

CERTIFICATE

*This is to certify that Mr./Ms. **Hemil...Chovatiya**..... with
enrolment no.**200303108003**..... has successfully
completed **his/her** laboratory experiments in the **JAVA**
PROGRAMMING WORKSHOP (203105259) from the department
of **Information Technology(4ITA1)**..... during the
academic year **2021-2022**.....*



Date of Submission:

Staff In charge:

Head of Department:



Faculty of Engineering & Technology
Subject Name: Java Workshop
Subject Code: 203105259
B.Tech.: IT Year: 2021-22 Semester: 4

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Practical Set: 1

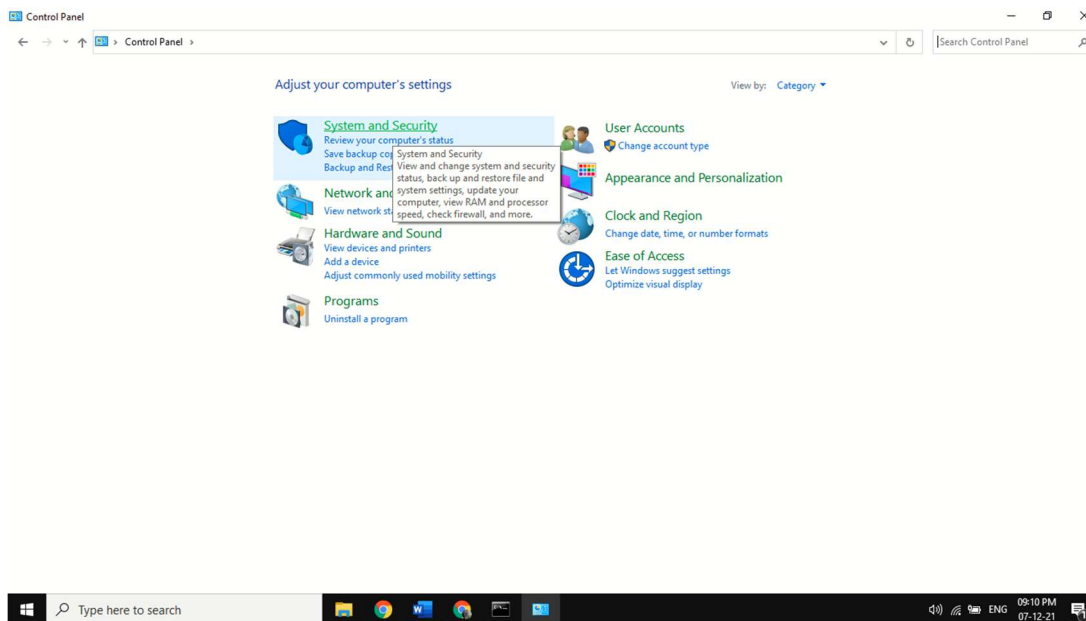
Basics of Java

Practical 1:

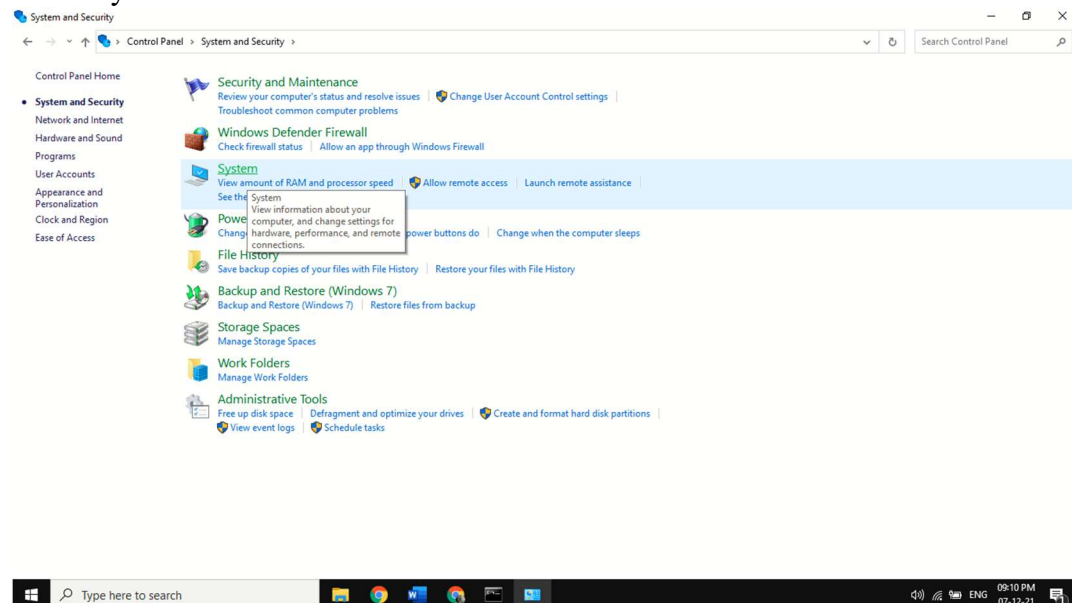
AIM: Prepare a report on how to set the PATH variable to the java directory.

Steps:

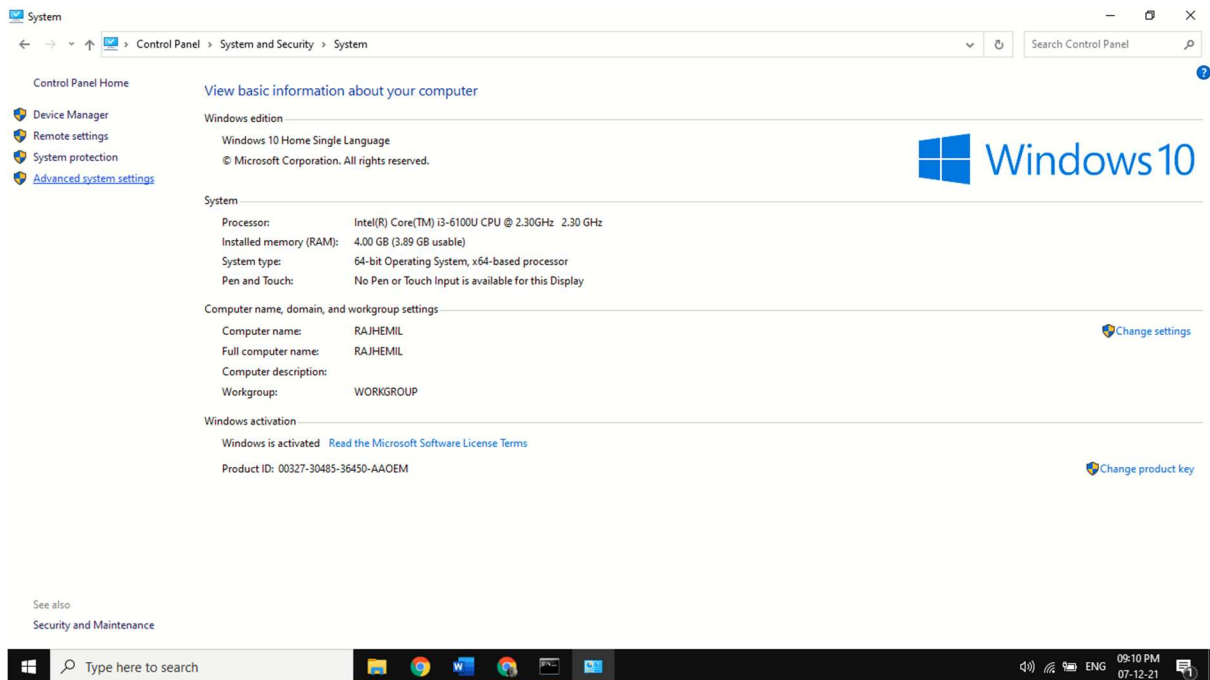
1. Open Control Panel and go to System and Security



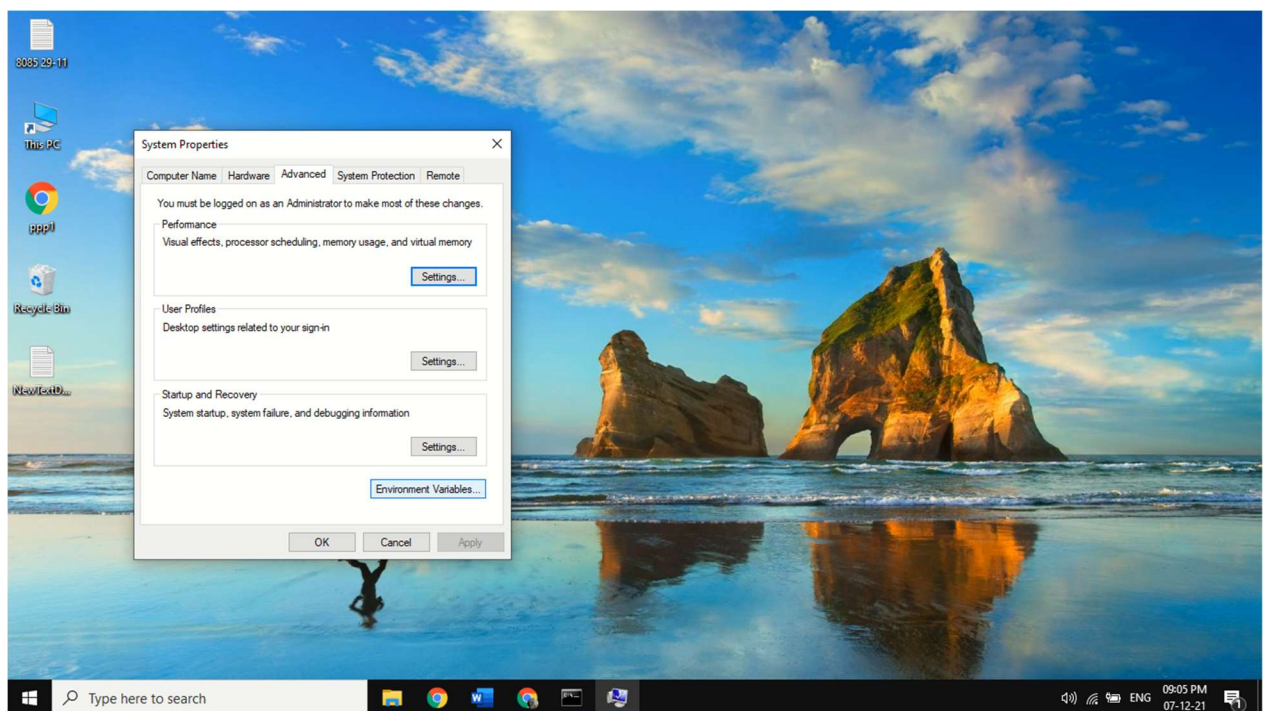
2. Go to System



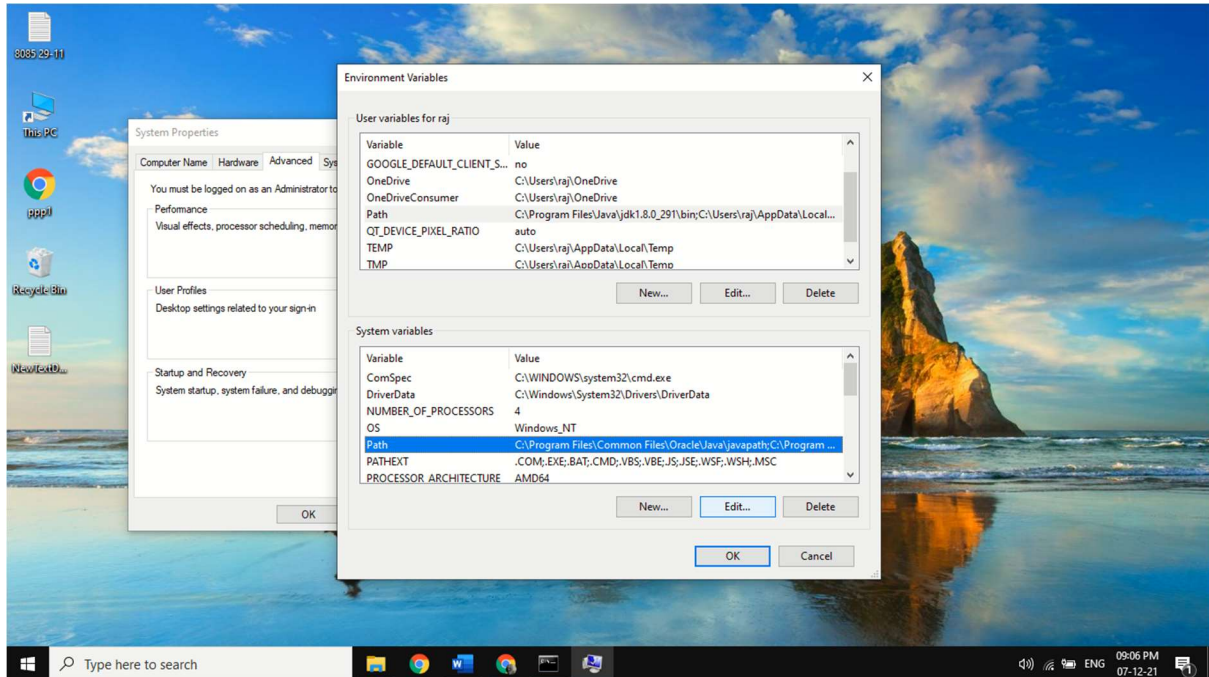
3. Go to Advanced System Setting



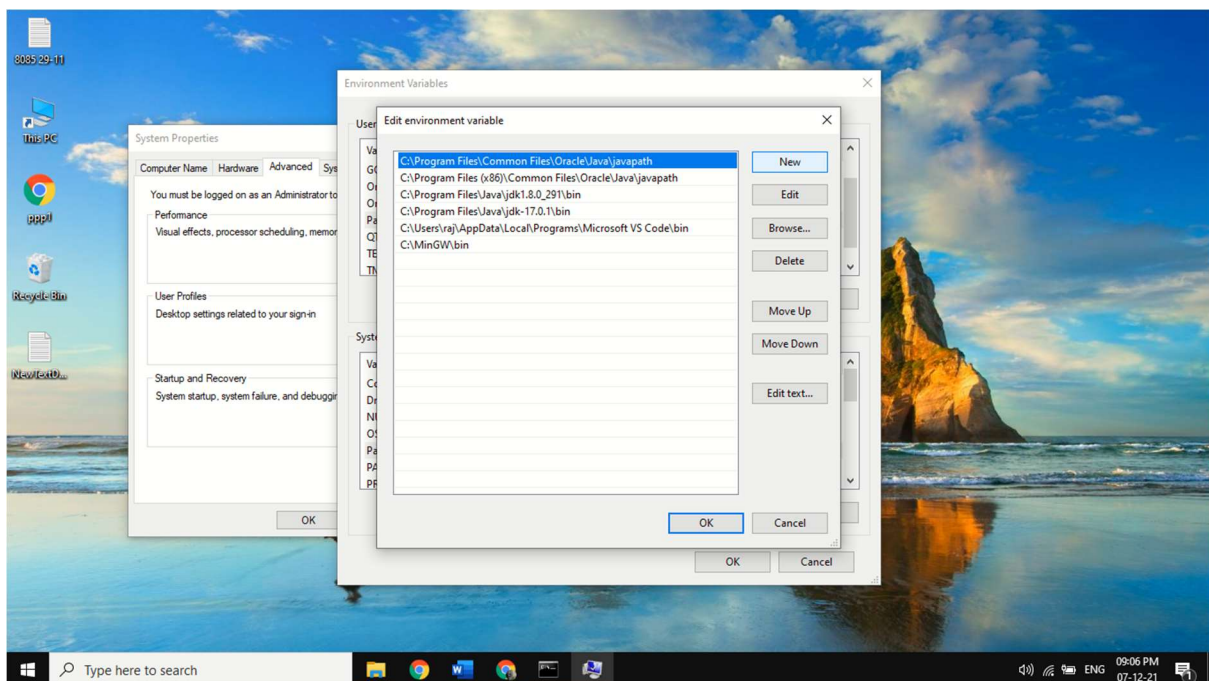
4. Go to Environment Variables



5. Click on path and then click on edit



6. Click on new and paste the Path of java as show below



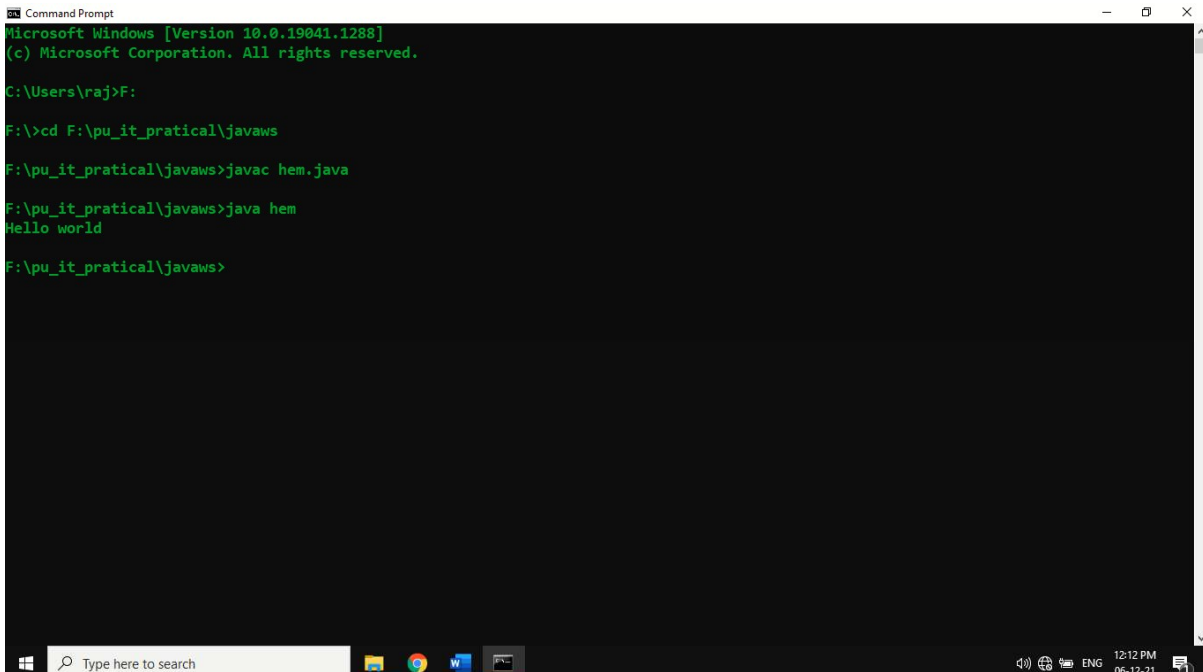
Practical 2:

AIM: Implement a JAVA program to display “Hello World” on the console.

CODE:

```
class hem
{
    public static void main(String args[])
    {
        System.out.println("Hello world");
    }
}
```

OUTPUT:



```
Microsoft Windows [Version 10.0.19041.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\raj>F:

F:\>cd F:\pu_it_practical\javaws

F:\pu_it_practical\javaws>javac hem.java

F:\pu_it_practical\javaws>java hem
Hello world

F:\pu_it_practical\javaws>
```

Practical 3:

AIM: How to compile and run the above program.

Steps:

1. Firstly Open The Command Line In Your Device
2. Than Go To C Or D Drive Wherever You Have Saved Your Code File.
3. Than Type Javac P1.Java To Compile And Get Class File For It
4. And Than Type Java P1 To Run The Program

Code:

C:\Users\raj>F:

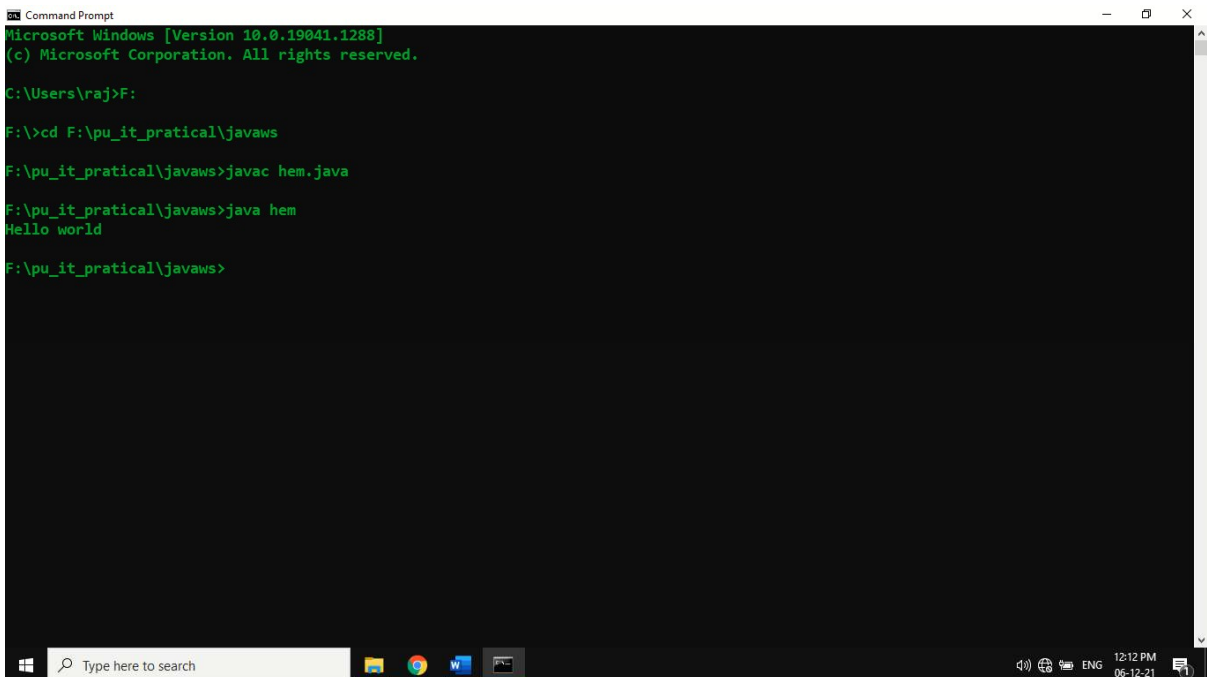
F:\>cd F:\pu_it_pratical\javaws

F:\pu_it_pratical\javaws>javac hem.java

F:\pu_it_pratical\javaws>java hem

Hello world

OUTPUT:



```
Microsoft Windows [Version 10.0.19041.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\raj>F:

F:\>cd F:\pu_it_pratical\javaws

F:\pu_it_pratical\javaws>javac hem.java

F:\pu_it_pratical\javaws>java hem
Hello world

F:\pu_it_pratical\javaws>
```

Practical 4:

AIM: Write a program to test number is prime or not.

CODE:

```
import java.util.*;

class prime{

    public static void main(String args[])
    {
        int a,p,i;

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter Number:");

        a= sc.nextInt();

        p=0;

        for(i=1;i<=a;i++)
        {
            if ( a % i == 0)
            {
                p++;
            }
        }

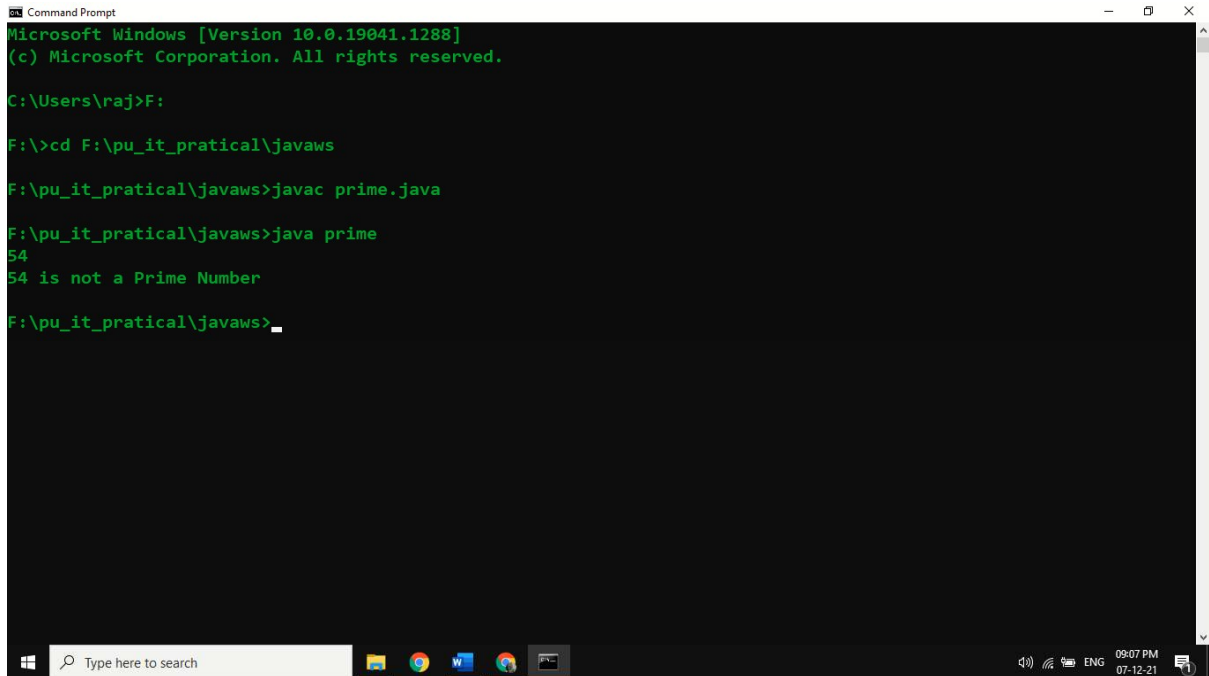
        if(p==2)
        {   System.out.println(a+" is a Prime Number");   }

        else

        {   System.out.println(a+" is not a Prime Number");   }

    }
}
```


Output:



```
Microsoft Windows [Version 10.0.19041.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\raj>F:

F:\>cd F:\pu_it_practical\javaws

F:\pu_it_practical\javaws>javac prime.java

F:\pu_it_practical\javaws>java prime
54
54 is not a Prime Number

F:\pu_it_practical\javaws>_
```

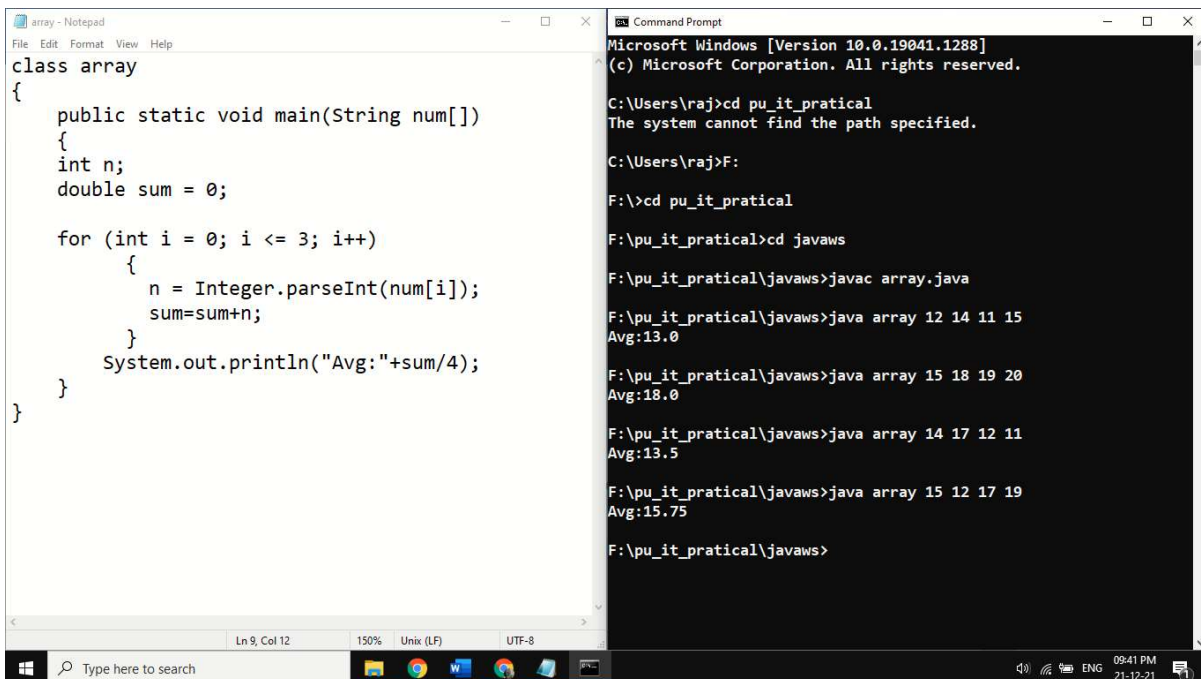
Practical 5:

AIM: Write a program that creates and initializes a four integer element array. Calculate and display the average of its values.

Code:

```
class array
{
    public static void main(String num[])
    {
        int n;
        double sum = 0;
        for (int i = 0; i <= 3; i++)
        {
            n = Integer.parseInt(num[i]);
            sum=sum+n;
        }
        System.out.println("Avg:"+sum/4);
    }
}
```

OUTPUT:



The screenshot shows two windows side-by-side. The left window is Notepad++ with the Java code from the previous block. The right window is a Windows Command Prompt. The Command Prompt shows the following sequence of commands and outputs:

```
Microsoft Windows [Version 10.0.19041.1288]
(c) Microsoft Corporation. All rights reserved.

C:\Users\raj>cd pu_it_practical
The system cannot find the path specified.

C:\Users\raj>F:

F:\>cd pu_it_practical

F:\pu_it_practical>cd javaws

F:\pu_it_practical\javaws>javac array.java

F:\pu_it_practical\javaws>java array 12 14 11 15
Avg:13.0

F:\pu_it_practical\javaws>java array 15 18 19 20
Avg:18.0

F:\pu_it_practical\javaws>java array 14 17 12 11
Avg:13.5

F:\pu_it_practical\javaws>java array 15 12 17 19
Avg:15.75

F:\pu_it_practical\javaws>
```

Practical Set: 2

Class, object and methods in JAVA

Practical 1:

AIM: Write class Box

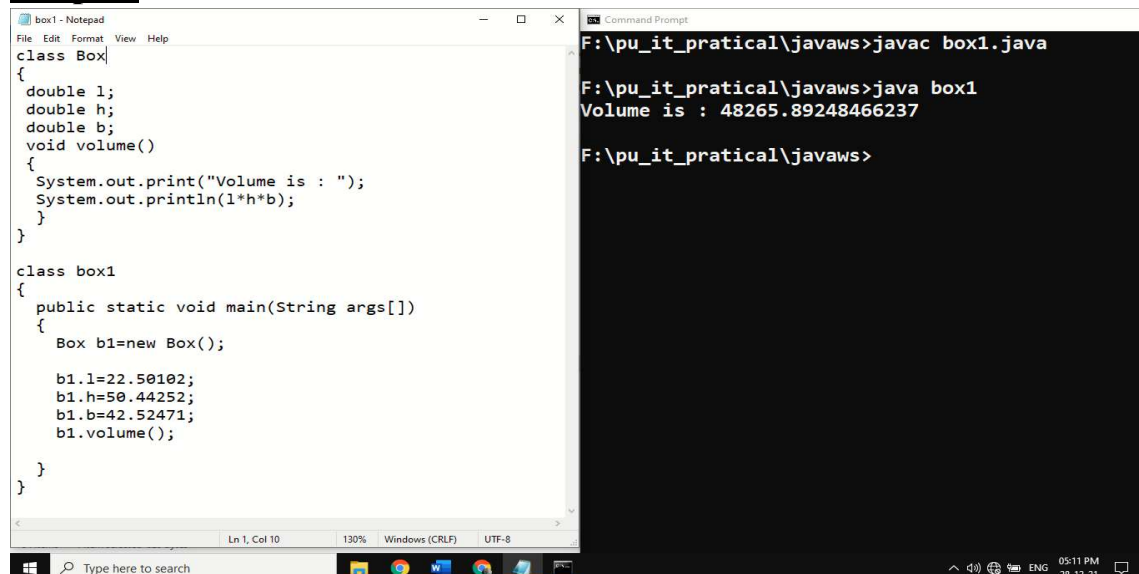
- Define data member l,b,h**
- Define method to set the data.**
- Define display method to display data member**

Code:

```
class Box
{
    double l;
    double h;
    double b;
    void volume()
    {
        System.out.print("Volume is : ");
        System.out.println(l*h*b);
    }
}

class box1
{
    public static void main(String args[])
    {
        Box b1=new Box();
        b1.l=22.50102;
        b1.h=50.44252;
        b1.b=42.52471;
        b1.volume();
    }
}
```

Output:



The screenshot shows a Windows desktop environment. On the left, a Notepad++ window titled 'box1 - Notepad' displays the Java code from the previous block. On the right, a Command Prompt window shows the execution of the code. The commands entered are 'javac box1.java' and 'java box1'. The output of the 'java box1' command is 'Volume is : 48265.89248466237'.

```
box1 - Notepad
File Edit Format View Help
class Box
{
double l;
double h;
double b;
void volume()
{
System.out.print("Volume is : ");
System.out.println(l*h*b);
}
}

class box1
{
public static void main(String args[])
{
Box b1=new Box();

b1.l=22.50102;
b1.h=50.44252;
b1.b=42.52471;
b1.volume();
}
}

Ln 1, Col 10 130% Windows (CRLF) UTF-8

Command Prompt
F:\pu_it_practical\javaws>javac box1.java
F:\pu_it_practical\javaws>java box1
Volume is : 48265.89248466237
F:\pu_it_practical\javaws>
```

Practical 2:

AIM: Write class Box

a. Define data member l,b,h.

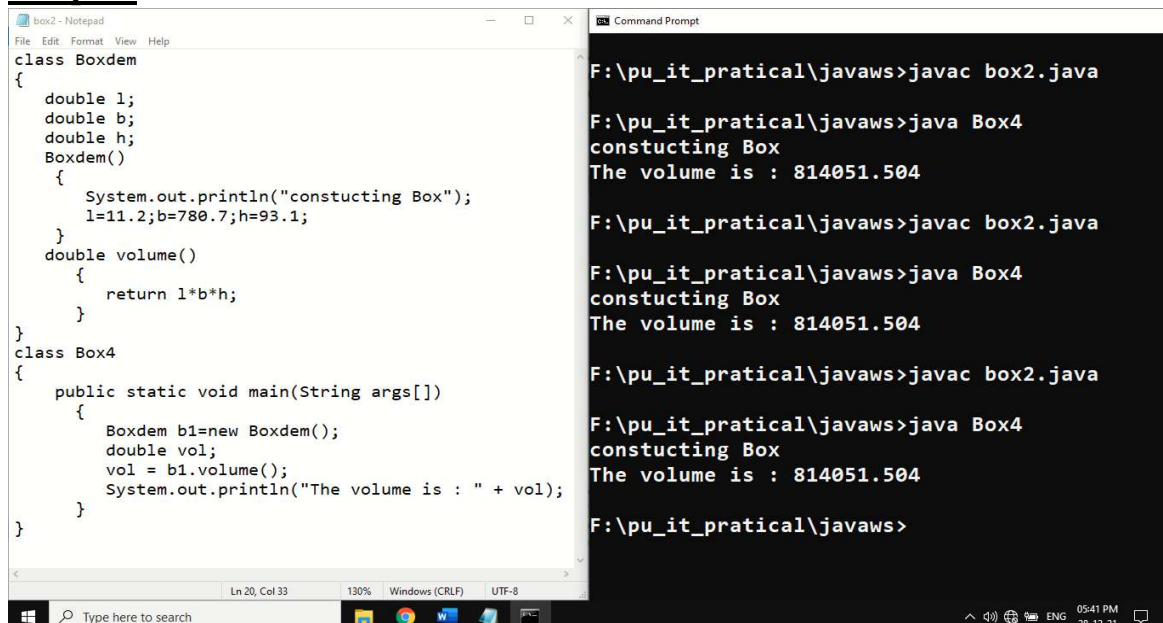
b. Define default and Parameterized constructor to initialize value of data member.

c. Define display method to display data member.

Code:

```
class Boxdem
{
    double l;
    double b;
    double h;
    Boxdem()
    {
        System.out.println("constucting Box");
        l=11.2;b=780.7;h=93.1;
    }
    double volume()
    {
        return l*b*h;
    }
}
class Box4
{
    public static void main(String args[])
    {
        Boxdem b1=new Boxdem();
        double vol;
        vol = b1.volume();
        System.out.println("The volume is : " + vol);
    }
}
```

Output:



The screenshot displays a Windows desktop environment. On the left, a Notepad++ window titled 'box2 - Notepad' contains the Java code for the 'Box' class and its test class 'Box4'. The code defines data members l, b, and h, a default constructor, a parameterized constructor, and a volume calculation method. The 'Box4' class contains a main method that creates a 'Boxdem' object and prints its volume. On the right, a Command Prompt window shows the execution of the code. It displays the compilation command 'javac box2.java', followed by three runs of 'java Box4'. Each run produces the output 'constucting Box' and 'The volume is : 814051.504'. The taskbar at the bottom shows the Windows Start button, a search bar, and several application icons. The system tray in the bottom right corner indicates the date as 28-12-21 and the time as 05:41 PM.

```
box2 - Notepad
File Edit Format View Help
class Boxdem
{
    double l;
    double b;
    double h;
    Boxdem()
    {
        System.out.println("constucting Box");
        l=11.2;b=780.7;h=93.1;
    }
    double volume()
    {
        return l*b*h;
    }
}
class Box4
{
    public static void main(String args[])
    {
        Boxdem b1=new Boxdem();
        double vol;
        vol = b1.volume();
        System.out.println("The volume is : " + vol);
    }
}

Ln 20, Col 33 130% Windows (CRLF) UTF-8

Command Prompt
F:\pu_it_practical\javaws>javac box2.java
F:\pu_it_practical\javaws>java Box4
constucting Box
The volume is : 814051.504
F:\pu_it_practical\javaws>javac box2.java
F:\pu_it_practical\javaws>java Box4
constucting Box
The volume is : 814051.504
F:\pu_it_practical\javaws>javac box2.java
F:\pu_it_practical\javaws>java Box4
constucting Box
The volume is : 814051.504
F:\pu_it_practical\javaws>
```

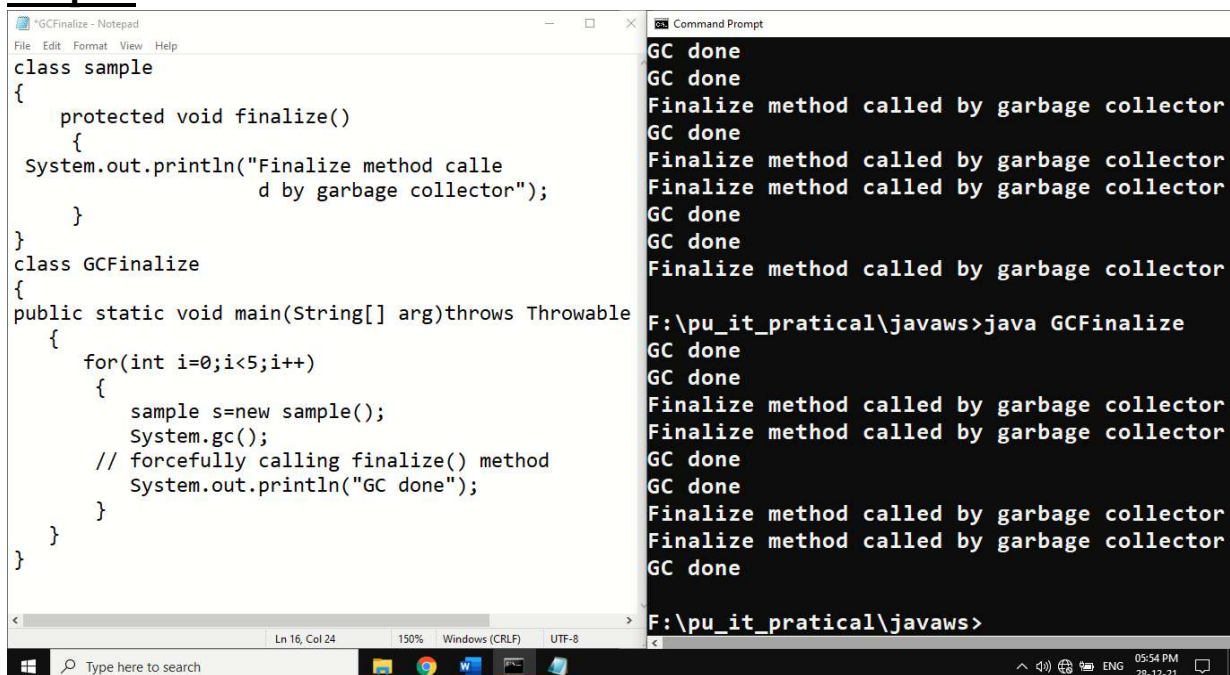
Practical 3:

AIM: Write a java Program for garbage collection.

Code:

```
class sample
{
    protected void finalize()
    {
        System.out.println("Finalize method called by garbage collector");
    }
}
class GCFinalize
{
    public static void main(String[] arg)throws Throwable
    {
        for(int i=0;i<5;i++)
        {
            sample s=new sample();
            System.gc(); // forcefully calling finalize() method
            System.out.println("GC done");
        }
    }
}
```

Output:



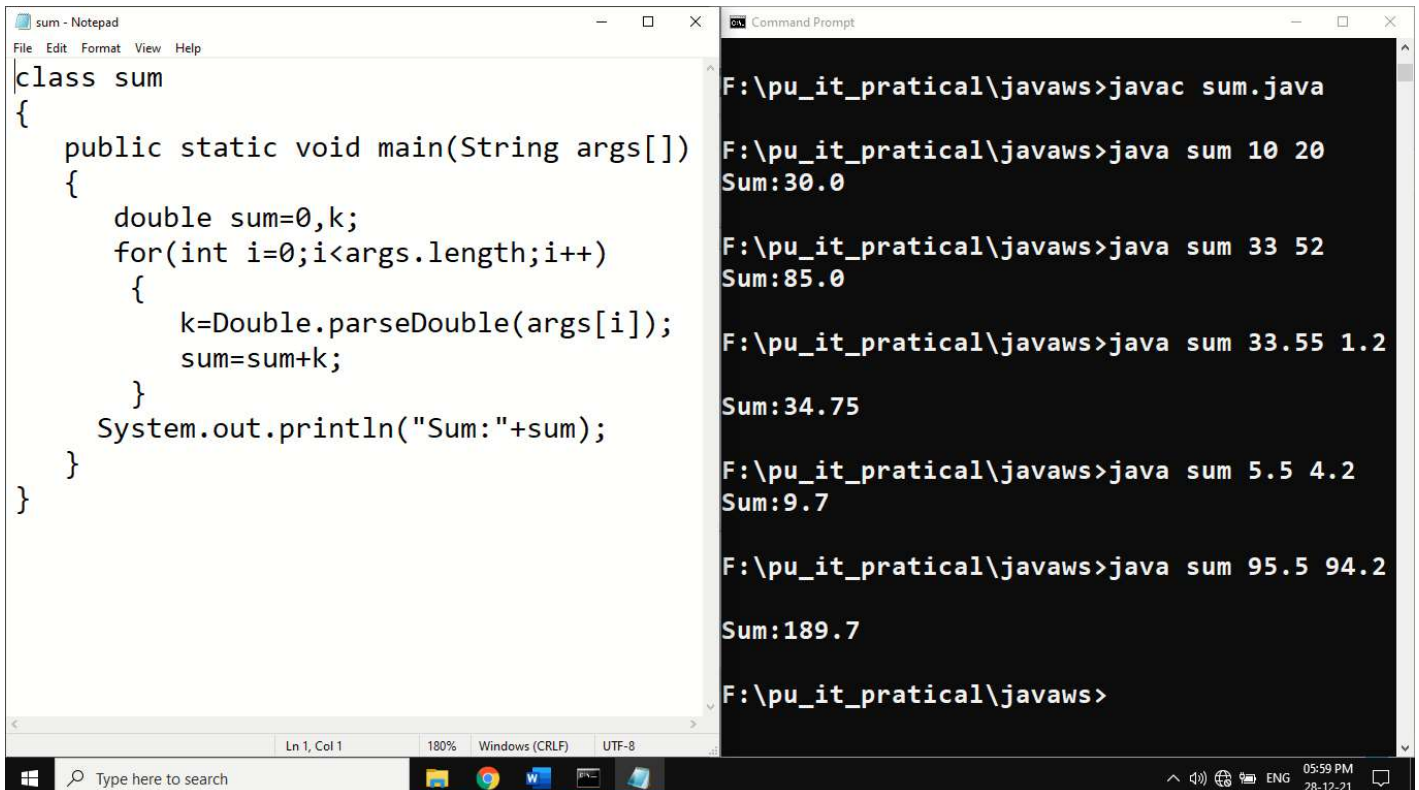
The screenshot shows a Notepad window titled "GCFinalize - Notepad" containing the Java code from the previous block. To its right is a Command Prompt window. The Command Prompt shows the output of running the program: "GC done" is printed five times, followed by "Finalize method called by garbage collector" being printed five times. The Command Prompt prompt is "F:\pu_it_pratical\javaws>".

Practical 4:

AIM: Write a java program to do sum of command line argument passed two Double numbers.

Code:

```
class sum
{
    public static void main(String args[])
    {
        double sum=0,k;
        for(int i=0;i<args.length;i++)
        {
            k=Double.parseDouble(args[i]);
            sum=sum+k;
        }
        System.out.println("Sum:"+sum);
    }
}
```

Output:

The screenshot shows two windows side-by-side. The left window is 'sum - Notepad' containing the Java code from the previous block. The right window is 'Command Prompt' showing the execution of the program. The output shows the sum of two command-line arguments for five different test cases.

```
sum - Notepad
File Edit Format View Help
class sum
{
    public static void main(String args[])
    {
        double sum=0,k;
        for(int i=0;i<args.length;i++)
        {
            k=Double.parseDouble(args[i]);
            sum=sum+k;
        }
        System.out.println("Sum:"+sum);
    }
}

Command Prompt
F:\pu_it_practical\javaws>javac sum.java
F:\pu_it_practical\javaws>java sum 10 20
Sum:30.0
F:\pu_it_practical\javaws>java sum 33 52
Sum:85.0
F:\pu_it_practical\javaws>java sum 33.55 1.2
Sum:34.75
F:\pu_it_practical\javaws>java sum 5.5 4.2
Sum:9.7
F:\pu_it_practical\javaws>java sum 95.5 94.2
Sum:189.7
F:\pu_it_practical\javaws>
```


Practical Set: 3

Inheritance

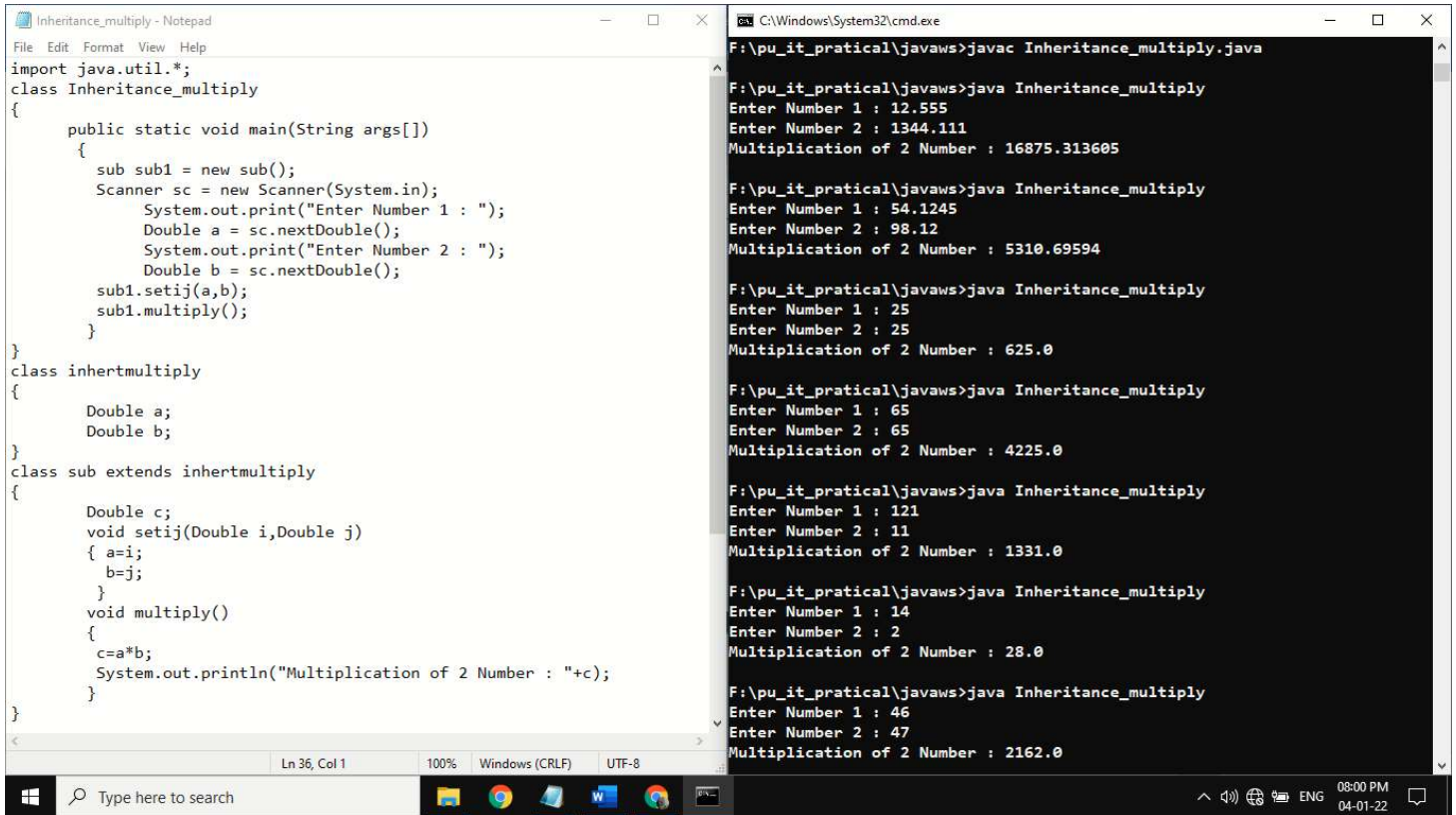
Practical 1:

AIM: Write java Program for single level inheritance.

Code:

```
import java.util.*;
class Inheritance_multiply
{
    public static void main(String args[])
    {
        sub sub1 = new sub();
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Number 1 : ");
        Double a = sc.nextDouble();
        System.out.print("Enter Number 2 : ");
        Double b = sc.nextDouble();
        sub1.setij(a,b);
        sub1.multiply();
    }
}
class inhertmultiply
{
    Double a;
    Double b;
}
class sub extends inhertmultiply
{
    Double c;
    void setij(Double i,Double j)
    {
        a=i;
        b=j;
    }
    void multiply()
    {
        c=a*b;
        System.out.println("Multiplication of 2 Number : "+c);
    }
}
```

Output:



```
Inheritance_multiply - Notepad
File Edit Format View Help
import java.util.*;
class Inheritance_multiply
{
    public static void main(String args[])
    {
        sub sub1 = new sub();
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Number 1 : ");
        Double a = sc.nextDouble();
        System.out.print("Enter Number 2 : ");
        Double b = sc.nextDouble();
        sub1.setij(a,b);
        sub1.multiply();
    }
}
class inhertmultiply
{
    Double a;
    Double b;
}
class sub extends inhertmultiply
{
    Double c;
    void setij(Double i,Double j)
    { a=i;
      b=j;
    }
    void multiply()
    {
        c=a*b;
        System.out.println("Multiplication of 2 Number : "+c);
    }
}

C:\Windows\System32\cmd.exe
F:\pu_it_pratical\javaws>javac Inheritance_multiply.java

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 12.555
Enter Number 2 : 1344.111
Multiplication of 2 Number : 16875.313605

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 54.1245
Enter Number 2 : 98.12
Multiplication of 2 Number : 5310.69594

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 25
Enter Number 2 : 25
Multiplication of 2 Number : 625.0

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 65
Enter Number 2 : 65
Multiplication of 2 Number : 4225.0

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 121
Enter Number 2 : 11
Multiplication of 2 Number : 1331.0

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 14
Enter Number 2 : 2
Multiplication of 2 Number : 28.0

F:\pu_it_pratical\javaws>java Inheritance_multiply
Enter Number 1 : 46
Enter Number 2 : 47
Multiplication of 2 Number : 2162.0
```

Practical 2:

AIM: Describe abstract class called Shape which has three subclasses say Triangle, Rectangle and Circle. Define one method area() in the abstract class and override this area() in these three subclasses to calculate area for specific class' object

Code:



Faculty of Engineering & Technology
Subject Name: Java Workshop
Subject Code: 203105259
B.Tech.: IT Year: 2021-22 Semester: 4

Practical Set: 4**Java Keyword****Practical 1:**

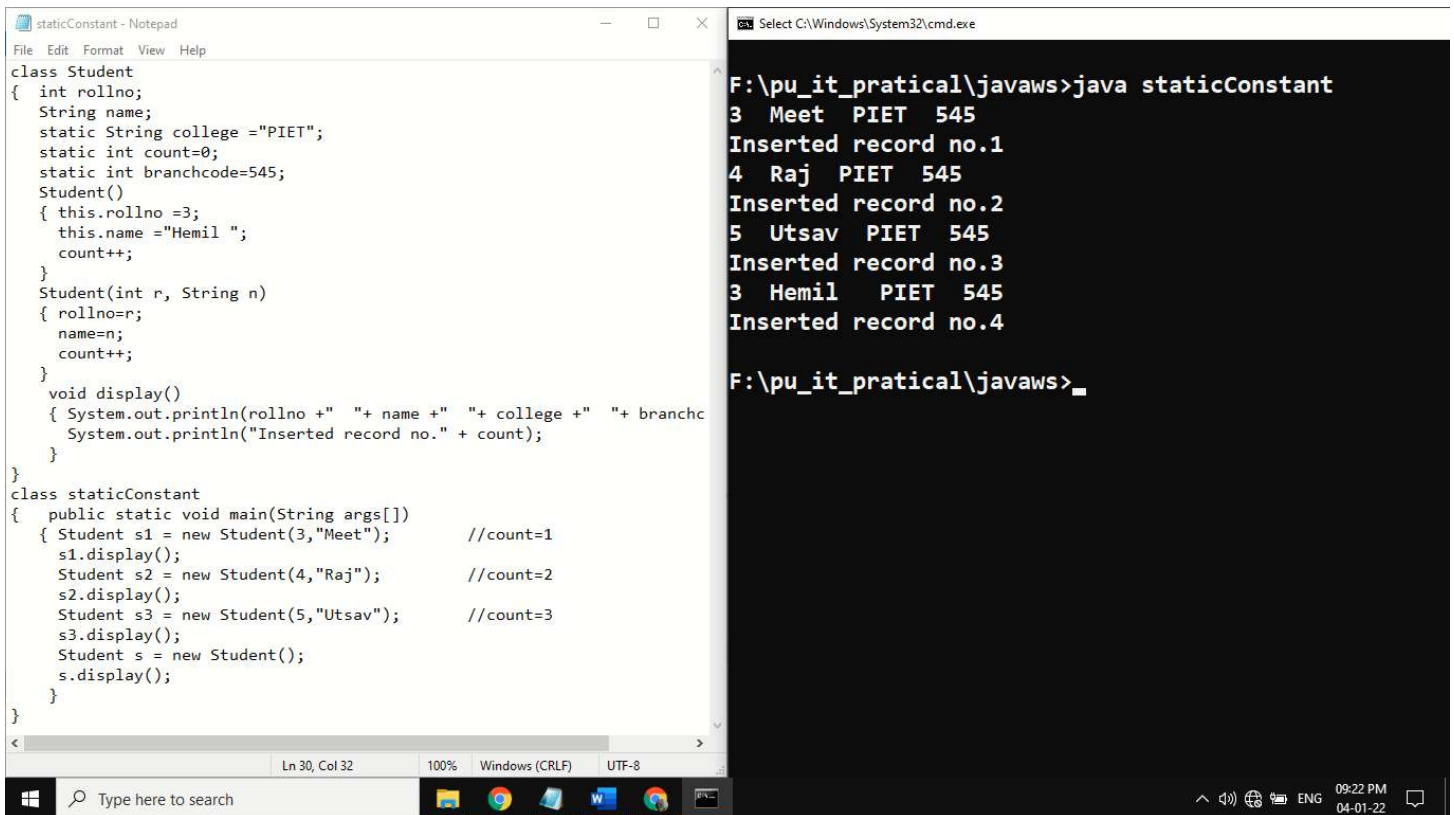
AIM: Write java program to demonstrate the use of static keyword.

Code:

```
class Student
{
    int rollno;
    String name;
    static String college ="PIET";
    static int count=0;
    static int branchcode=545;
    Student()
    {
        this.rollno =3;
        this.name ="Hemil ";
        count++;
    }
    Student(int r, String n)
    {
        rollno=r;
        name=n;
        count++;
    }
    void display()
    {
        System.out.println(rollno +" "+ name +" "+ college +" "+ branchcode);
        System.out.println("Inserted record no." + count);
    }
}
class staticConstant
{
    public static void main(String args[])
    {
        Student s1 = new Student(3,"Meet");    //count=1
        s1.display();
        Student s2 = new Student(4,"Raj");    //count=2
    }
}
```

```
s2.display();
Student s3 = new Student(5,"Utsav");    //count=3
s3.display();
Student s = new Student();
s.display();
}
}
```

Output:



```
staticConstant - Notepad
File Edit Format View Help
class Student
{ int rollno;
  String name;
  static String college = "PIET";
  static int count=0;
  static int branchcode=545;
  Student()
  { this.rollno =3;
    this.name ="Hemil ";
    count++;
  }
  Student(int r, String n)
  { rollno=r;
    name=n;
    count++;
  }
  void display()
  { System.out.println(rollno + " " + name + " " + college + " " + branchcode);
    System.out.println("Inserted record no." + count);
  }
}
class staticConstant
{ public static void main(String args[])
{ Student s1 = new Student(3,"Meet");    //count=1
  s1.display();
  Student s2 = new Student(4,"Raj");    //count=2
  s2.display();
  Student s3 = new Student(5,"Utsav");    //count=3
  s3.display();
  Student s = new Student();
  s.display();
}
}
```

```
Select C:\Windows\System32\cmd.exe
F:\pu_it_practical\javaws>java staticConstant
3 Meet PIET 545
Inserted record no.1
4 Raj PIET 545
Inserted record no.2
5 Utsav PIET 545
Inserted record no.3
3 Hemil PIET 545
Inserted record no.4
F:\pu_it_practical\javaws>
```




Faculty of Engineering & Technology
Subject Name: Java Workshop
Subject Code: 203105259
B.Tech.: IT Year: 2021-22 Semester: 4