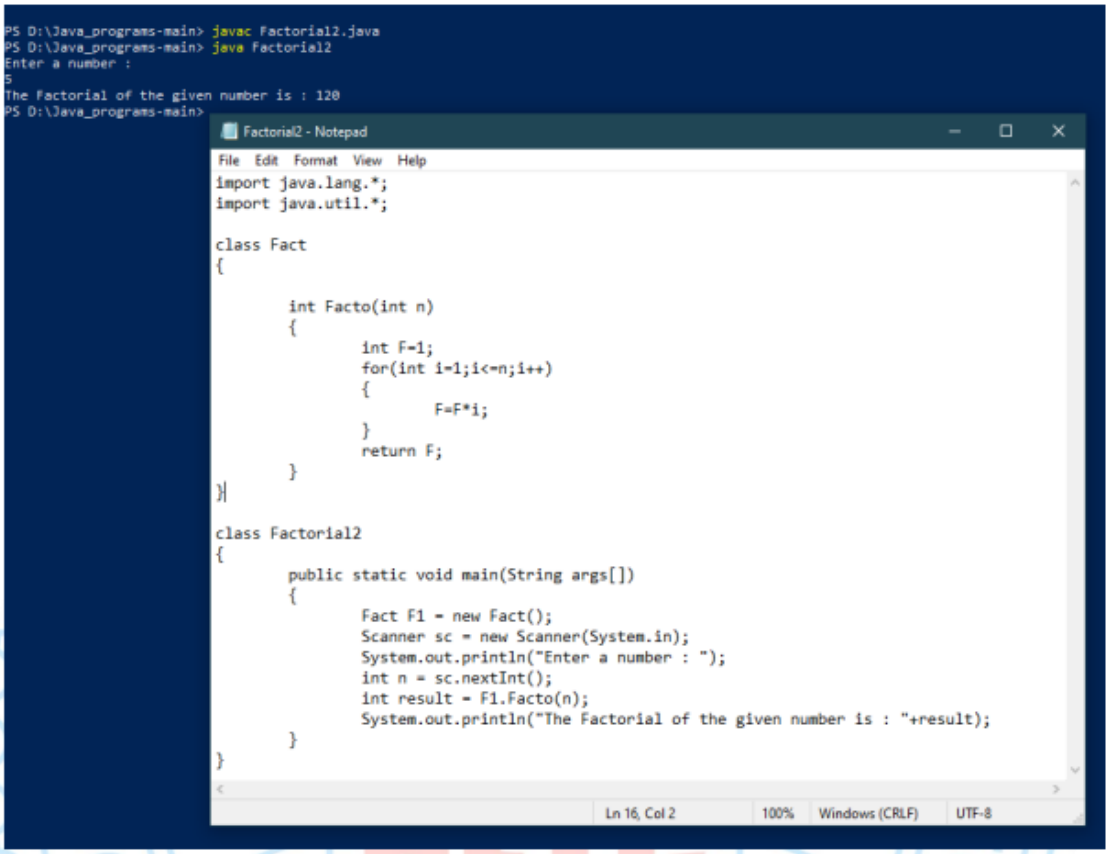
Program 8:

Write a java program to define a separate method to calculate factorial inside the class of main.



Program 9:

Write a java program to implement program 8 by creating an object.



Program 10:

Writre a java program to define a class having a method to calculate factorial and prime.

Input:-

```
import java.lang.*;
import java.util.*;

class PF
{
        int check_prime(int n)
        {
                int c = 0;
                for(int i=1;i<=n;i++)
                {
                        if(n%i==0)
```

```
                {
                        c++;
                }
        }
        if(c==2)
                System.out.println("Prime Number");
        else
                System.out.println("Not a Prime Number");
        return 0;
    }

    int Facto(int n)
    {
        int F=1;
        for(int i=1;i<=n;i++)
        {
                F=F*i;
        }
        return F;
    }
}

class Prime_and_Facto
{

    public static void main(String args[])
    {
        PF obj = new PF();
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a Number : ");
        int n = sc.nextInt();
        obj.check_prime(n);
        int result=obj.Facto(n);
```

```
            System.out.println("The Factorial of the given number is : "+result);
        }
}
```

Output:-

```
Enter a Number :
5
Prime Number
The Factorial of the given number is : 120
PS D:\Java_programs-main>
```

Program 11:

Write a java program to implement the program 10 by introducing a data member in the class.

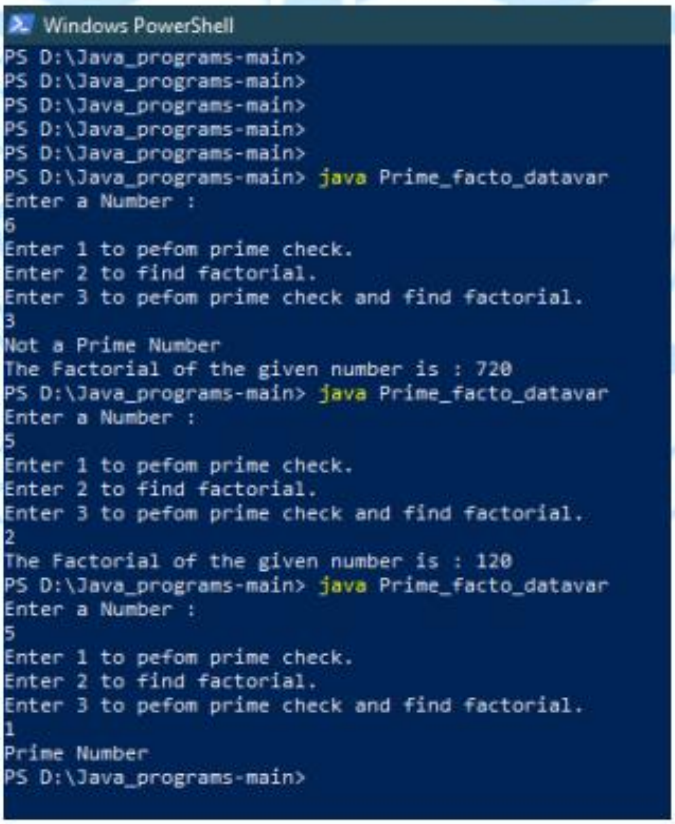
Input:-

```
import java.lang.*;
import java.util.*;

class PF
{
    int a;

    int check_prime()
    {
        int c = 0;
        for(int i=1;i<=a;i++)
        {
            if(a%i==0)
            {
                c++;
            }
        }
        if(c==2)
            System.out.println("Prime Number");
        else
            System.out.println("Not a Prime Number");
        return 0;
```

```
        }

        int Facto()
        {
                int F=1;
                for(int i=1;i<=a;i++)
                {
                        F=F*i;
                }
                return F;
        }
}

class Prime_facto_datavar
{
        public static void main(String args[])
        {
                PF obj = new PF();
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter a Number : ");
                int n = sc.nextInt();
                obj.a = n;
                System.out.println("Enter 1 to pefom prime check.");
                System.out.println("Enter 2 to find factorial.");
                System.out.println("Enter 3 to pefom prime check and find factorial.");
                int in = sc.nextInt();
                if(in==1)
                {
                        obj.check_prime();
                }
                else if(in==2)
                {
```

```
            int result=obj.Facto();
            System.out.println("The Factorial of the given number is : "+result);
        }
        else if(in==3)
        {
            obj.check_prime();
            System.out.println("The Factorial of the given number is : "+obj.Facto());
        }
        else
        {
            System.out.println("INCORRECT CHOICE");
        }
    }
}
```

Output:-



Program 12:

Write java programs to implement the different use of class.

Program 1:

```
PS D:\Java_programs-main> javac Factorial.java
PS D:\Java_programs-main> java Factorial
Enter a number :
5
The Factorial of the given number is : 120
PS D:\Java_programs-main>
```

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class Factorial
{

	static int Facto(int n)
	{
		int F=1;
		for(int i=1;i<=n;i++)
		{
			F=F*i;
		}
		return F;
	}
	public static void main(String args[])
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a number : ");
		int n = sc.nextInt();
		int result = Facto(n);
		System.out.println("The Factorial of the given number is : "+result);
	}
}
```

Program 2:

```
PS D:\Java_programs-main> javac Factorial_const.java
PS D:\Java_programs-main> java Factorial_const
Enter a number :
5
The Factorial of the number5 is : 120
PS D:\Java_programs-main>
```

Factorial_const - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class Fact
{
	Fact()
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a number : ");
		int number = sc.nextInt();
		int F=1;
		for(int i=1;i<=number;i++)
		{
			F=F*i;
		}
		System.out.println("The Factorial of the number"+number+" is : "+F);
	}
}

class Factorial_const
{
	public static void main(String args[])
	{
		Fact f1 = new Fact();
	}
}
```

Program 3:

```
PS D:\Java_programs-main> javac Factorial2.java
PS D:\Java_programs-main> java Factorial2
Enter a number :
5
The Factorial of the given number is : 120
PS D:\Java_programs-main>
```

Factorial2 - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class Fact
{

	int Facto(int n)
	{
		int F=1;
		for(int i=1;i<=n;i++)
		{
			F=F*i;
		}
		return F;
	}
}

class Factorial2
{
	public static void main(String args[])
	{
		Fact F1 = new Fact();
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a number : ");
		int n = sc.nextInt();
		int result = F1.Facto(n);
		System.out.println("The Factorial of the given number is : "+result);
	}
}
```

Program 4:

```
PS D:\Java_programs-main> javac New_Factorial.java
PS D:\Java_programs-main> java New_Factorial
Enter a number :
5
The Factorial of the given number is : 120
PS D:\Java_programs-main>
```

*New_Factorial - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class Fact
{

	int Facto(int n)
	{
		int F=1;
		for(int i=1;i<=n;i++)
		{
			F=F*i;
		}
		return F;
	}
}

class New_Factorial
{
	public static void main(String args[])
	{
		Fact F1 = new Fact();
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter a number : ");
		int n = sc.nextInt();
		int result = F1.Facto(n);
		System.out.println("The Factorial of the given number is : "+result);
	}
}
```

Program 13:

Write java program to add using default constructor in java.

```
PS D:\Java_programs-main> javac adding_using_cons.java
PS D:\Java_programs-main> java adding_using_cons
Enter the first number :
20.5
Enter the second number :
40.5
The addition result is : 61.(
PS D:\Java_programs-main>
```

adding_using_cons - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class add
{

        double number1;
        double number2;

        void add(double n1, double n2)
        {
                number1=n1;
                number2=n2;
        }

        void add()
        {
                System.out.println("The addition result is : "+ (number1+number2));
        }
}

class adding_using_cons
{
        public static void main(String args[])
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter the first number : ");
                double n1 = sc.nextDouble();
                System.out.println("Enter the second number : ");
                double n2 = sc.nextDouble();

                add obj = new add();

                obj.add(n1,n2);
                obj.add();
        }
}
```

Program 14:

Write a java program to add using method in java.

```
PS D:\Java_programs-main> java adding_using_method
Enter the first number :
10.5
Enter the second number :
20.5
The addition result is : 31.0
PS D:\Java_programs-main>
```

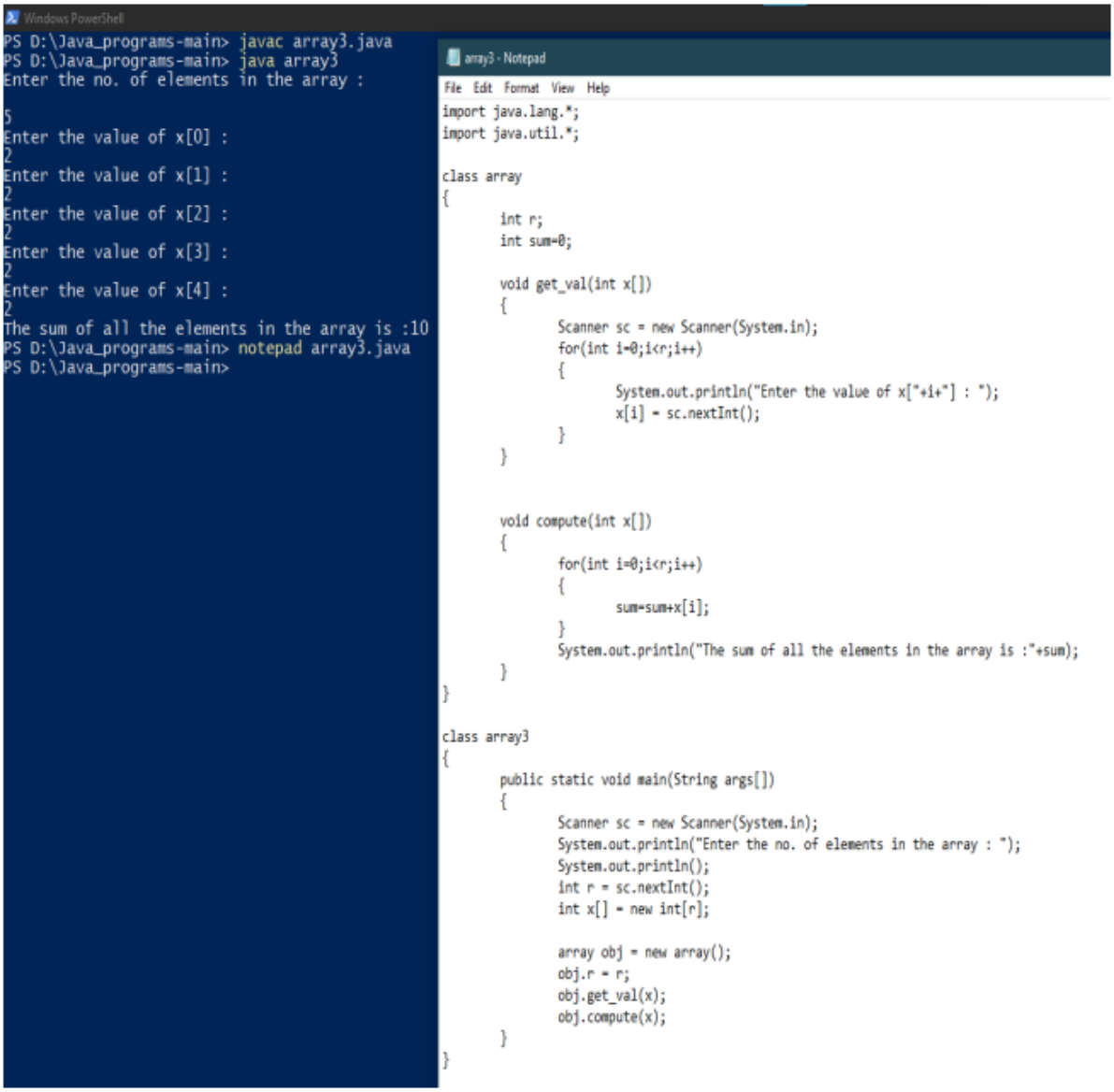
adding_using_method - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class add
{

	double number1;
	double number2;

	void value_declaration(double n1, double n2)
	{
		number1=n1;
		number2=n2;
	}

	void add_num()
	{
		System.out.println("The addition result is : "+ (number1+number2));
	}
}

class adding_using_method
{
	public static void main(String args[])
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the first number : ");
		double n1 = sc.nextDouble();
		System.out.println("Enter the second number : ");
		double n2 = sc.nextDouble();

		add obj = new add();

		obj.value_declaration(n1,n2);
		obj.add_num();
	}
}
```

Program 15:

Write a java program to calculate the sum of elements using array in java.



```
Windows PowerShell
PS D:\Java_programs-main> javac array3.java
PS D:\Java_programs-main> java array3
Enter the no. of elements in the array :

5
Enter the value of x[0] :
2
Enter the value of x[1] :
2
Enter the value of x[2] :
2
Enter the value of x[3] :
2
Enter the value of x[4] :
2
The sum of all the elements in the array is :10
PS D:\Java_programs-main> notepad array3.java
PS D:\Java_programs-main>
```

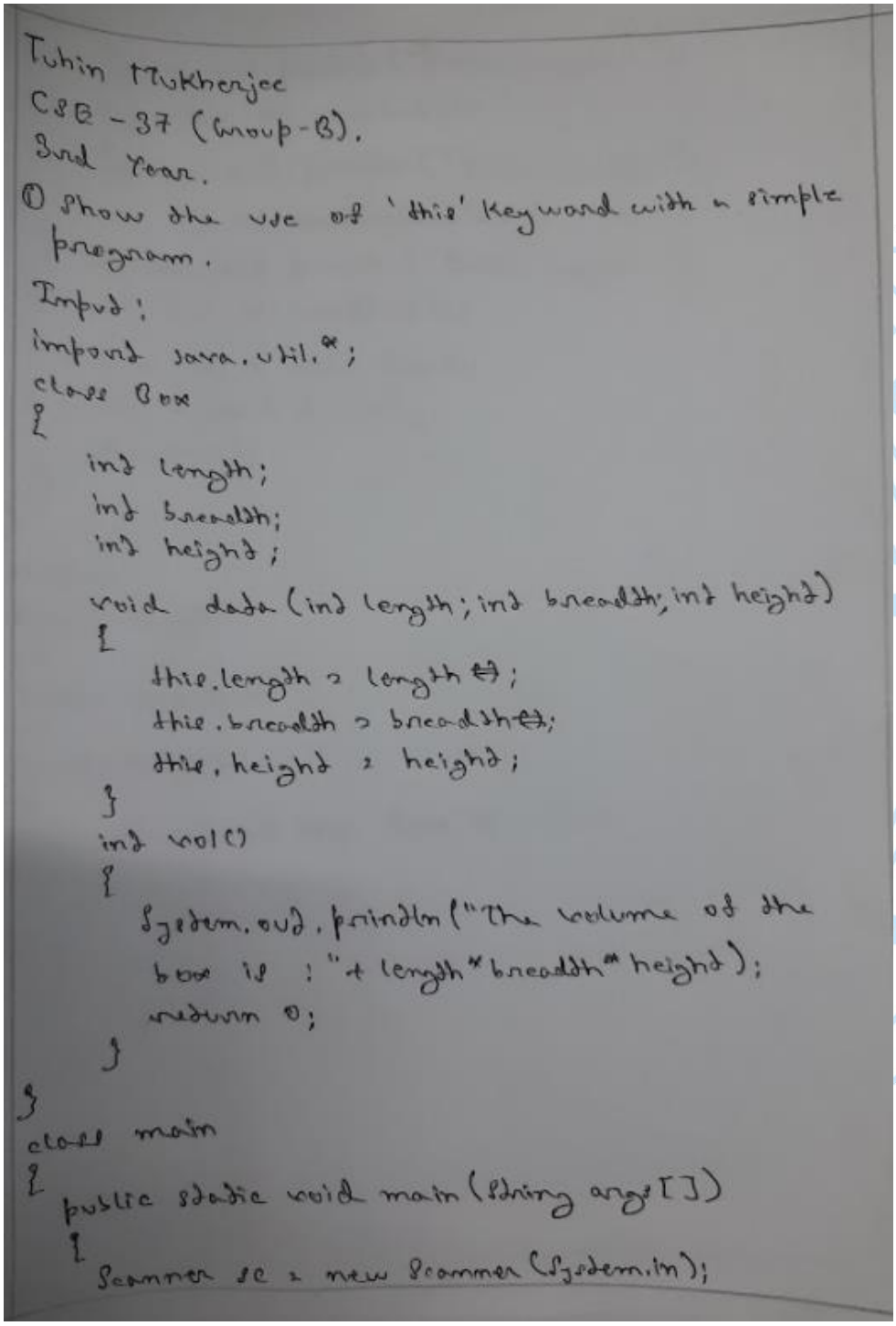
array3 - Notepad

File Edit Format View Help

```
import java.lang.*;
import java.util.*;

class array
{
	int r;
	int sum=0;

	void get_val(int x[])
	{
		Scanner sc = new Scanner(System.in);
		for(int i=0;i<r;i++)
		{
			System.out.println("Enter the value of x["+i+"] : ");
			x[i] = sc.nextInt();
		}
	}


	void compute(int x[])
	{
		for(int i=0;i<r;i++)
		{
			sum=sum+x[i];
		}
		System.out.println("The sum of all the elements in the array is :"+sum);
	}
}

class array3
{
	public static void main(String args[])
	{
		Scanner sc = new Scanner(System.in);
		System.out.println("Enter the no. of elements in the array : ");
		System.out.println();
		int r = sc.nextInt();
		int x[] = new int[r];

		array obj = new array();
		obj.r = r;
		obj.get_val(x);
		obj.compute(x);
	}
}
```

Program 16:

Writre a java program to Show the use of 'this' keyword with a simple program.

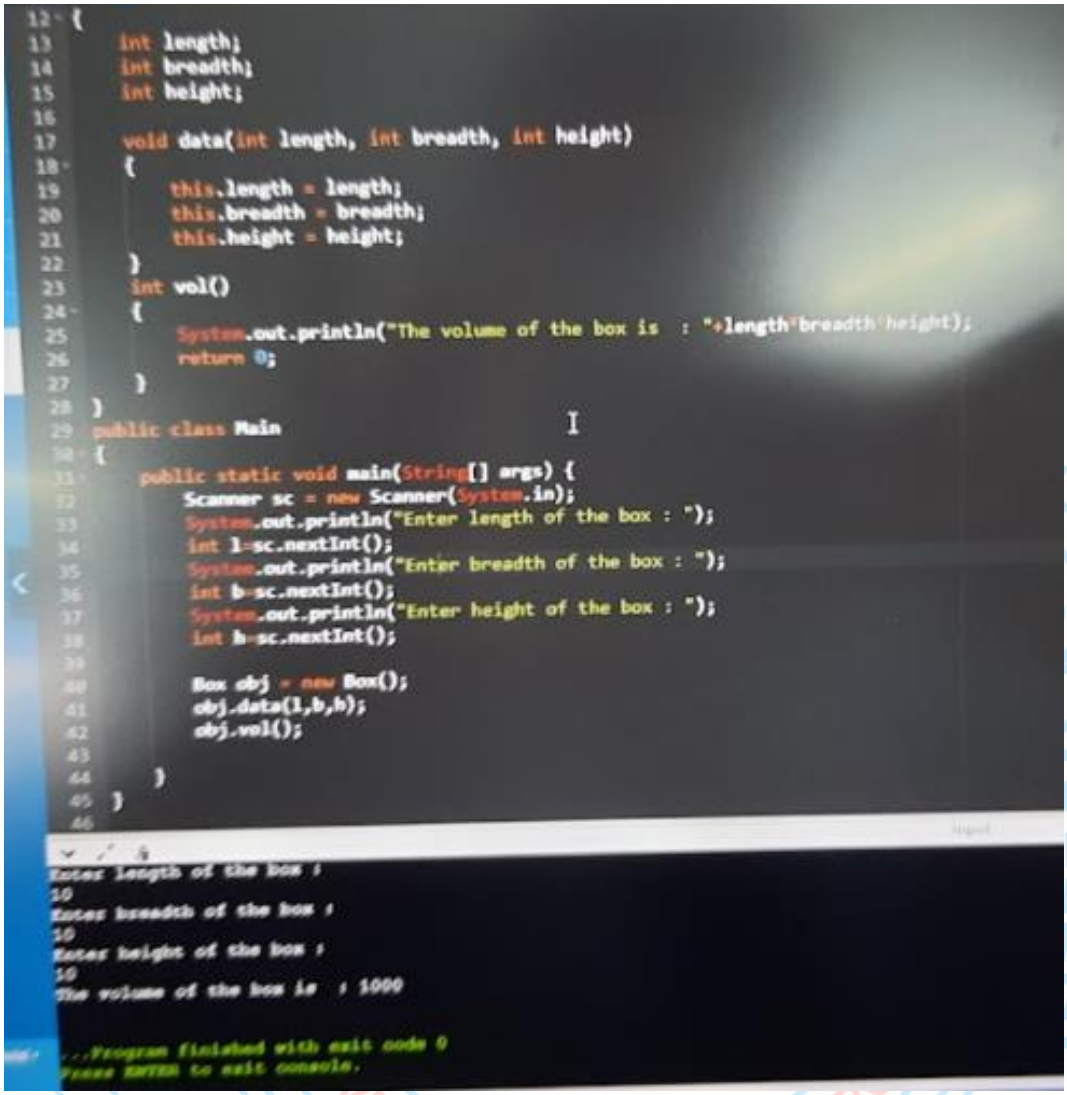


```
Tuhin Mukherjee
CSE - 37 (Group-B).
3rd Year.
① Show the use of 'this' keyword with a simple
  program.
Input :
import java.util.*;
class Box
{
    int length;
    int breadth;
    int height;
    void data (int length; int breadth; int height)
    {
        this.length = length;
        this.breadth = breadth;
        this.height = height;
    }
    int vol()
    {
        System.out.println("The volume of the
        box is : "+ length*breadth*height);
        return 0;
    }
}
class main
{
  public static void main (String args[])
  {
    Scanner sc = new Scanner(System.in);
```

```
        System.out.println("Enter length:");
        int l = sc.nextInt();
        System.out.println("Enter breadth:");
        int b = sc.nextInt();
        System.out.println("Enter height:");
        int h = sc.nextInt();

        Box obj = new Box();
        obj.data(l,b,h);
        obj.vol();
    }
}
```

Output:

```
Enter length:
10
Enter breadth:
10
Enter height:
10
The volume of the Box is: 1000
```

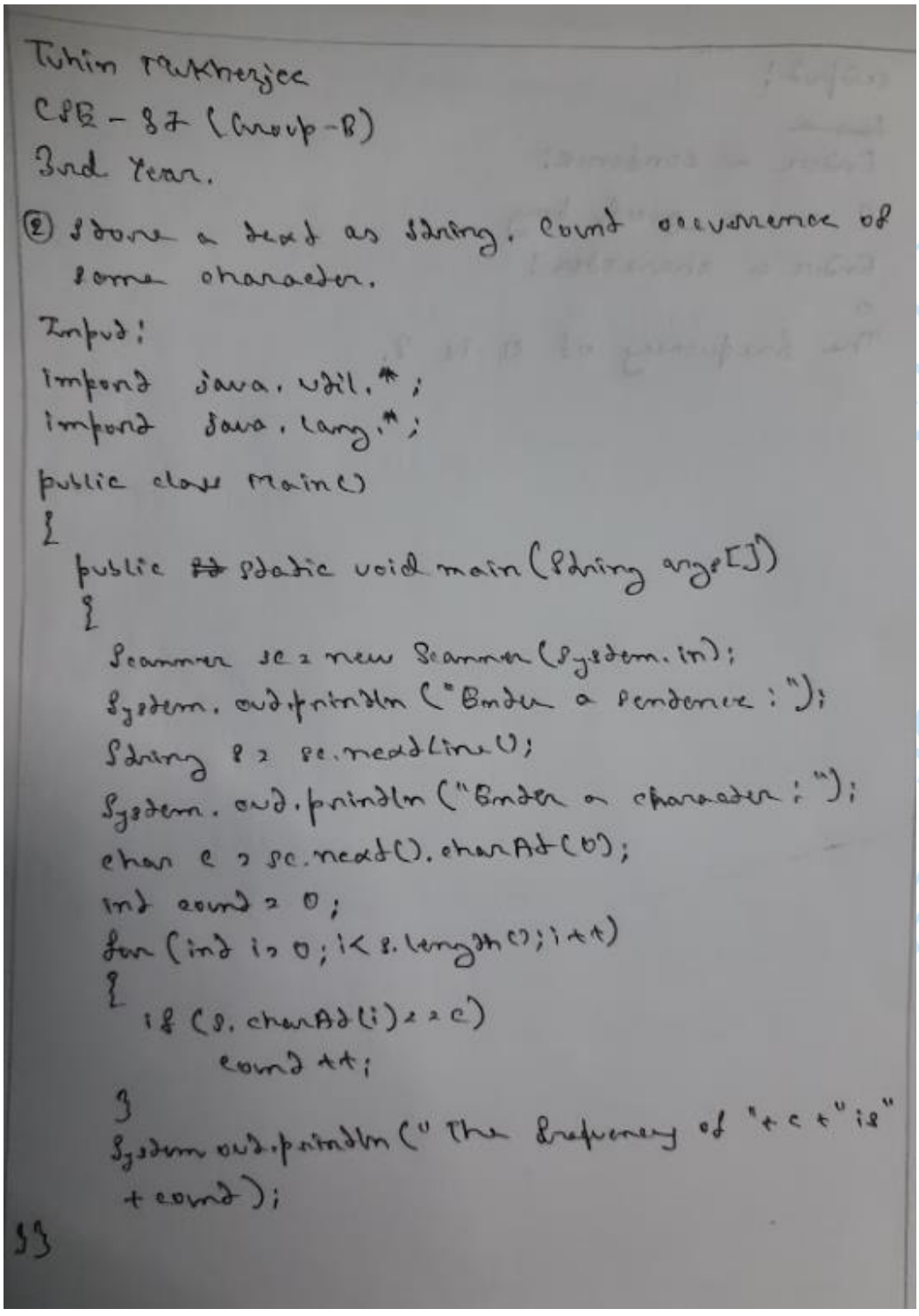


```
{
    int length;
    int breadth;
    int height;

    void data(int length, int breadth, int height)
    {
        this.length = length;
        this.breadth = breadth;
        this.height = height;
    }
    int vol()
    {
        System.out.println("The volume of the box is  : "+length*breadth*height);
        return 0;
    }
}
public class Main
{
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter length of the box : ");
        int l=sc.nextInt();
        System.out.println("Enter breadth of the box : ");
        int b=sc.nextInt();
        System.out.println("Enter height of the box : ");
        int h=sc.nextInt();

        Box obj = new Box();
        obj.data(l,b,h);
        obj.vol();

    }
}
```

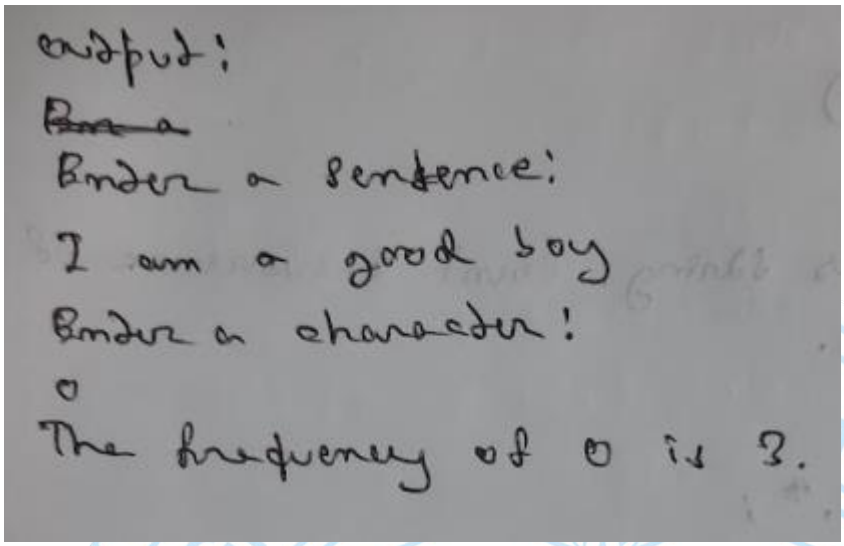
```
Enter length of the box :
10
Enter breadth of the box :
10
Enter height of the box :
10
The volume of the box is  : 1000

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 17:

Write a java program to Store a text (Ex. 'We shall overcome') as string. Count occurrence of some character.



```
Tuhin Mukherjee
CSE - 87 (Group-B)
3rd Year.
(2) Store a text as String. Count occurrence of
    some character.
Input:
import java.util.*;
import java.lang.*;
public class Main()
{
  public static void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter a Sentence:");
    String s = sc.nextLine();
    System.out.println("Enter a character:");
    char c = sc.next().charAt(0);
    int count = 0;
    for(int i=0; i<s.length(); i++)
    {
      if(s.charAt(i) == c)
          count++;
    }
    System.out.println("The frequency of "+c+" is"
    +count);
}}
```

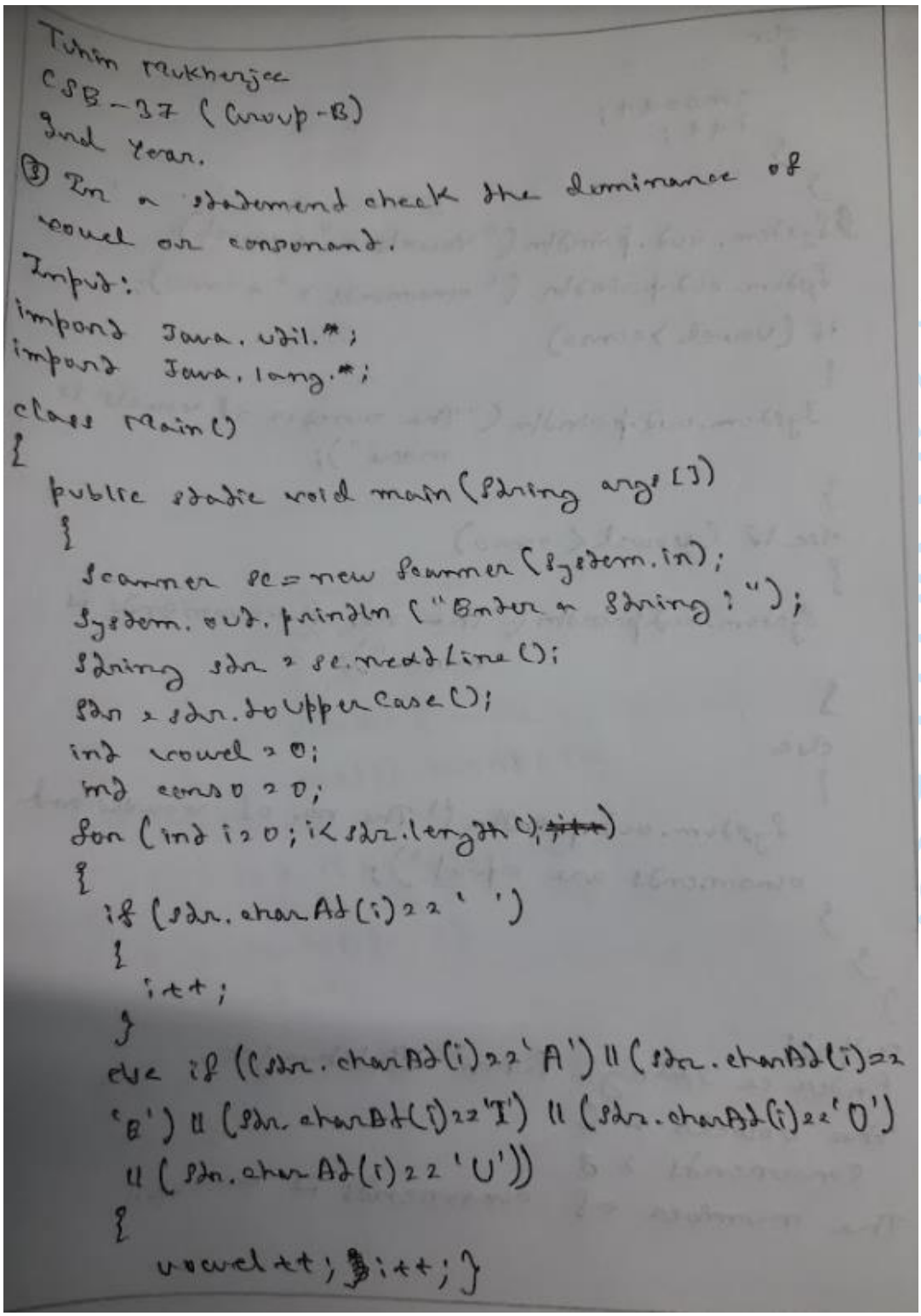



```java
/*****************************************************************************

Welcome to GDB Online.
GDB online is an online compiler and debugger tool for C, C++, Python, Java, PHP, Ruby, Perl,
C#, VB, Swift, Pascal, Fortran, Haskell, Objective-C, Assembly, HTML, CSS, JS, SQLite, Prolog.
Code, Compile, Run and Debug online from anywhere in world.

*****************************************************************************/
import java.util.*;
import java.lang.*;

public class Main
{
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a sentence : ");
        String s = sc.nextLine();
        System.out.println("Enter the character to find its frequency : ");
        char c = sc.next().charAt(0);
        int count = 0;
        for (int i=0;i<s.length();i++)
        {
            if(s.charAt(i)==c)
            {
                count++;
            }
        }
        System.out.println("The frequency of "+c+" is "+count);
    }
}
```

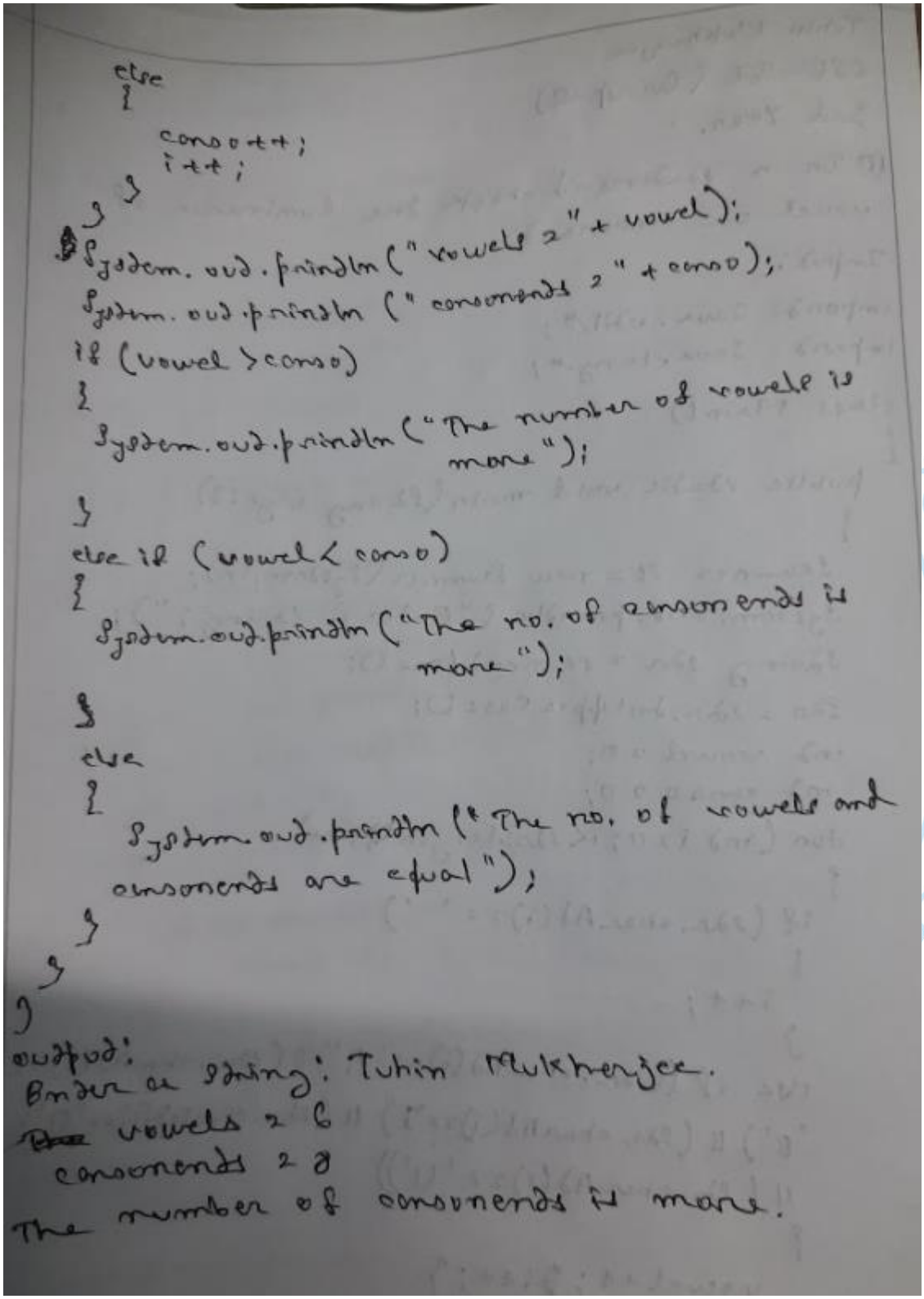
```
Enter a sentence :
i am a good boy
Enter the character to find its frequency :
o
The frequency of o is 3

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 18:

Write a java program to check the dominance of vowel or consonant in a statement.



```
Tuhin Mukherjee
CSB-37 (Group-B)
2nd Year.
(8) In a statement check the dominance of
vowel or consonant.
Input:
import java.util.*;
import java.lang.*;
class Main()
{
  public static void main(String args[])
  {
   Scanner sc=new Scanner(System.in);
   System.out.println("Enter a String:");
   String str = sc.nextLine();
   str = str.toUpperCase();
   int vowel = 0;
   int cons = 0;
   for (int i=0; i<str.length(); i++)
   {
    if (str.charAt(i)==' ')
    {
      i++;
    }
    else if ((str.charAt(i)=='A') || (str.charAt(i)==
    'E') || (str.charAt(i)=='I') || (str.charAt(i)=='O')
     || (str.charAt(i)=='U'))
    {
      vowel++; }i++; }
```



```
        else
        {
            conso++;
            i++;
        }
    }
    System.out.println("vowels = " + vowel);
    System.out.println("consonents = " + conso);
    if (vowel > conso)
    {
        System.out.println("The number of vowels is
                            more");
    }
    else if (vowel < conso)
    {
        System.out.println("The no. of consonents is
                            more");
    }
    else
    {
        System.out.println("The no. of vowels and
        consonents are equal");
    }
}
}
```

output:
Enter a string: Tuhin Mukherjee.
vowels = 6
consonents = 8
The number of consonents is more.

Program 19:

Write a simple program using the Box class to show the capability of inheritance.

```
import java.lang.*;
import java.util.*;

class Box1
{
    double width;
    double height;
    double length;

    void set_val( double w, double h, double l)
    {
        width=w;
        height=h;
        length=l;
    }

    void cal_vol()
    {
        System.out.println("The volume of the box is : "+ width*height*length);
    }
}

class Box2 extends Box1
{
    double weight;

    void set_val( double w )
    {
        weight = w;
    }

    void display()
    {
        System.out.println("The weight of the box is : "+weight);
    }
}


class Box_inheritance
```

```
{
    public static void main(String args[])
    {

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the width of the Box : ");
        double a = sc.nextInt();
        System.out.println("Enter the height of the Box : ");
        double b = sc.nextInt();
        System.out.println("Enter the length of the Box : ");
        double c = sc.nextInt();
        System.out.println("Enter the Weight of the Box : ");
        double w = sc.nextInt();

        Box2 obj = new Box2();

        obj.set_val(a,b,c);
        obj.cal_vol();
        obj.set_val(w);
        obj.display();
    }
}
```

Output:

PS D:\Java_programs-main> java Box_inheritance

Enter the height of the Box :

10

Enter the length of the Box :

10

Enter the Weight of the Box :

100

The volume of the box is : 1000.0

The weight of the box is : 100.0

PS D:\Java_programs-main>

Program 20:

Write a java program to Show the utility of method overloading in inheritance.

```
import java.lang.*;
import java.util.*;

class Box1
{
    double width;
    double height;
    double length;
    double volume;

    void set_val( double w, double h, double l)
    {
        width=w;
        height=h;
        length=l;
    }

    void cal_vol()
    {
        volume = width*height*length;
    }
}

class Box2 extends Box1
{
    double weight;

    void set_val( double w )
    {
        weight = w;
    }

    void display()
    {
        System.out.println("The lenght of the box is : "+length);
        System.out.println("The weidth of the box is : "+width);
        System.out.println("The height of the box is : "+height);

        System.out.println("The weight of the box is : "+weight);
        System.out.println("The volume of the box is : "+ volume );
    }
}
```

```
class Box_inheritance
{
    public static void main(String args[])
    {

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the width of the Box : ");
        double a = sc.nextInt();
        System.out.println("Enter the height of the Box : ");
        double b = sc.nextInt();
        System.out.println("Enter the length of the Box : ");
        double c = sc.nextInt();
        System.out.println("Enter the Weight of the Box : ");
        double w = sc.nextInt();

        Box2 obj = new Box2();

        obj.set_val(a,b,c);
        obj.cal_vol();
        obj.set_val(w);
        obj.display();
    }
}
```

Output:

```
PS D:\Java_programs-main> java Box_inheritance
Enter the width of the Box :
10
Enter the height of the Box :
10
Enter the length of the Box :
10
Enter the Weight of the Box :
100
The lenght of the box is : 10.0
The weidth of the box is : 10.0
The height of the box is : 10.0
The weight of the box is : 100.0
The volume of the box is : 1000.0
PS D:\Java_programs-main>
```

Program 21:

Write a java program to implement hierarchical inheritance using two dimensional shapes.

```
import java.lang.*;
import java.util.*;

class SHAPE
{
    int dim1;
    int dim2;

    void set_val(int a,int b)
    {
        dim1=a;
        dim2=b;
    }
}

class TRIANGLE extends SHAPE
{
    void area()
    {
        System.out.println();
        System.out.println("The area of the triangle is : "+(0.5*dim1*dim2));
    }
}

class RECTANGLE extends TRIANGLE
{
    void area()
    {
        System.out.println();
        System.out.println("The length of the rectangle is : "+dim1);
        System.out.println("The bredth of the rectangle is : "+dim2);
        System.out.println("The area of the rectangle is : "+dim1*dim2);
    }
}


class shapes
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter dimention 1 : ");
```

```
        int d1=sc.nextInt();
        System.out.println("Enter dimention 2 : ");
        int d2=sc.nextInt();

        TRIANGLE obj1 = new TRIANGLE();
        RECTANGLE obj2 = new RECTANGLE();

        obj1.set_val(d1,d2);
        obj1.area();
        obj2.set_val(d1,d2);
        obj2.area();
    }
}
```

OUTPUT:

```
OUTPUT    TERMINAL    DEBUG CONSOLE    PROBLEMS
PS D:\Java_programs-main> javac .\shapes.java
PS D:\Java_programs-main> java shapes
Enter dimention 1 :
10
Enter dimention 2 :
5

The area of the triangle is : 25.0

The length of the rectangle is : 10
The bredth of the rectangle is : 5
The area of the rectangle is : 50
PS D:\Java_programs-main>
```

Program 22:

Write a java program to Implement the concept of method overriding and show its use.

```
import java.util.*;

class shapes
{
    void area()
    {
        System.out.println("EMPTY");
    }
}

class square extends shapes
{
    int a;
    void input(int d1)
    {
        a=d1;
    }
    void area()
    {
        System.out.println("The area of square = "+(a*a));
    }
}
class rectangle extends shapes
{
    int a;
    int b;
    void input(int d1, int d2)
    {
        a=d1;
        b=d2;
    }
    void area()
    {
        System.out.println("The area of rectangle = "+(a*b));
    }

}

class Figure
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
```

```
        System.out.println("Enter Dim-1 : ");
        int d1 = sc.nextInt();
        System.out.println("Enter Dim-2 : ");
        int d2 = sc.nextInt();
        square sq = new square();
        sq.input(d1);
        rectangle rec = new rectangle();
        rec.input(d1,d2);

        sq.area();
        rec.area();
    }
}
```

Output:

```
PS D:\Java_programs-main> javac Figure.java
PS D:\Java_programs-main> java Figure
Enter Dim-1 :
10
Enter Dim-2 :
20
The area of square = 100
The area of rectangle = 200
PS D:\Java_programs-main>
```

Program 23:

Write a java program to implement dynamic method dispatch with simple example.

```
class A
{
    void show()
    {
        System.out.println("class A is called");
    }
}
class B extends A
{
    void show()
    {
        System.out.println("class B is called");
    }
}
class C extends A
{
    void show()
    {
        System.out.println("class C is called");
    }
}

class Dinamical
{
    public static void main(String args[])
    {
        A a = new A();
        B b = new B();
        C c = new C();
        A r = a;
        r.show();
        r=b;
        r.show();
        r=c;
        r.show();
    }
}
```

```
PS D:\Java_programs-main> javac Dinamical.java
PS D:\Java_programs-main> java Dinamical
class A is called
class B is called
class C is called
PS D:\Java_programs-main>
```

Program 24:

Write a java program to Show how to use the hidden version of some overridden method.

```
class A
{
    void show()
    {
        System.out.println("class A is called");
    }
}
class B extends A
{
    void show()
    {
        super.show();
        System.out.println("class B is called");
    }
}

class Dinamical
{
    public static void main(String args[])
    {
        A a = new A();
        B b = new B();
        A r = b;
        r.show();
    }
}
```

OUTPUT:

```
PS D:\Java_programs-main> javac Dinamical.java
PS D:\Java_programs-main> java Dinamical
class A is called
class B is called
PS D:\Java_programs-main>
```

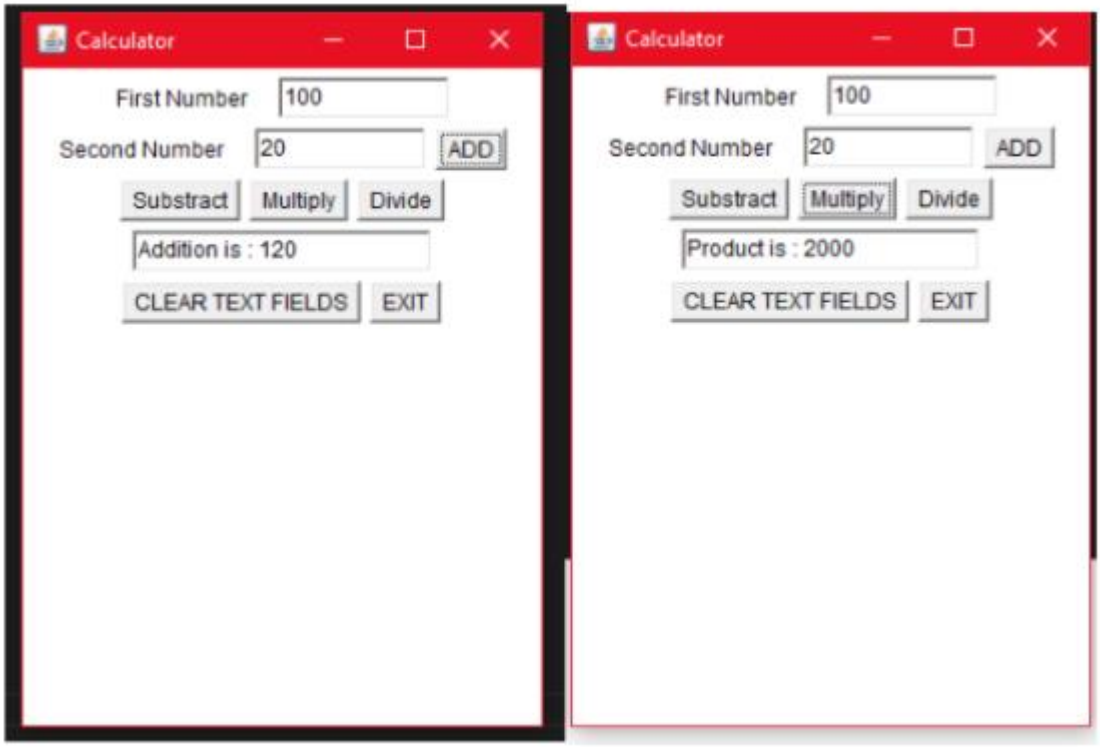
Program 25:

Write a java program to Develop a small calculator(Addition,Subtraction,Multiplication and Division only) using Java GUI.

```
import java.awt.*;
import java.awt.event.*;

class Calculator implements ActionListener
{
    Button B1,B2,B3,B4,B5,B6;//,B7;
    Label L1,L2;//,L3,L4,L5;
    Frame F1;
    TextField TF1,TF2,TF3,TF4,TF5,TF6,TF7;

    Calculator()
    {
        B1=new Button("ADD");
        B2=new Button("Substract");
        B3=new Button("Multiply");
        B4=new Button("Divide");
        B5=new Button("CLEAR TEXT FIELDS");
        B6=new Button("EXIT");
        //B7=new Button("Simple Interest");

        L1=new Label("First Number");
        L2=new Label("Second Number");
        //L3=new Label("Principle");
        //L4=new Label("Rate");
        //L5=new Label("Time");

        TF1=new TextField(10);
        TF2=new TextField(10);
        TF3=new TextField(20);
        //TF4=new TextField(5);
        //TF5=new TextField(5);
        //TF6=new TextField(5);
        //TF7=new TextField(10);

        F1=new Frame("Calculator");
        F1.setSize(300,400);
        F1.show();
        F1.setLayout(new FlowLayout());

        F1.add(L1);F1.add(TF1);
        F1.add(L2);F1.add(TF2);
        F1.add(B1);F1.add(B2);F1.add(B3);F1.add(B4);
        F1.add(TF3);
        //F1.add(L3);F1.add(TF4);
        //F1.add(L4);F1.add(TF5);
        //F1.add(L5);F1.add(TF6);
```

```
        //F1.add(B7);
        //F1.add(TF7);
        F1.add(B5);
        F1.add(B6);

        B1.addActionListener(this);
        B2.addActionListener(this);
        B3.addActionListener(this);
        B4.addActionListener(this);
        B5.addActionListener(this);
        B6.addActionListener(this);
        //B7.addActionListener(this);
    }

    public void actionPerformed(ActionEvent ae)
    {
        if(ae.getSource()==B1)
        {
            int a= Integer.parseInt(TF1.getText());
            int b= Integer.parseInt(TF2.getText());
            int c=a+b;
            TF3.setText("Addition is : "+Integer.toString(c));
        }
        else if(ae.getSource()==B2)
        {
            int a= Integer.parseInt(TF1.getText());
            int b= Integer.parseInt(TF2.getText());
            int c=a-b;
            TF3.setText("Difference is : "+Integer.toString(Math.abs(c)));
        }
        else if(ae.getSource()==B3)
        {
            int a= Integer.parseInt(TF1.getText());
            int b= Integer.parseInt(TF2.getText());
            int c=a*b;
            TF3.setText("Product is : "+Integer.toString(c));
        }
        else if(ae.getSource()==B4)
        {
            int a= Integer.parseInt(TF1.getText());
            int b= Integer.parseInt(TF2.getText());
            int c=a/b;
            TF3.setText("Division is :"+Integer.toString(c));
        }
        /**else if(ae.getSource()==B7)
        {
            int p=Integer.parseInt(TF4.getText());
            int r=Integer.parseInt(TF5.getText());
```

```
            int t=Integer.parseInt(TF6.getText());
            int si=(p*r*t)/100;
            TF7.setText(Integer.toString(si));
        }*/
        else if(ae.getSource()==B5)
        {
            TF1.setText("");
            TF2.setText("");
            TF3.setText("");
        }
        else if(ae.getSource()==B6)
        {
            F1.dispose();
        }
    }

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

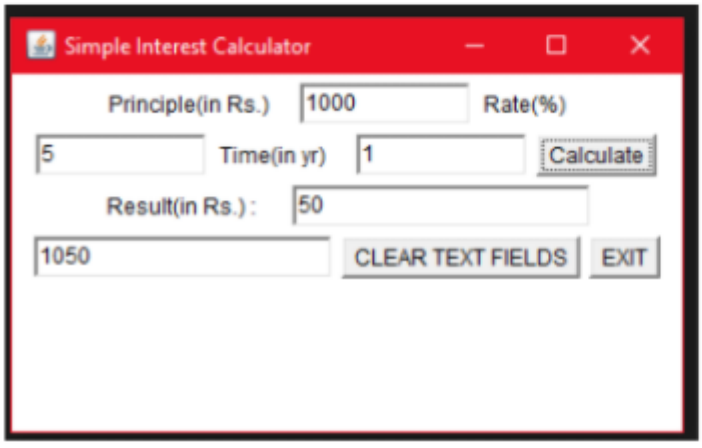


Program 26:

Write a java program to develop a Java GUI to calculate the Simple Interest and Final Amount based on Principal Amount, Rate and Time

```
import java.awt.*;
import java.awt.event.*;

class Simple_interest implements ActionListener
{
    Button B1,B2,B3;
    Label L1,L2,L3,L4;
    Frame F1;
    TextField TF1,TF2,TF3,TF4,TF5;

    Simple_interest()
    {
        B1=new Button("Calculate");
        B2=new Button("CLEAR TEXT FIELDS");
        B3=new Button("EXIT");

        L1=new Label("Principle(in Rs.)");
        L2=new Label("Rate(%)");
        L3=new Label("Time(in yr)");
        L4=new Label("Result(in Rs.) : ");

        TF1=new TextField(10);
        TF2=new TextField(10);
        TF3=new TextField(10);
        TF4=new TextField(20);
        TF5=new TextField(20);

        F1=new Frame("Simple Interest Calculator");
        F1.setSize(300,400);
        F1.show();
        F1.setLayout(new FlowLayout());

        F1.add(L1);F1.add(TF1);
        F1.add(L2);F1.add(TF2);
        F1.add(L3);F1.add(TF3);
        F1.add(B1);
        F1.add(L4);
        F1.add(TF4);
        F1.add(TF5);
        F1.add(B2);
        F1.add(B3);

        B1.addActionListener(this);
        B2.addActionListener(this);
        B3.addActionListener(this);
    }

    public void actionPerformed(ActionEvent ae)
```

```
    {
        if(ae.getSource()==B1)
        {
            int p=Integer.parseInt(TF1.getText());
            int r=Integer.parseInt(TF2.getText());
            int t=Integer.parseInt(TF3.getText());
            int si=(p*r*t)/100;
            int amount=p+si;
            TF4.setText(Integer.toString(si));
            TF5.setText(Integer.toString(amount));
        }
        else if(ae.getSource()==B2)
        {
            TF1.setText("");
            TF2.setText("");
            TF3.setText("");
            TF4.setText("");
            TF5.setText("");
        }
        else if(ae.getSource()==B3)
        {
            F1.dispose();
        }
    }

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



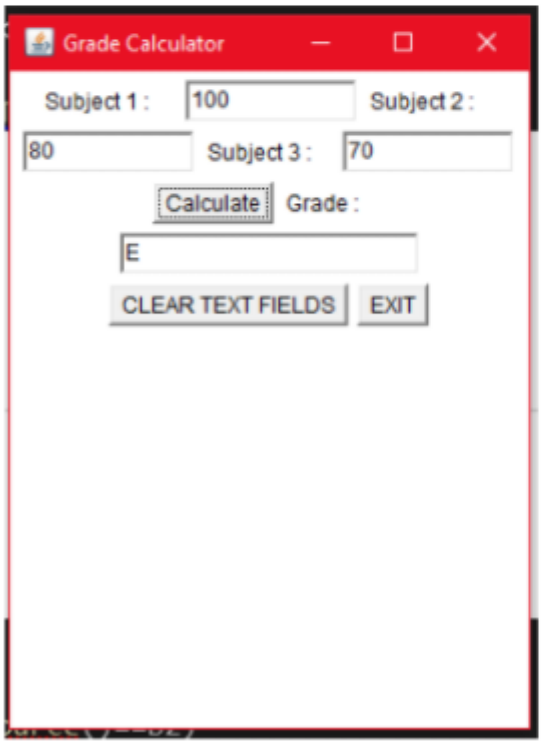
Program 27:

Write a java program to Develop one java GUI to display the grade of a student based on three subjects mark.

```
      import java.awt.*;
import java.awt.event.*;

class GradeGUI implements ActionListener
{
    Button B1,B2,B3;
    Label L1,L2,L3,L4;
    Frame F1;
    TextField TF1,TF2,TF3,TF4;

    GradeGUI()
    {
        B1=new Button("Calculate");
        B2=new Button("CLEAR TEXT FIELDS");
        B3=new Button("EXIT");

        L1=new Label("Subject 1 : ");
        L2=new Label("Subject 2 :");
        L3=new Label("Subject 3 :");
        L4=new Label("Grade : ");

        TF1=new TextField(10);
        TF2=new TextField(10);
        TF3=new TextField(10);
        TF4=new TextField(20);

        F1=new Frame("Grade Calculator");
        F1.setSize(300,400);
        F1.show();
        F1.setLayout(new FlowLayout());
```

```
        F1.add(L1);F1.add(TF1);
        F1.add(L2);F1.add(TF2);
        F1.add(L3);F1.add(TF3);
        F1.add(B1);
        F1.add(L4);
        F1.add(TF4);
        F1.add(B2);
        F1.add(B3);

        B1.addActionListener(this);
        B2.addActionListener(this);
        B3.addActionListener(this);
    }
    public void actionPerformed(ActionEvent ae)
    {
        if(ae.getSource()==B1)
        {
            int m1=Integer.parseInt(TF1.getText());
            int m2=Integer.parseInt(TF2.getText());
            int m3=Integer.parseInt(TF3.getText());
            int avg=(m1+m2+m3)/3;
            if(avg>=90)
            {
                TF4.setText("O");
            }
            else if((avg>=80))
            {
                TF4.setText("E");
            }
            else if((avg>=70))
            {
                TF4.setText("A");
            }
            else if((avg>=60))
            {
                TF4.setText("B");
            }
            else if((avg>=50))
            {
                TF4.setText("C");
            }
            else if((avg>=40))
            {
                TF4.setText("D");
            }
            else if(avg<40)
            {
                TF4.setText("F");
```

```
            }
        }
        else if(ae.getSource()==B2)
        {
            TF1.setText("");
            TF2.setText("");
            TF3.setText("");
            TF4.setText("");
        }
        else if(ae.getSource()==B3)
        {
            F1.dispose();
        }
    }
    public static void main(String args[])
    {
        new GradeGUI();
    }
}
```



Program 28:

Write a java program Using interface present the essence of multiple inheritance in java.

```
import java.lang.*;

interface boy
{
    void show_boy();
}
interface girl
{
    void show_girl();
}
class Interface1 implements boy,girl{
    public void show_boy()
    {
        System.out.println("I am boy interface!");
    }
    public void show_girl()
    {
        System.out.println("I am girl interface!");
    }

    public static void main(String args[])
    {
        Interface1 I1 = new Interface1();
        I1.show_boy();
        I1.show_girl();
    }
}
```

```
OUTPUT  TERMINAL  DEBUG CONSOLE  PROBLEMS
PS D:\Work\Java_programs-main> java Interface1
I am boy interface!
I am girl interface!
PS D:\Work\Java_programs-main>
```

Program 29:

Write a java program to find grade of subject from obtained marks. Utilize constant data declared inside interface to implement this program.

```
interface grade
{
    final int O = 90;
    final int E = 80;
    final int A = 70;
    final int B = 60;
    final int C = 50;
    final int D = 40;

    void result();
}
class Grade implements grade
{
    int sub1=85;
    int sub2=90;
    int sub3=45;

    public void result()
    {
        int avg = (sub1+sub2+sub3)/3;
        if(avg>=O)
        {
            System.out.println("Grade : O");
        }
        else if((avg>=E) && (avg<O))
        {
            System.out.println("Grade : E");
        }
        else if((avg>=A) && (avg<E))
        {
            System.out.println("Grade : A");
        }
        else if((avg>=B) && (avg<A))
        {
            System.out.println("Grade : B");
        }
        else if((avg>=C) && (avg<B))
        {
            System.out.println("Grade : C");
        }
        else if((avg>=D) && (avg<C))
        {
            System.out.println("Grade : D");
        }
        else
        {
            System.out.println("Grade : F");
        }
```

```
    }
    public static void main(String args[])
    {
        Grade GO = new Grade();
        GO.result();
    }
}
```

```
Grade : A
```

Program 30:

Write a java program to……

Class A extends B implements C,D
Here B is abstract class.
Each one of B, C, D contains two abstract methods, one being common among all.
Complete the program and show the use of all the methods.

```
interface C
{
    void show();
    void show_C();
}
interface D
{
    void show();
    void show_D();
}
abstract class B
{
    abstract void show();
    abstract void show_B();
}

class A extends B implements C,D
{
    public void show()
    {
        System.out.println("Common show method is called!");
    }
    public void show_C()
    {
        System.out.println("I am C. I am being called!");
    }
    public void show_D()
    {
        System.out.println("I am D. I am being called!");
    }
    public void show_B()
    {
        System.out.println("I am B. I am being called!");
    }
    public void show_A()
    {
        System.out.println("I am A. I am being called!");
    }
}

class Abstraction_drama
{
    public static void main(String args[])
    {
        A obj = new A();
        obj.show();
        obj.show_A();
        obj.show_B();
```

```
        obj.show_C();
        obj.show_D();
    }
}
```

```
PS D:\Work\Java_programs-main> javac Abstraction_drama.java
PS D:\Work\Java_programs-main> java Abstraction_drama
Common show method is called!
I am A. I am being called!
I am B. I am being called!
I am C. I am being called!
I am D. I am being called!
PS D:\Work\Java_programs-main>
```

Program 31:

Write a java program create a linked list using the java collection framework and perform six basic operations such as

Add. Insert, Delete, Display, sort, and search an element.

```
import java.util.*;

public class Linklist {
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        LinkedList<Integer> ll = new LinkedList<>();
        boolean L=true;
        while(L)
        {
            System.out.println(" Enter 1 to perform Insertion\n Enter 2 to
perform deletion\n Enter 3 to perform Display\n Enter 4 to perform sorting\n
Enter 5 to perform Search.\n Enter 6 to terminate!");
            int choice = sc.nextInt();
            switch(choice)
            {
                case 1:
                {
                    System.out.println("Enter an element to insert into the
linked list :");
                    int ele = sc.nextInt();
                    ll.add(ele);
                    break;
                }
                case 2:
                {
                    System.out.println("Removing the last element \n After
removal the link list is :");
                    ll.remove(ll.size()-1);
                    System.out.println(ll);
                    break;
                }

                case 3:
                {
                    System.out.println("The Linked list is : ");
                    for (int i = 0; i < ll.size(); i++)
                    {
                        System.out.print(ll.get(i) + " ");
                    }
                    System.out.println();
```

```
                    break;
                }

                case 4:
                {
                    System.out.println("After sorting the link list : ");
                    Collections.sort(ll);
                    for (int i = 0; i < ll.size(); i++)
                    {
                        System.out.print(ll.get(i) + " ");
                    }
                    System.out.println();
                    break;
                }

                case 5:
                {
                    System.out.println("Enter the element to be searched
for.");
                    int ele = sc.nextInt();
                    boolean found = false;
                    for (int i = 0; i < ll.size(); i++)
                    {
                        if(ll.get(i)==ele)
                        {
                            System.out.println("The element is found in the
link list!");
                            found =true;
                        }
                    }
                    if(found==false)
                    {
                        System.out.println("Element not found in the link
list.");
                    }
                    break;
                }

                case 6:
                {
                    System.out.println("Terminating now...");
                    L=false;
                    break;
                }

                default:
                System.out.println("Wrong choice!");
            }
```

```
        }
    }
}
```

OUTPUT:

```
PS D:\Work\Java_programs-main> javac Linklist.java
PS D:\Work\Java_programs-main> java Linklist
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
1
Enter an element to insert into the linked list :
10
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
1
Enter an element to insert into the linked list :
20
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
1
Enter an element to insert into the linked list :
60
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
1
Enter an element to insert into the linked list :
30
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
3
```

```
3
The Linked list is :
10 20 60 5
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
4
After sorting the link list :
5 10 20 60
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
5
Enter the element to be searched for.
20
The element is found at 21 position of the link list
 Enter 1 to perform Insertion
 Enter 2 to perform deletion
 Enter 3 to perform Display
 Enter 4 to perform sorting
 Enter 5 to perform Search.
 Enter 6 to terminate!
6
Terminating now...
PS D:\Work\Java_programs-main>
```

Program 32:

Write a java program to perform Exception Handling using try-catch-finally block.

Testing finally block.

Finally.java

```java
public class Finally {
    Run | Debug
    public static void main(String args[])
    {
        try
        {
            int number=10/0;
            System.out.println(number);
        }
        catch(ArithmeticException e)
        {
            System.out.println("Number can not be divided with zero!");
        }
        finally
        {
            System.out.println("This is finally block.");
        }
        System.out.println("All blocks are executed.");
    }
}
```

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS D:\Work\Java_programs-main> javac Finally.java
PS D:\Work\Java_programs-main> java Finally
Number can not be divided with zero!
This is finally block.
All blocks are executed.
PS D:\Work\Java_programs-main>
```