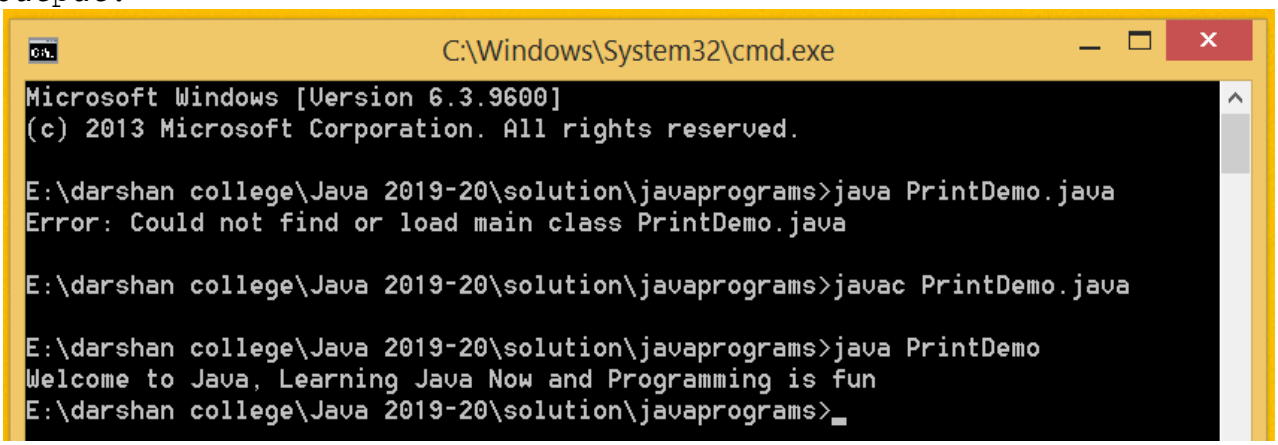
Practical-1

2. WAP to print "Welcome to Java, Learning Java Now and Programming is fun".

```
class PrintDemo{
   //Main Method
   public static void main(String[] args) {

         //print string using print method
         System.out.print("Welcome to Java, Learning Java Now and
         Programming is fun");

   }
}
```

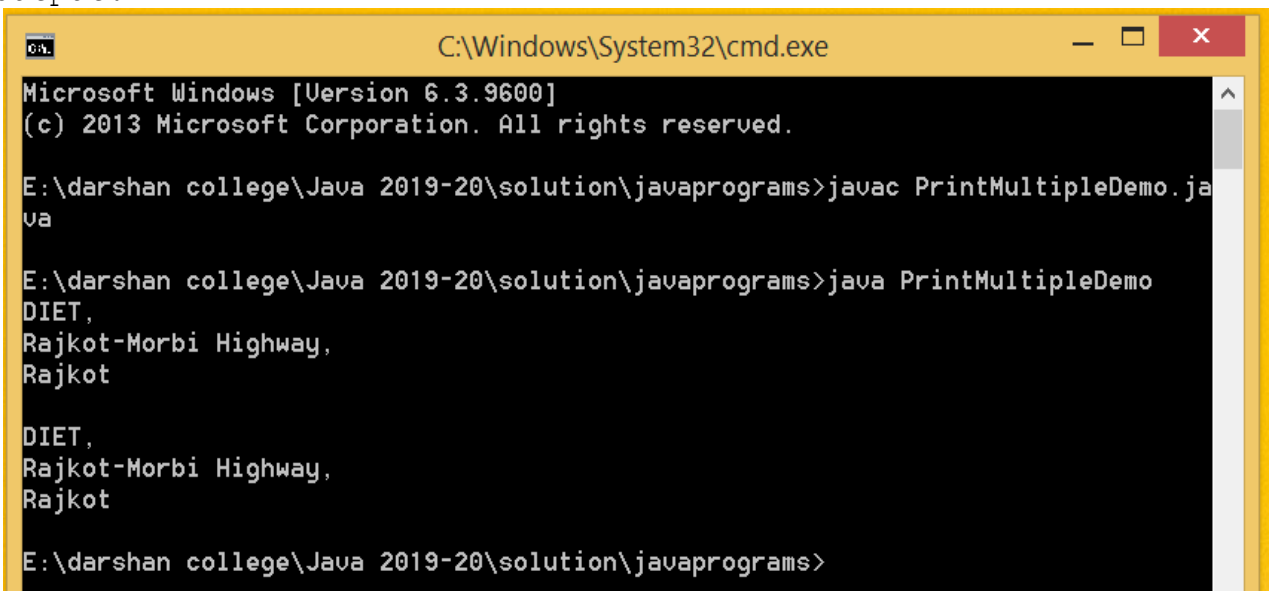
Output:



3. WAP to print your address i) using single print ii) using multiple println

```
class PrintMultipleDemo{
   //Main Method
   public static void main(String[] args) {

         //print string using single print
         System.out.print("DIET,\nRajkot-Morb Highway,\nRajkot\n");

         //print string using multiple println
         System.out.println("DIET,");
         System.out.println("Rajkot-Morbi Highway,");
         System.out.println("Rajkot");
   }
}
```

Output:

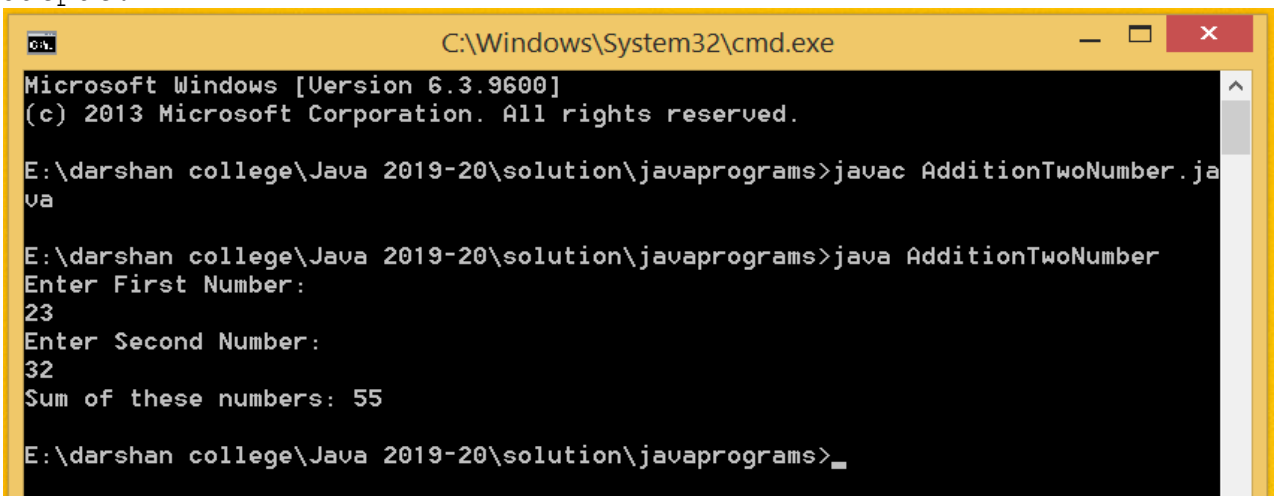

C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
E:\darshan college\Java 2019-20\solution\javaprograms>javac PrintMultipleDemo.ja
va
E:\darshan college\Java 2019-20\solution\javaprograms>java PrintMultipleDemo
DIET,
Rajkot-Morbi Highway,
Rajkot
DIET,
Rajkot-Morbi Highway,
Rajkot
E:\darshan college\Java 2019-20\solution\javaprograms>

Practical-2

1. WAP to print addition of 2 numbers (with Scanner)

```
import java.util.Scanner;
public class AdditionTwoNumber {

    public static void main(String[] args) {
        //Declare Variables
        int num1, num2, sum;
       //Declare Scanner
        Scanner sc = new Scanner(System.in);

       //Scan two integer variable using nextInt()
        System.out.println("Enter First Number: ");
        num1 = sc.nextInt();

        System.out.println("Enter Second Number: ");
        num2 = sc.nextInt();

        sum = num1 + num2;
        System.out.println("Sum of these numbers: "+sum);
    }
}
```

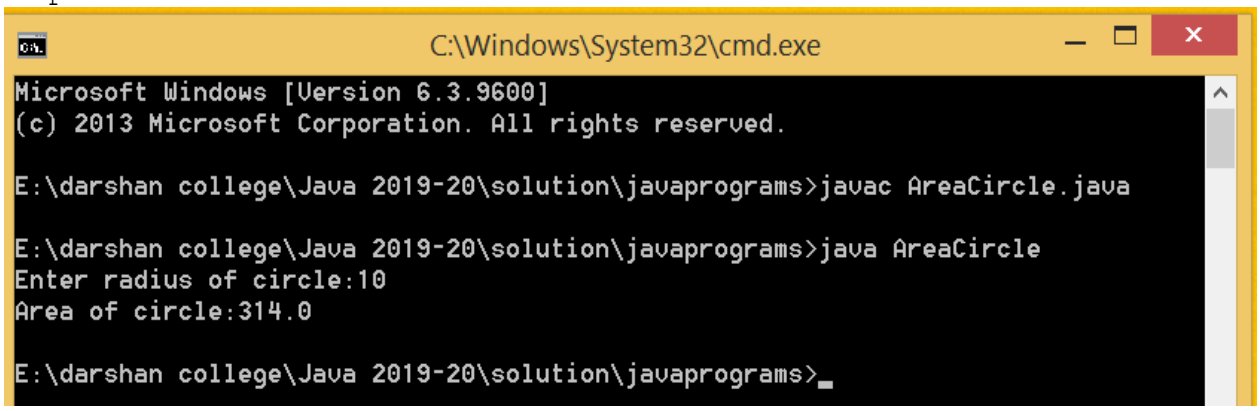
Output:



2. WAP to calculate Area of Circle.

```
import java.util.Scanner;
public class AreaCircle {

     public static void main(String[] args){
        //Declare Variables
         int r;
         double pi = 3.14, area;

        //Declare Scanner
         Scanner s = new Scanner(System.in);
        //Scan Variable
         System.out.print("Enter radius of circle:");
         r = s.nextInt();
         area = pi * r * r;
         System.out.println("Area of circle:"+area);
    }
}
```

Output:

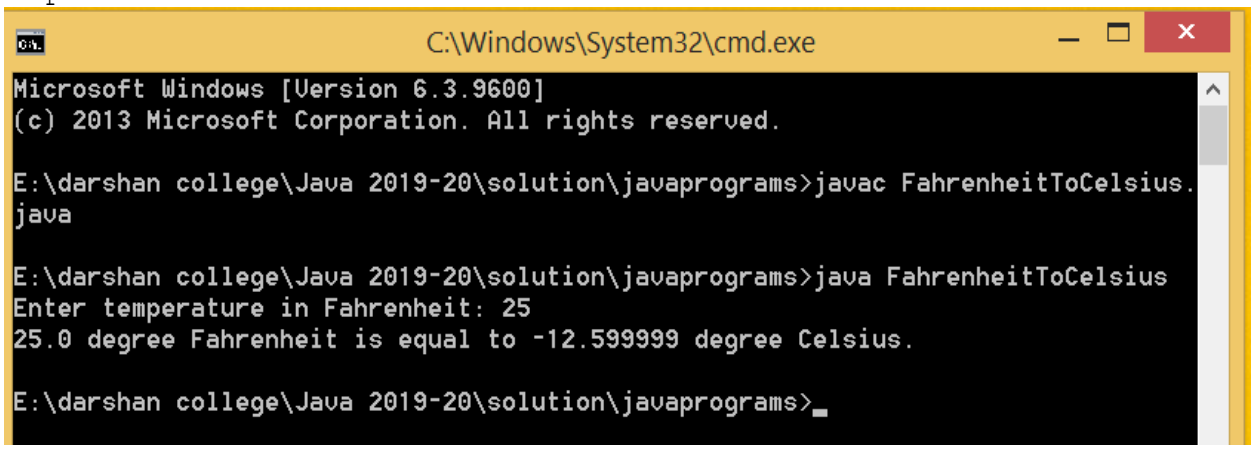


3. WAP to convert temperature from Fahrenheit to Celsius.

```
import java.util.Scanner;

public class FahrenheitToCelsius {

   public static void main(String[] args) {

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

```
        // Input temperature in Fahrenheit
        System.out.print("Enter temperature in Fahrenheit: ");
        float F = in.nextFloat();

        // Convert Fahrenheit to Celsius
        float C = (F - 32) * (9f / 5);

        System.out.println(F + " degree Fahrenheit is equal to " +
        C + " degree Celsius.");
    }
}
```

Output:

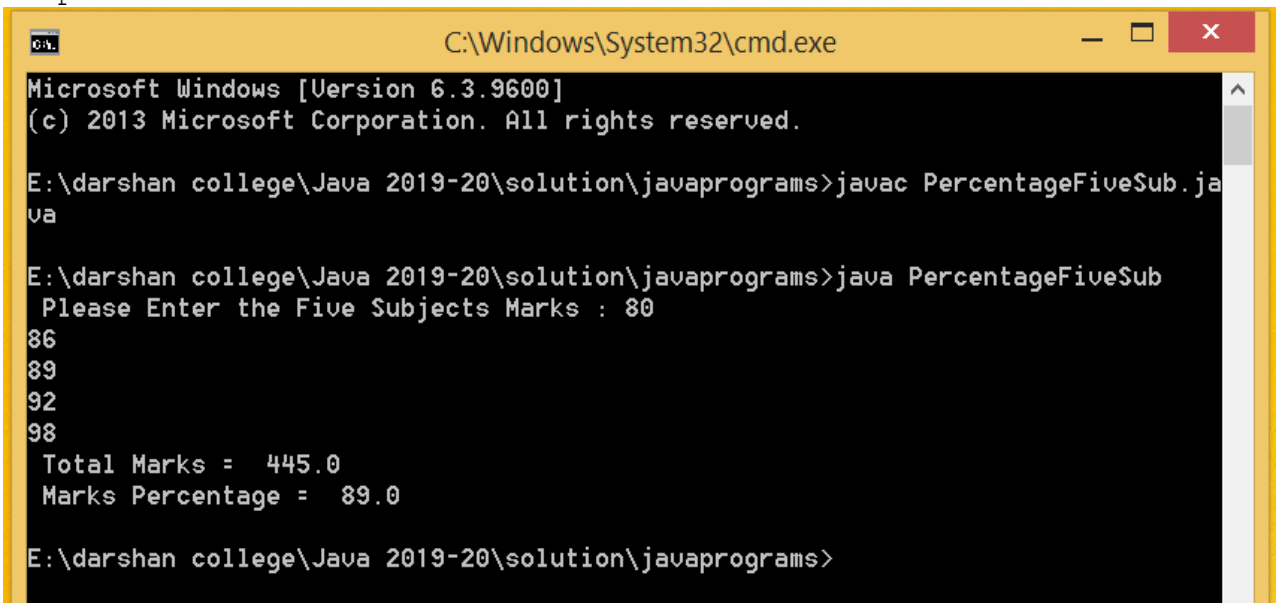


4. WAP to find percentage of 5 subjects.

```
import java.util.Scanner;

public class PercentageFiveSub {

   public static void main(String[] args) {
        //Declare Variables
        int english, chemistry, computers, physics, maths;
       double total, Percentage;

        //Declare Scanner
        Scanner sc = new Scanner(System.in);
        sc = new Scanner(System.in);

        //Scan 5 subject marks
        System.out.print("Please Enter the Five Subjects Marks :
        ");
```

```
            english = sc.nextInt();
            chemistry = sc.nextInt();
            computers = sc.nextInt();
            physics = sc.nextInt();
            maths = sc.nextInt();

           total = english + chemistry + computers + physics + maths;
           Percentage = (total / 500) * 100;

           System.out.println(" Total Marks =  " + total);
           System.out.println(" Marks Percentage =  " + Percentage);
      }
}
```

Output:

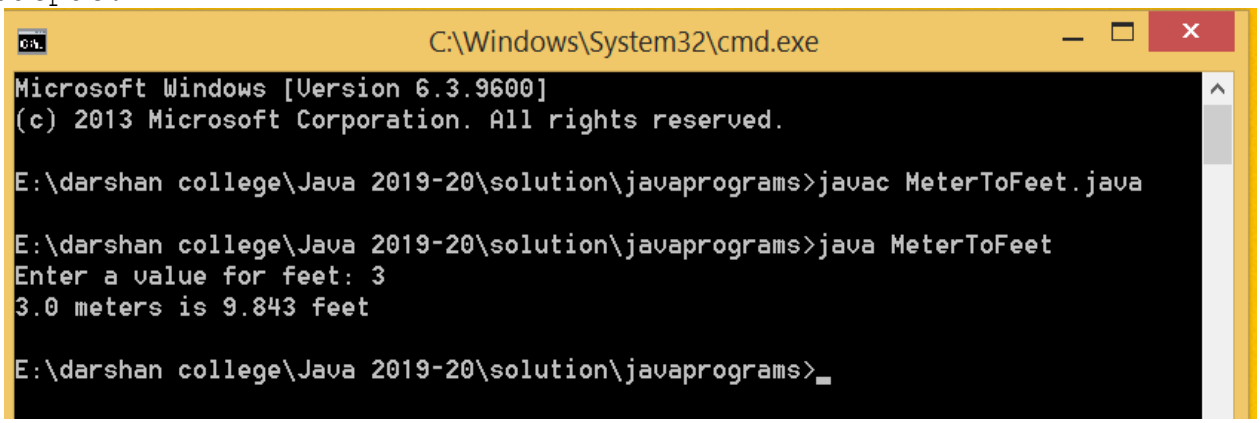


5. WAP that reads a number in meters, converts it to feet, and displays the result.

```
import java.util.Scanner;
public class MeterToFeet {

    public static void main(String[] args) {

        //Declare Scanner
         Scanner input = new Scanner(System.in);

        //Scan number in meters
        System.out.print("Enter a value for feet: ");
```

```
        double meters = input.nextDouble();

        double feet = meters * 3.281 ;

         System.out.println(meters + " meters is " + feet + "
         feet");
    }
}
```

Output:

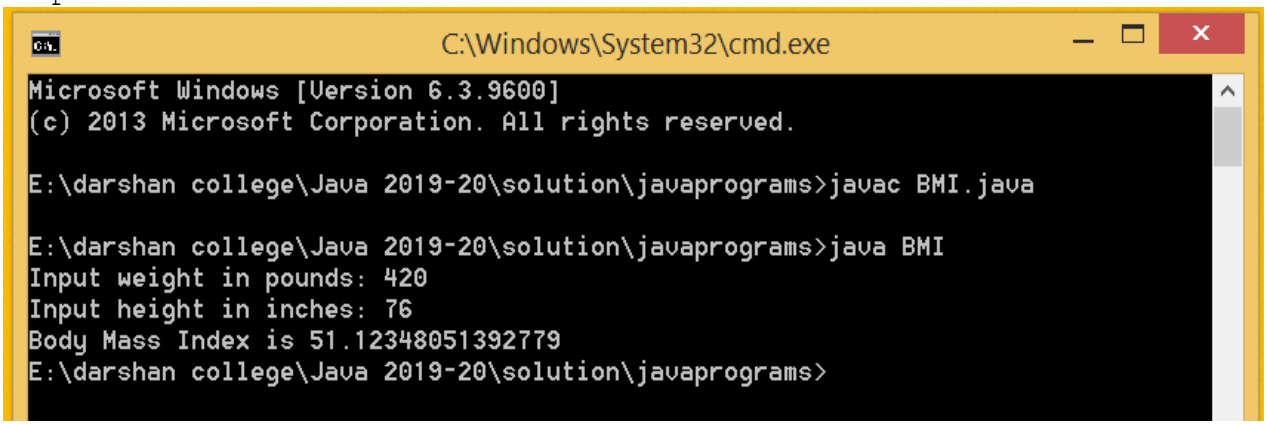


6. Body Mass Index (BMI) is a measure of health on weight. It can be calculated by taking your weight in kilograms and dividing by the square of your height in meters. Write a program that prompts the user to enter a weight in pounds and height in inches and displays the BMI.
   Note:- 1 pound=.45359237 Kg and 1 inch=.0254 meters.

```
import java.util.Scanner;
public class BMI {

    public static void main(String[] args) {

        //Declare Scanner
         Scanner sc = new Scanner(System.in);

        //Scan weight and height
        System.out.print("Input weight in pounds: ");
         double weight = sc.nextDouble();

         System.out.print("Input height in inches: ");
         double height = sc.nextDouble();
```

```
        //Convert weight from pounds to kg unit
        double weightKG = weight * 0.45359237;

        //Convert height from inches to meter unit
        double heightMeter = height * 0.0254;

        //Calculate BMI and print BMI
         double BMI = weightKG/(heightMeter * heightMeter);
         System.out.print("Body Mass Index is " + BMI);
    }
}
```

Output:

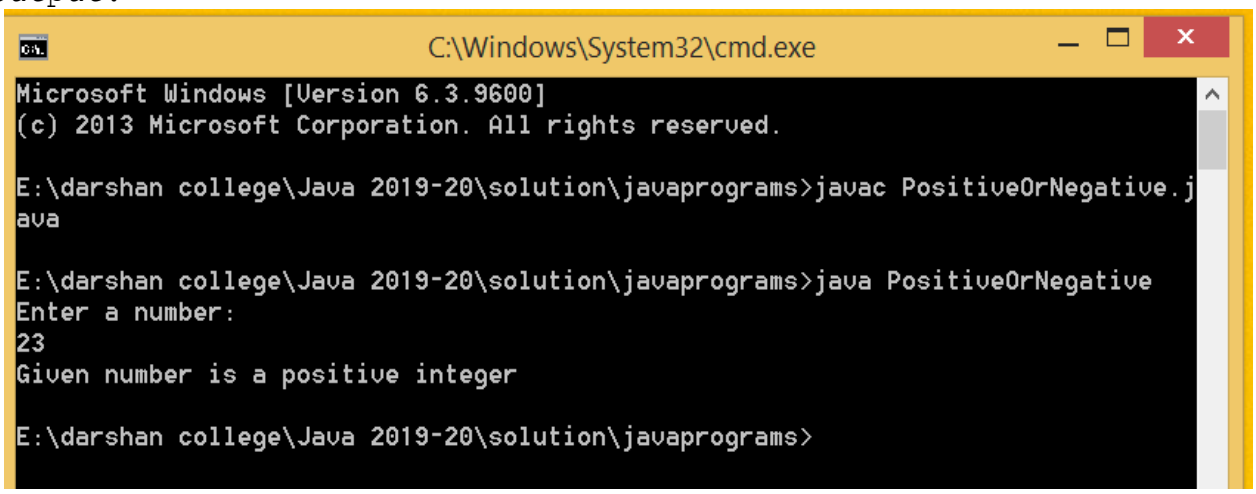


Practical-3

1. WAP to check whether the given number is positive or negative.

```
import java.util.Scanner;

public class PositiveOrNegative {
   public static void main(String args[]){
      //Declare Variables
     int num;

     //Declare Scanner
     Scanner sc = new Scanner(System.in);

     //Scan number
      System.out.println("Enter a number:");
      num = sc.nextInt();

      if (num > 0)
     {
         System.out.println("Given number is a positive integer");
      }
     else if(num < 0)
     {
         System.out.println("Given number is a negative integer");
      }
   }
}
```

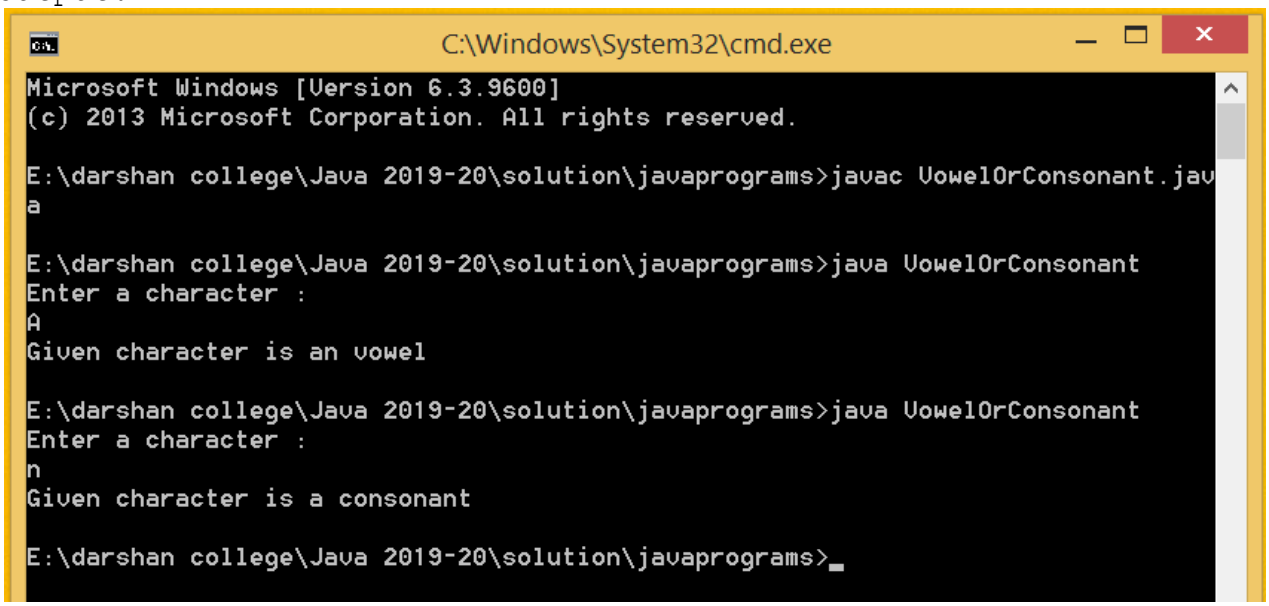
Output:



2. WAP that prompts the user to enter a letter and check whether a letter is a vowel or consonants.

```
import java.util.Scanner;
public class VowelOrConsonant {
   public static void main(String args[]){

        //Declare Scanner
        Scanner sc = new Scanner(System.in);

        //Scan letter
        System.out.println("Enter a character :");
         char ch = sc.next().charAt(0);

        if(ch == 'a'|| ch == 'e'|| ch == 'i' ||ch == 'o' ||ch ==
        'u' || ch == 'A'|| ch == 'E'|| ch == 'I' ||ch == 'O' ||ch
        == 'U')
        {
             System.out.println("Given character is an vowel");
        }
        else
        {
             System.out.println("Given character is a consonant");
        }
   }
}
```

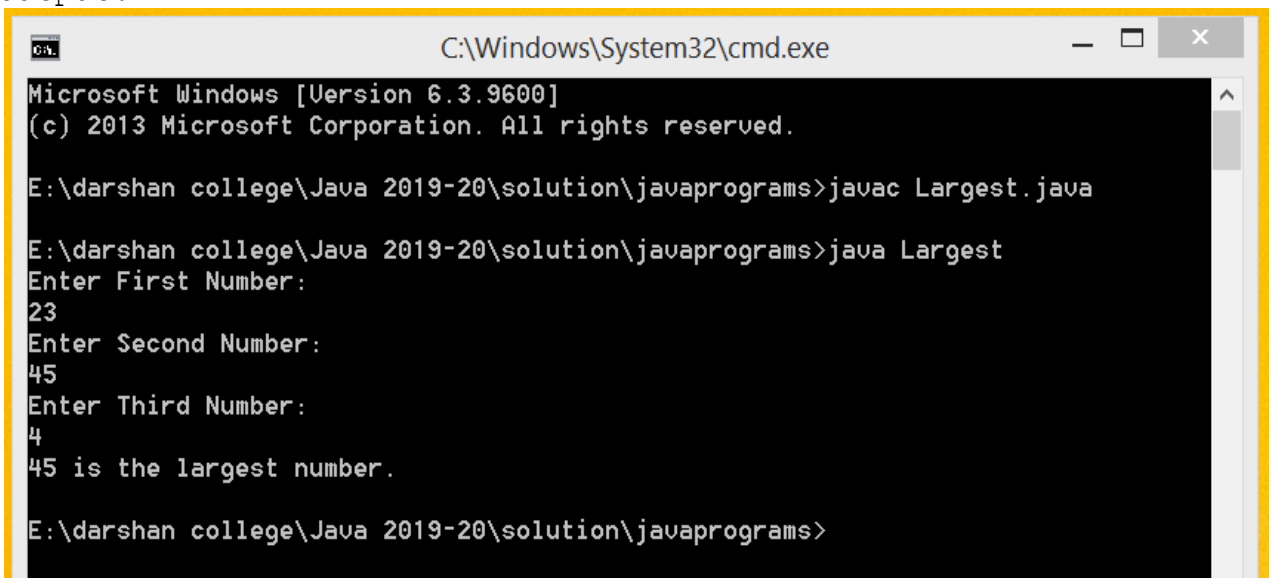
Output:



3. WAP to find out largest number from given three numbers without using Logical Operator.

```
import java.util.Scanner;
public class Largest {

    public static void main(String[] args) {
        //Declare Variables
        int n1, n2, n3;
       //Declare Scanner
        Scanner sc = new Scanner(System.in);

       //Scan three integer variable using nextInt()
        System.out.println("Enter First Number: ");
        n1 = sc.nextInt();
        System.out.println("Enter Second Number: ");
        n2 = sc.nextInt();
       System.out.println("Enter Third Number: ");
        n3 = sc.nextInt();

         if(n1 >= n2)
        {
            if(n1 >= n3)
                System.out.println(n1   +   "   is   the   largest
                number.");
            else
                System.out.println(n3   +   "   is   the   largest
                number.");
        }
       else
       {
            if(n2 >= n3)
                System.out.println(n2   +   "   is   the   largest
                number.");
            else
                System.out.println(n3   +   "   is   the   largest
                number.");
        }
    }
}
```

Output:

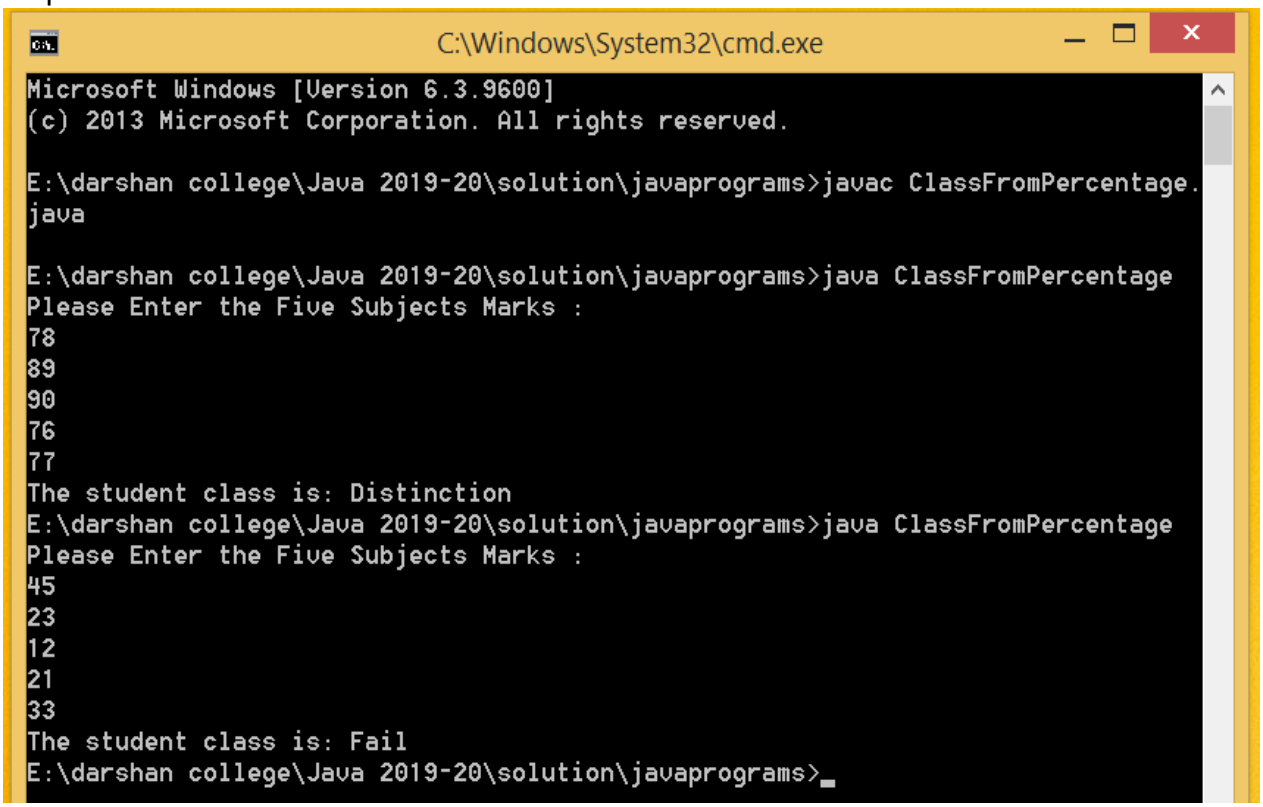


4. WAP to read marks of five subjects. Calculate percentage and print class accordingly. Fail below 35, Pass Class between 35 to 45, Second Class between 45 to 60, First Class between 60 to 70, Distinction if more than 70.

```
import java.util.Scanner;
public class ClassFromPercentage {

   public static void main(String[] args) {
             //Declare Variables
             int english, chemistry, computers, physics, maths;
             double total, percentage;

             //Declare Scanner
             Scanner sc = new Scanner(System.in);
             sc = new Scanner(System.in);

             //Scan 5 subject marks
              System.out.println("Please Enter the Five Subjects
              Marks : ");
             english = sc.nextInt();
             chemistry = sc.nextInt();
             computers = sc.nextInt();
             physics = sc.nextInt();
             maths = sc.nextInt();
              total = english + chemistry + computers + physics +
              maths;
```

```
                percentage = (total / 500) * 100;

                System.out.print("The student class is: ");
                if(percentage>=70)
                {
                     System.out.print("Distinction");
                }
                else if(percentage>=60 && percentage<70)
                {
                     System.out.print("First Class");
                }
                else if(percentage>=45 && percentage<60)
                {
                     System.out.print("Second Class");
                }
                else if(percentage>=35 && percentage<45)
                {
                     System.out.print("Pass Class");
                }
                else
                {
                     System.out.print("Fail");
                }
          }
     }
```

Output:

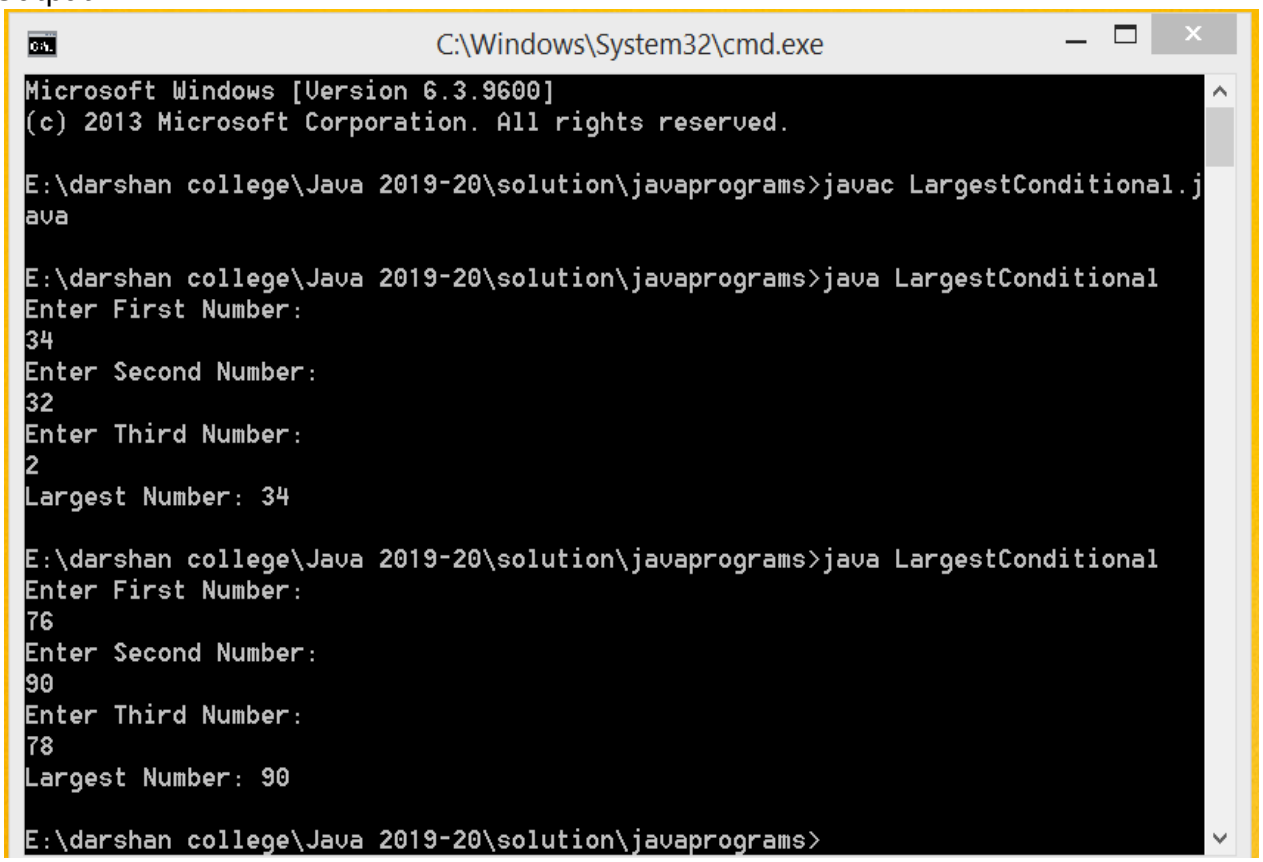


5. WAP to find out largest number from given 3 numbers using conditional operator.

```
import java.util.Scanner;
public class LargestConditional {

    public static void main(String[] args) {
        //Declare Variables
        int n1, n2, n3, largest;
      //Declare Scanner
        Scanner sc = new Scanner(System.in);

      //Scan three integer variable using nextInt()
        System.out.println("Enter First Number: ");
        n1 = sc.nextInt();
        System.out.println("Enter Second Number: ");
        n2 = sc.nextInt();
      System.out.println("Enter Third Number: ");
        n3 = sc.nextInt();

      largest = (n1>n2)? (n1>n3?n1:n3) : (n2>n3?n2:n3);
```

```
            System.out.println("Largest Number: "+ largest);
        }
    }
```

Output:

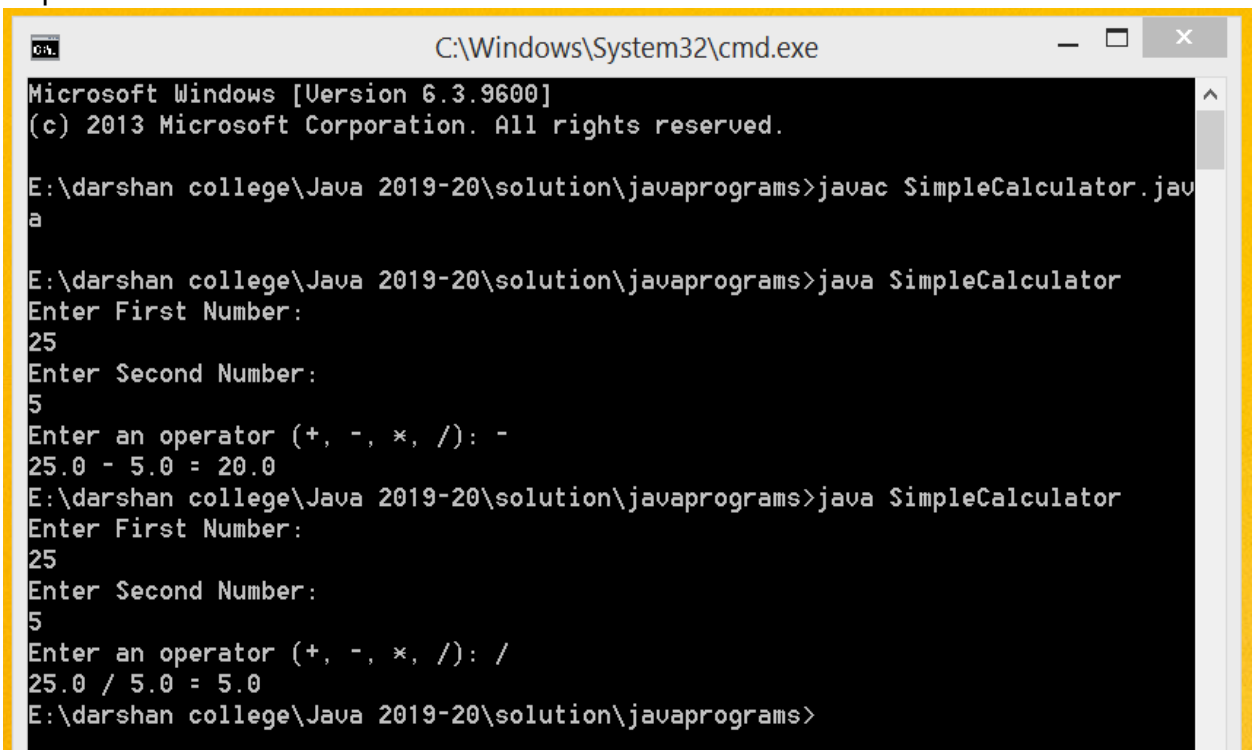


6. WAP to make a Simple Calculator using switch...case.

```
import java.util.Scanner;
public class SimpleCalculator {

    public static void main(String[] args) {
        //Declare Variables
        double  num1, num2, result;
      char operator;

        //Declare Scanner
        Scanner sc = new Scanner(System.in);

      //Scan two integer variable using nextInt()
```

```
            System.out.println("Enter First Number: ");
            num1 = sc.nextDouble();

            System.out.println("Enter Second Number: ");
            num2 = sc.nextDouble();

          System.out.print("Enter an operator (+, -, *, /): ");
            operator = sc.next().charAt(0);

            switch(operator)
            {
                case '+':
                    result = num1 + num2;
                    break;

                case '-':
                    result = num1 - num2;
                    break;

                case '*':
                    result = num1 * num2;
                    break;

                case '/':
                    result = num1 / num2;
                    break;

             default:
                    System.out.printf("Operator is not correct");
                    return;
            }

            System.out.printf(num1 + " "+ operator+ " "+ num2+" =
"+result);
        }
}
```

Output:

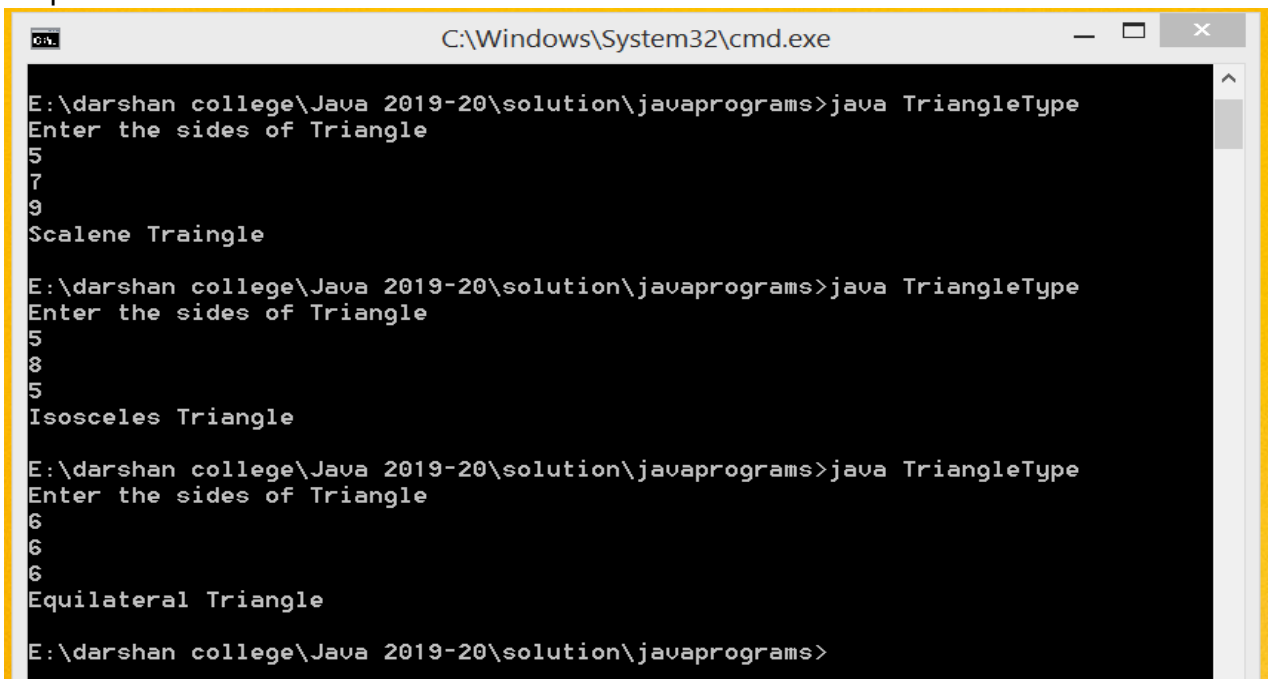


7. Three sides of a triangle are entered through the keyboard. WAP to check whether the triangle is isosceles, equilateral, scalene or right angled triangle.

```
import java.util.Scanner;
public class TriangleType {

    public static void main(String[] args) {
        //Declare Variables
        int a,b,c;

        //Declare Scanner
        Scanner sc = new Scanner(System.in);

      //Scan three sides of triangle
        System.out.println("Enter the sides of Triangle");
      a=sc.nextInt();
      b=sc.nextInt();
      c=sc.nextInt();

        if(a==b&&b==c)
            System.out.println("Equilateral Triangle");
```

```
        else if(a*a+b*b==c*c || b*b+c*c==a*a || a*a+c*c==b*b)
              System.out.println("Right Angle Triangle");
        else if(a==b||b==c||c==a)
              System.out.println("Isosceles Triangle");
         else
              System.out.println("Scalene Traingle");
    }
}
```

Output:

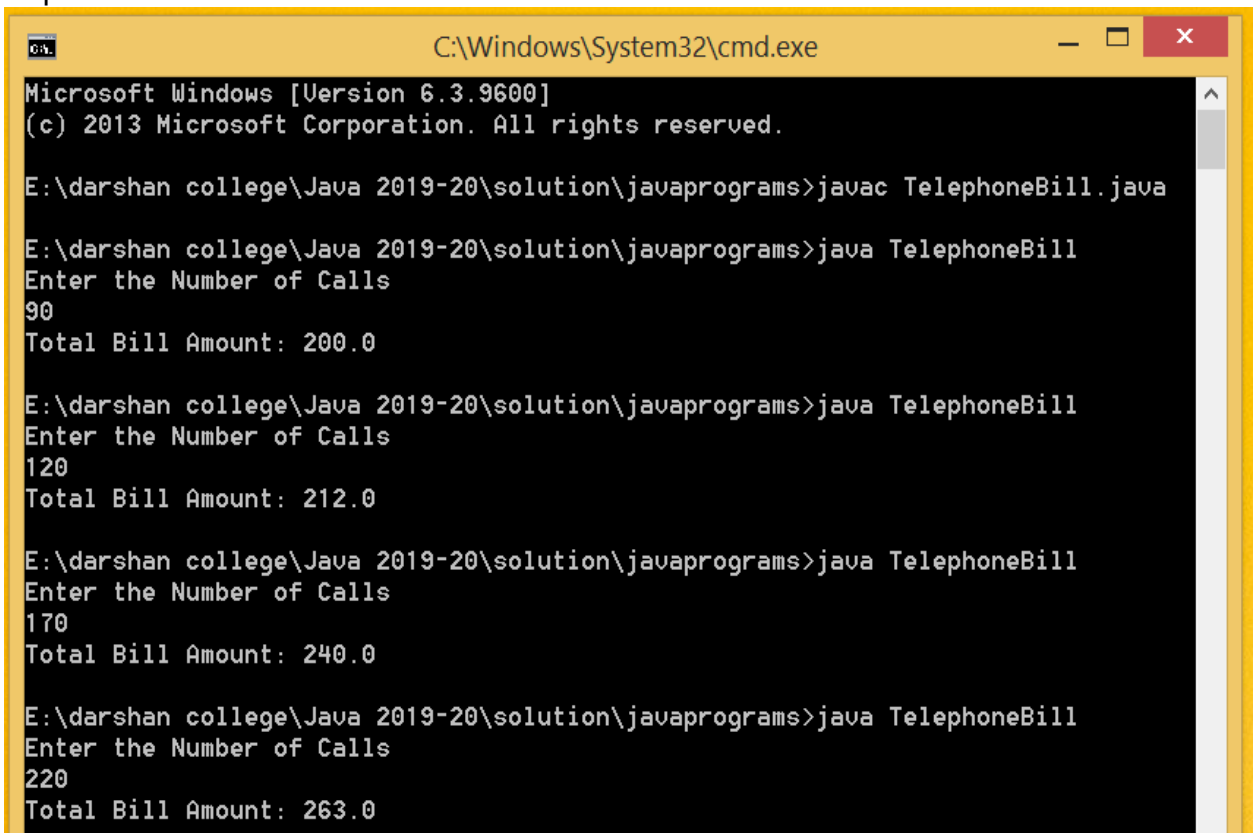


8. WAP that prompts the user to input number of calls and calculate the monthly telephone bills as per the following rule:
   Minimum Rs. 200 for up to 100 calls.
   Plus Rs. 0.60 per call for next 50 calls.
   Plus Rs. 0.50 per call for next 50 calls.
   Plus Rs. 0.40 per call for any call beyond 200 calls.

```
import java.util.Scanner;
public class TelephoneBill {
   public static void main(String args[]){
        //Declare Variables
        int totalCalls;
        double billAmount;
```

```
        //Declare Scanner
        Scanner sc = new Scanner(System.in);

        //Scan number
        System.out.println("Enter the Number of Calls");
        totalCalls = sc.nextInt();

        if (totalCalls<=100)
             billAmount=200;
        else if (totalCalls>100 && totalCalls<=150)
             billAmount=200+(0.60*(totalCalls-100));
        else if (totalCalls>150 && totalCalls<=200)
             billAmount=200+(0.60*50)+(0.50*(totalCalls-150));
        else
             billAmount=200+(0.60*50)+(0.50*50)+(0.40*(totalCalls-
200));

        System.out.println("Total Bill Amount: " + billAmount);
    }
}
```

Output:

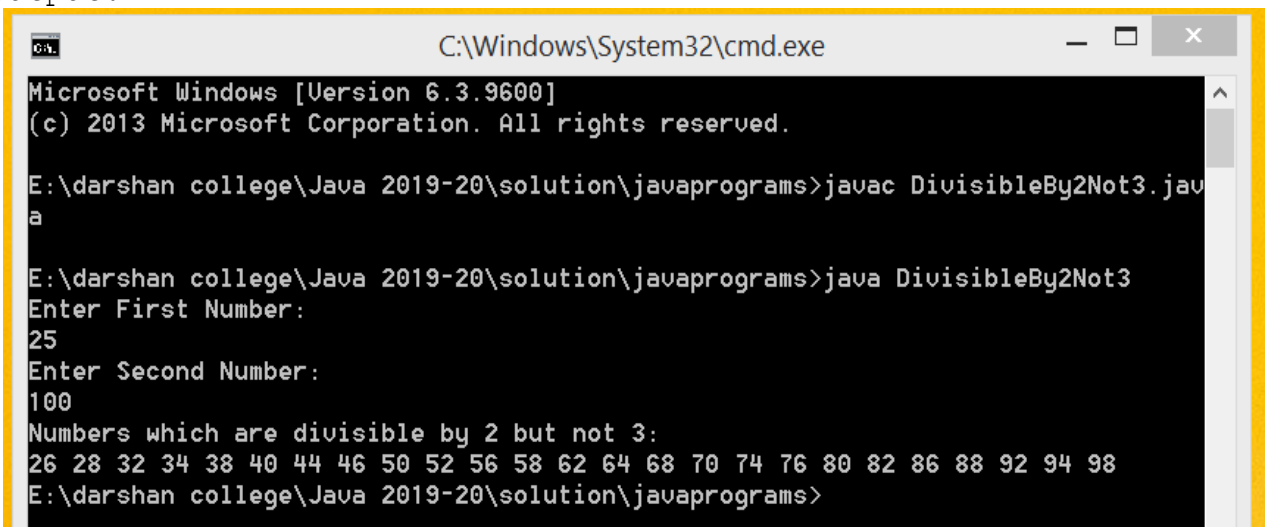


Practical-4

1. WAP to print numbers between two given numbers which is divisible by 2 but not divisible by 3.

```
import java.util.Scanner;
public class DivisibleBy2Not3 {

    public static void main(String[] args) {
        //Declare Variables
        int num1, num2;
        //Declare Scanner
        Scanner sc = new Scanner(System.in);

        //Scan two integer variable
        System.out.println("Enter First Number: ");
        num1 = sc.nextInt();

        System.out.println("Enter Second Number: ");
        num2 = sc.nextInt();

        System.out.println("Numbers which are divisible by 2 but
        not 3:");

        // iterate from num1 to num2
        for (int i = num1; i < num2; i++)
        {
            if (i % 2 == 0 && i % 3 != 0)
                System.out.print(i + " ");
        }
    }
}
```

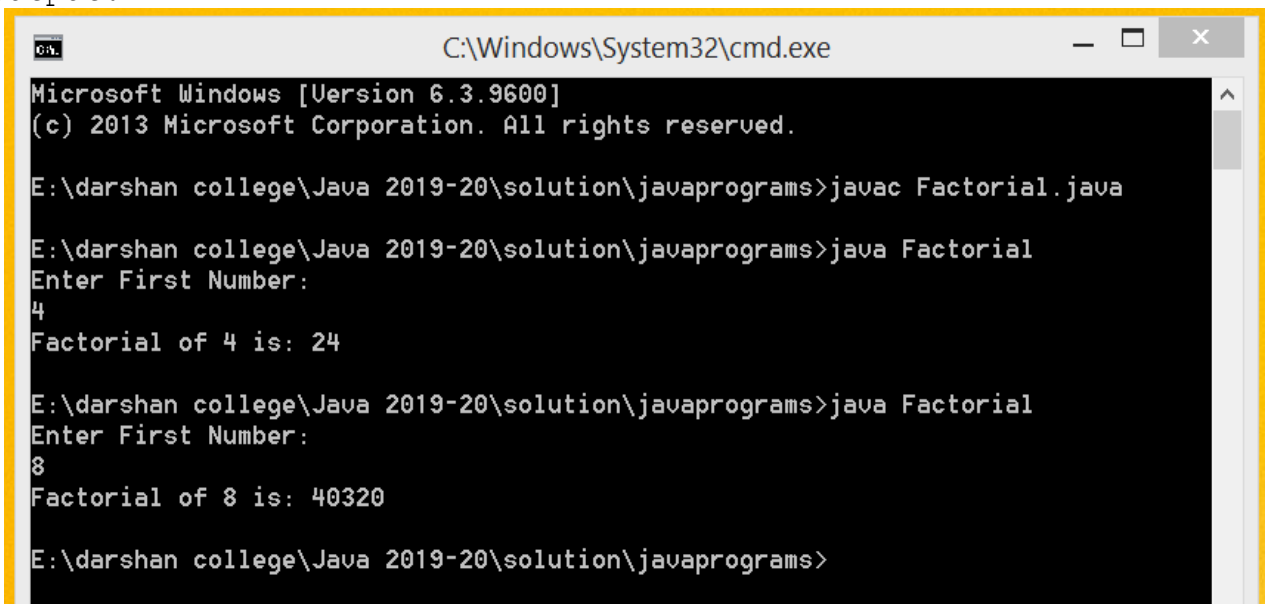
Output:



2. WAP to find factorial of the given number.

```
import java.util.Scanner;
public class Factorial {

    public static void main(String[] args) {
        //Declare Variables
        int number,i,fact=1;

        //Declare Scanner
        Scanner sc = new Scanner(System.in);

        //Scan integer variable
        System.out.println("Enter First Number: ");
        number = sc.nextInt();

        // iterate from 1 to number
        for(i=1;i<=number;i++)
        {
             fact=fact*i;
        }

        System.out.println("Factorial of "+number+" is: "+fact);
    }
}
```

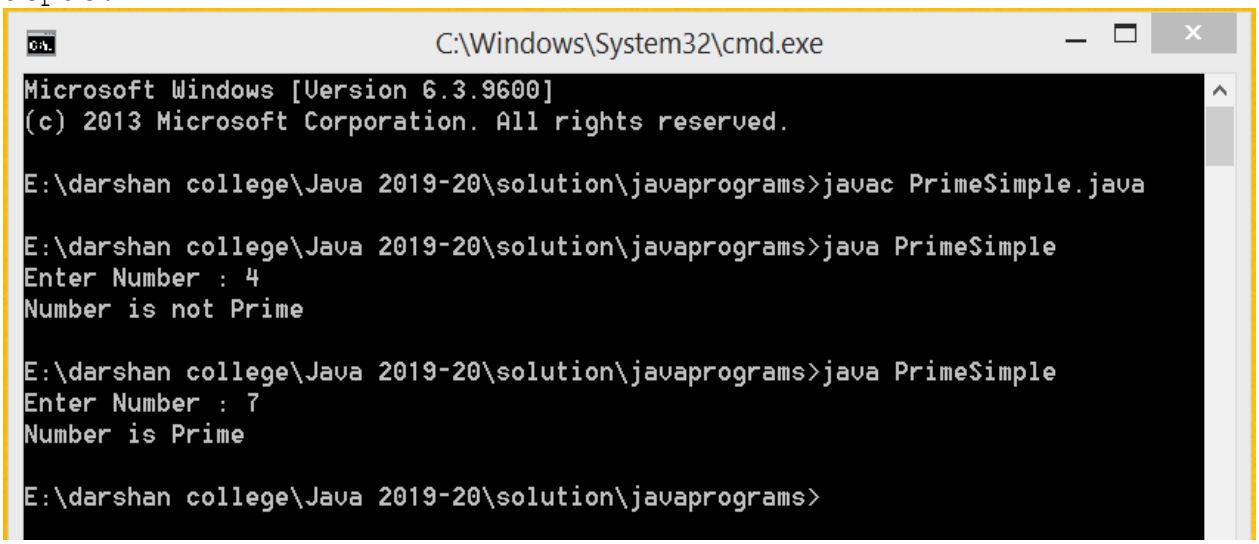
Output:



3. WAP to find whether the given number is prime or not.

```
import java.util.*;
class PrimeSimple{
   public static void main(String[] args) {
        int n, prime=0;
        Scanner sc = new Scanner(System.in);

        //Get details
        System.out.print("Enter Number : ");
        n = sc.nextInt();

        for(int i = 2; i < n; i++){
             if(n % i == 0)
             {
                  prime = 1;
                  break;
             }
        }

        if(prime == 1)
             System.out.println("Number is not Prime");
        else
             System.out.println("Number is Prime");
   }
}
```

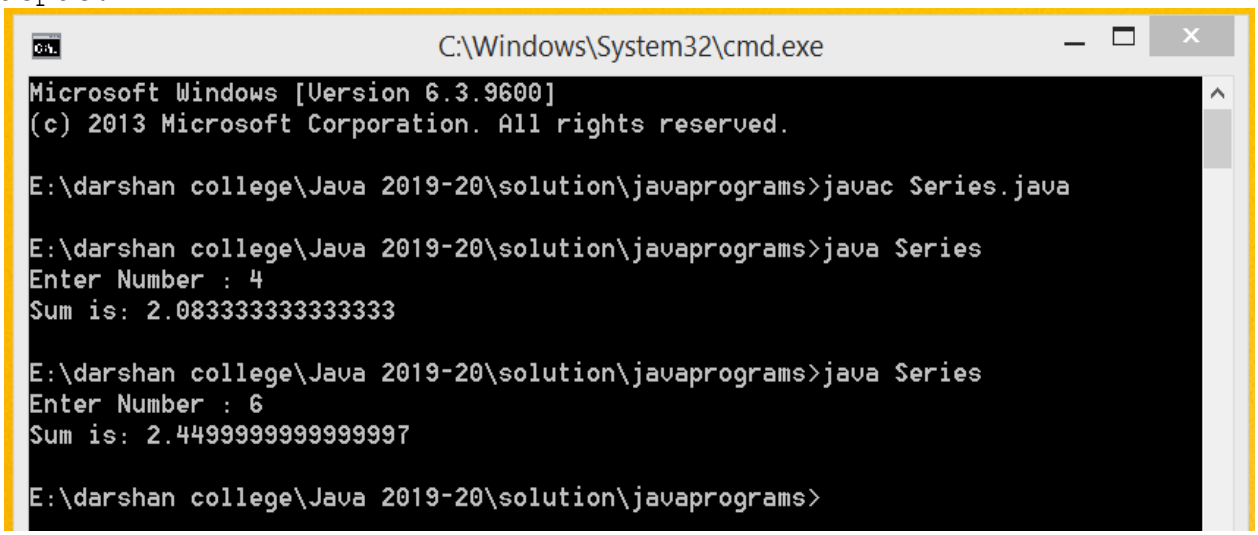
Output:



4. WAP to print sum of series 1+1/2+1/3+1/4+.....+1/n

```
import java.util.*;

class Series{
   public static void main(String[] args) {
        //Declare Variables
        int n;
        double sum=0;
        //Declare Scanner
        Scanner sc = new Scanner(System.in);

        //Scan variable
        System.out.print("Enter Number : ");
        n = sc.nextInt();

        for (int i = 1; i <= n; i++)
           sum = sum + 1.0/i;

        System.out.println("Sum is: "+ sum);
   }
}
```

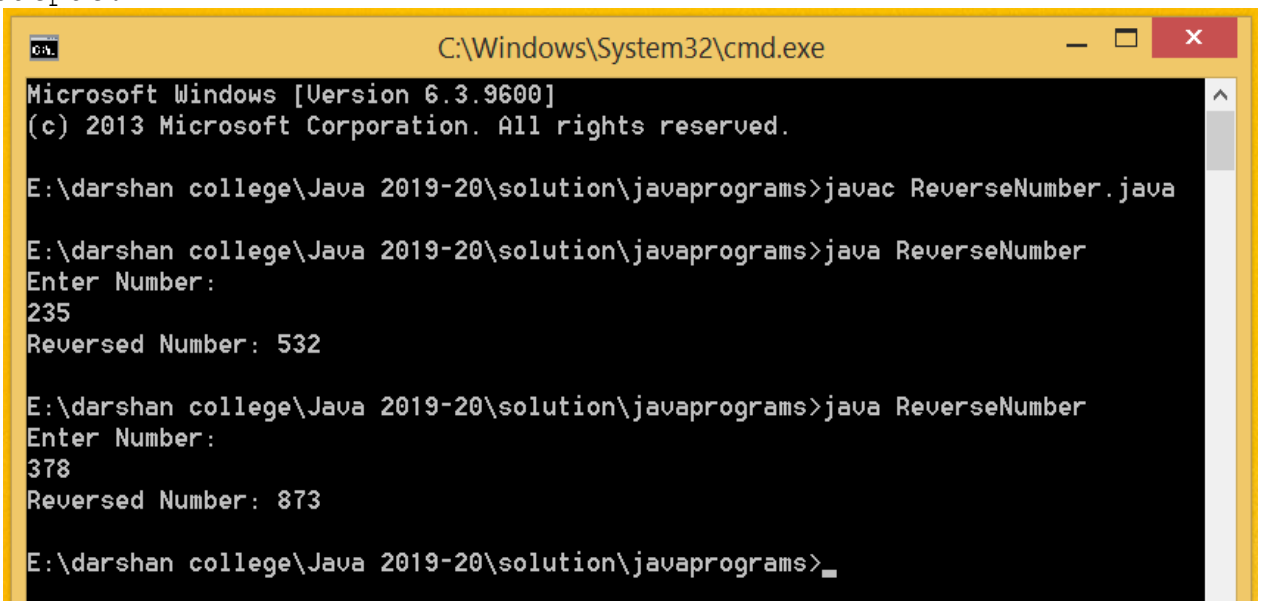
Output:



5. WAP to print given number in reverse order.

```
import java.util.Scanner;
public class ReverseNumber {

    public static void main(String[] args) {
        //Declare Variables
        int number,i,reversed = 0;

       //Declare Scanner
        Scanner sc = new Scanner(System.in);

       //Scan integer variable
        System.out.println("Enter Number: ");
        number = sc.nextInt();

       while(number != 0) {
            int digit = number % 10;
            reversed = reversed * 10 + digit;
            number /= 10;
        }

        System.out.println("Reversed Number: " + reversed);
   }
}
```

Output:

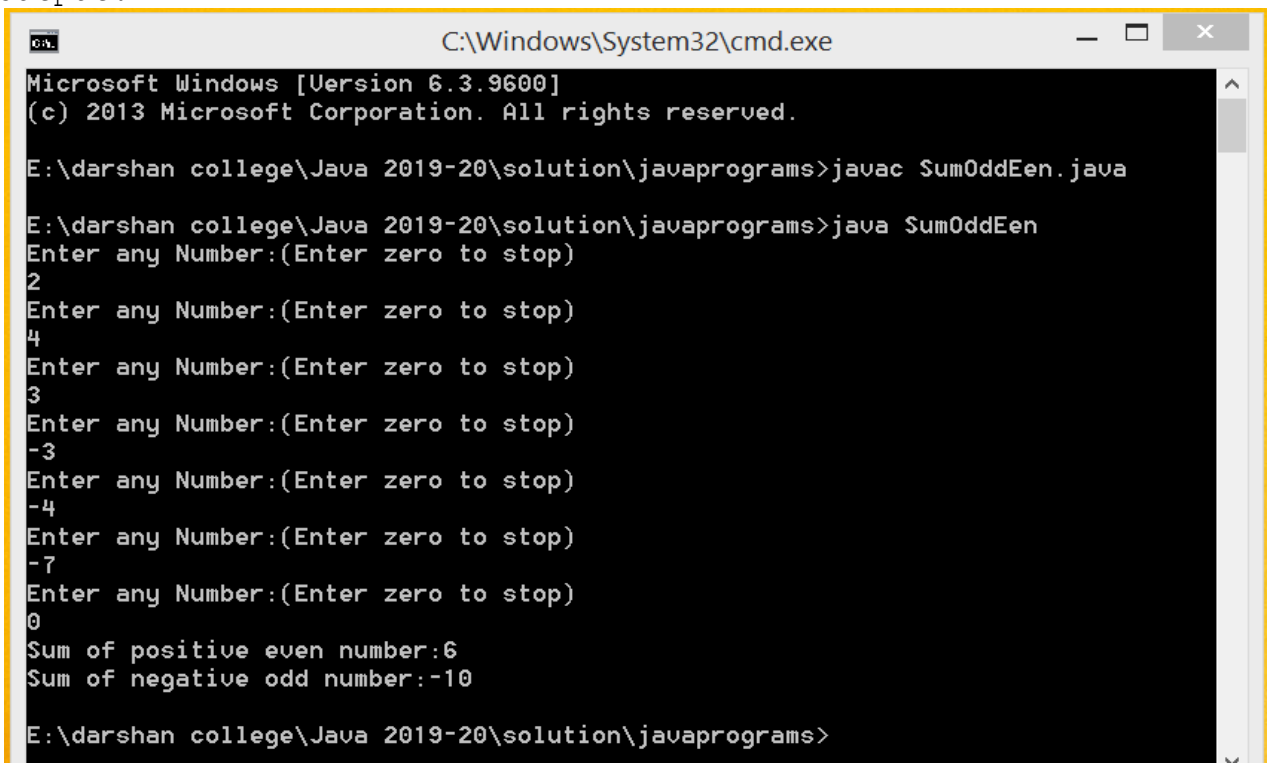


6. WAP program to calculate the sum of all positive even numbers and the sum of all negative odd numbers from a set of numbers. You can enter 0 (zero) to quit the program and thus it displays the result.

```
import java.util.Scanner;
public class SumOddEen {

    public static void main(String[] args) {
        //Declare Variables
        int sumOdd=0,sumEven=0,number;

       //Declare Scanner
        Scanner sc = new Scanner(System.in);

       while(true)
       {
            //Scan integer variable, enter zero to stop
             System.out.println("Enter any Number:(Enter zero to
             stop)");
            number = sc.nextInt();

            if(number>0 && number % 2 == 0)
                 sumEven+=number;
            if(number<0 && number % 2 != 0)
                 sumOdd+=number;
            if(number==0)
```

```
                    break;
            }
            System.out.println("Sum of positive even number:"+sumEven);
            System.out.println("Sum of negative odd number:"+sumOdd);
        }
}
```

Output:

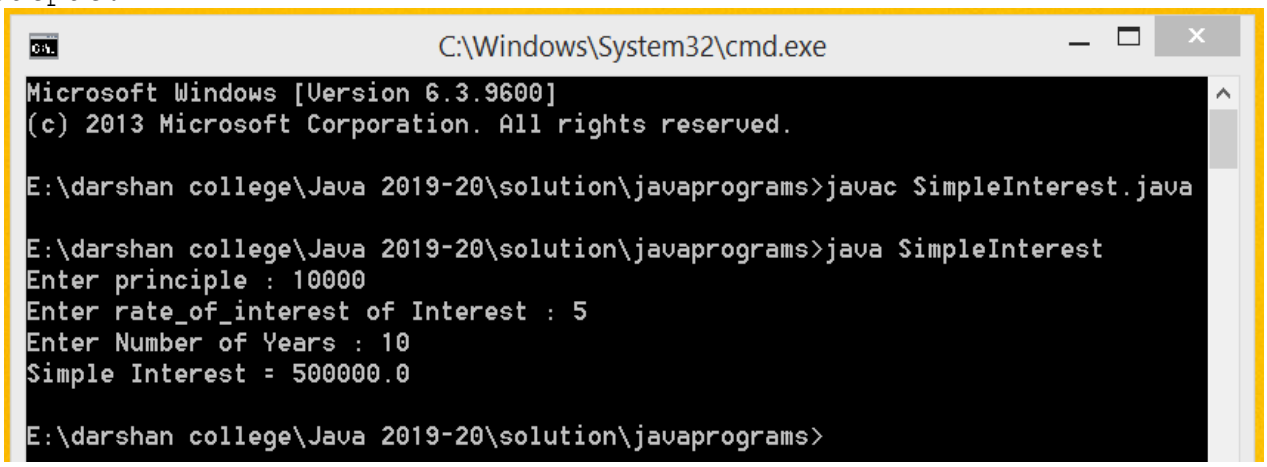


Practical-5

1. WAP to calculate simple interest using method.

```
import java.util.*;

class SimpleInterest{
   //Method
    static   void   calculateInterest(double   principle,   double
    rate_of_interest, double number_of_years){
        double simple_interest;
        //Calculate Interest & Print
         simple_interest   =   principle   *   rate_of_interest   *
         number_of_years;
        System.out.println("Simple Interest = " + simple_interest);
   }

   //Main Method
   public static void main(String[] args) {
        double principle, rate_of_interest, number_of_years;
        Scanner sc = new Scanner(System.in);

        //Get details
        System.out.print("Enter principle : ");
        principle = sc.nextDouble();
        System.out.print("Enter rate_of_interest of Interest : ");
        rate_of_interest = sc.nextDouble();
        System.out.print("Enter Number of Years : ");
        number_of_years = sc.nextDouble();

        //Method call
        calculateInterest(principle,rate_of_interest,
        number_of_years);
   }
}
```

Output:

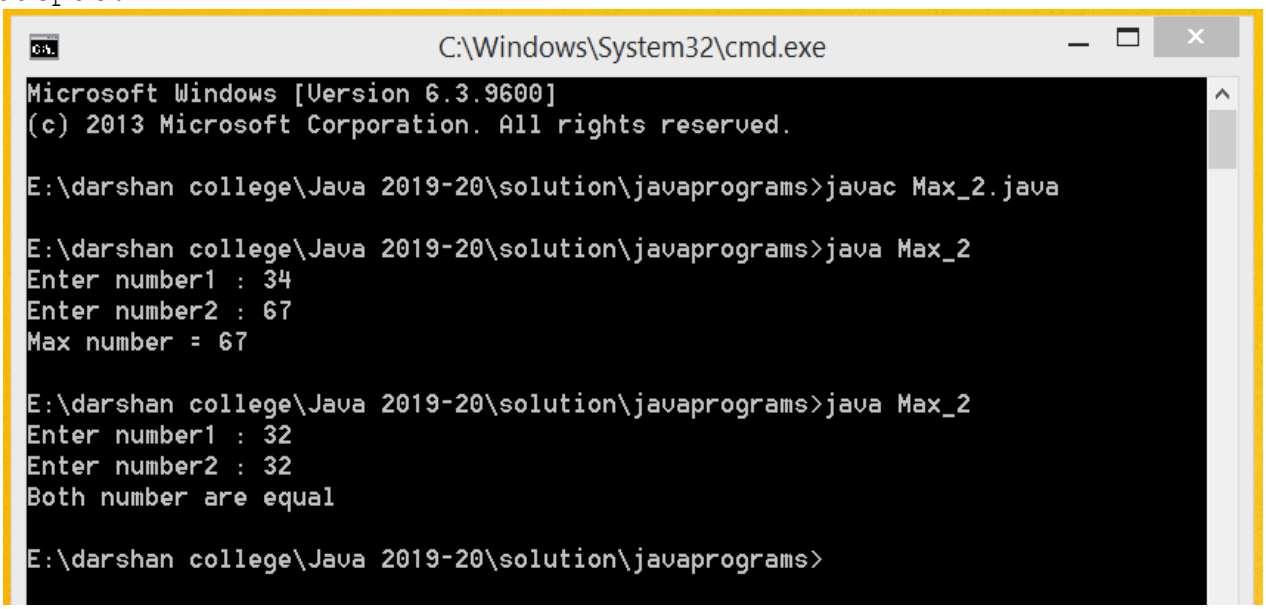


2. WAP to find maximum number from given two numbers using method.

```
import java.util.*;

class Max_2{
   //Method
   static void maxNumber(int number1, int number2){
        int max = 0, equal = 0;

        //Find Max
        if(number1 > number2)
             max = number1;
        else if(number2 > number1)
             max = number2;
        else
             equal = 1;

        //Print Max
        if(equal == 0)
             System.out.println("Max number = " + max);
        else
             System.out.println("Both number are equal");
   }

   //Main Method
   public static void main(String[] args) {
        int number1, number2;
        Scanner sc = new Scanner(System.in);

        //Get details
```

```
        System.out.print("Enter number1 : ");
        number1 = sc.nextInt();
        System.out.print("Enter number2 : ");
        number2 = sc.nextInt();

        //Method call
        maxNumber(number1,number2);
    }
}
```

Output:

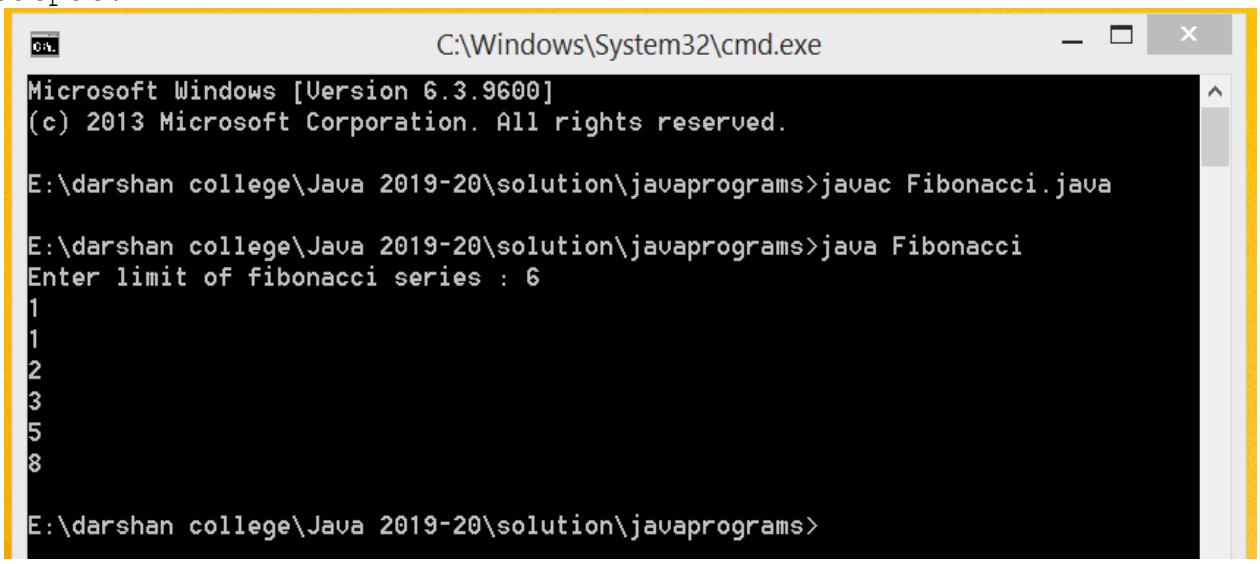


3. WAP to generate Fibonacci series of N given number using method.

```
import java.util.*;

class Fibonacci{
    //Method
    static void printFibonacci(int n){
        int n1 = 1, n2 = 1, temp;

        for(int count = 0 ; count < n; count++){
            System.out.println(n1);
            temp = n2;
            n2 = n1 + n2;
            n1 = temp;
        }
    }
```

```
    //Main Method
    public static void main(String[] args) {
          int n;
          Scanner sc = new Scanner(System.in);

          //Get details
          System.out.print("Enter limit of fibonacci series : ");
          n = sc.nextInt();

          //Method call
          printFibonacci(n);
    }
}
```

Output:

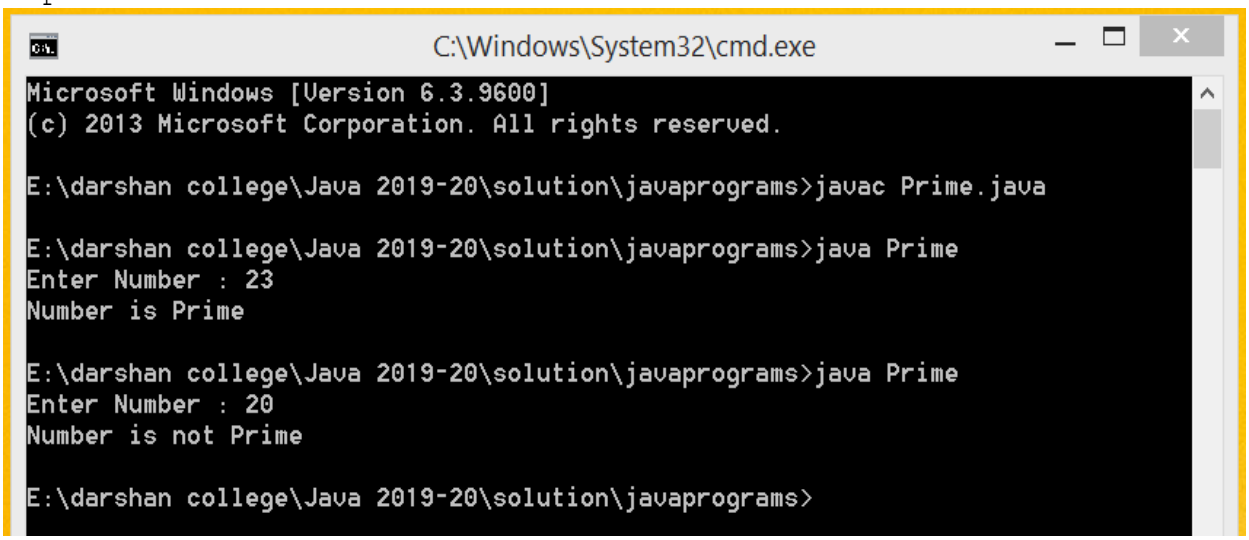


4. WAP to accept a number and check whether the number is prime or not. Use method name check (int n). The method returns 1, if the number is prime otherwise, it returns 0.

```
import java.util.*;

class Prime{
    //Method
    static int check(int n){
          for(int i = 2; i < n; i++){
               if(n % i == 0)
                    return 0;
          }
```

```
            return 1;
      }

      //Main Method
      public static void main(String[] args) {
            int n, prime;
            Scanner sc = new Scanner(System.in);

            //Get details
            System.out.print("Enter Number : ");
            n = sc.nextInt();

            //Method call
            prime = check(n);
            if(prime == 0)
                  System.out.println("Number is not Prime");
            else
                  System.out.println("Number is Prime");
      }
}
```

Output:



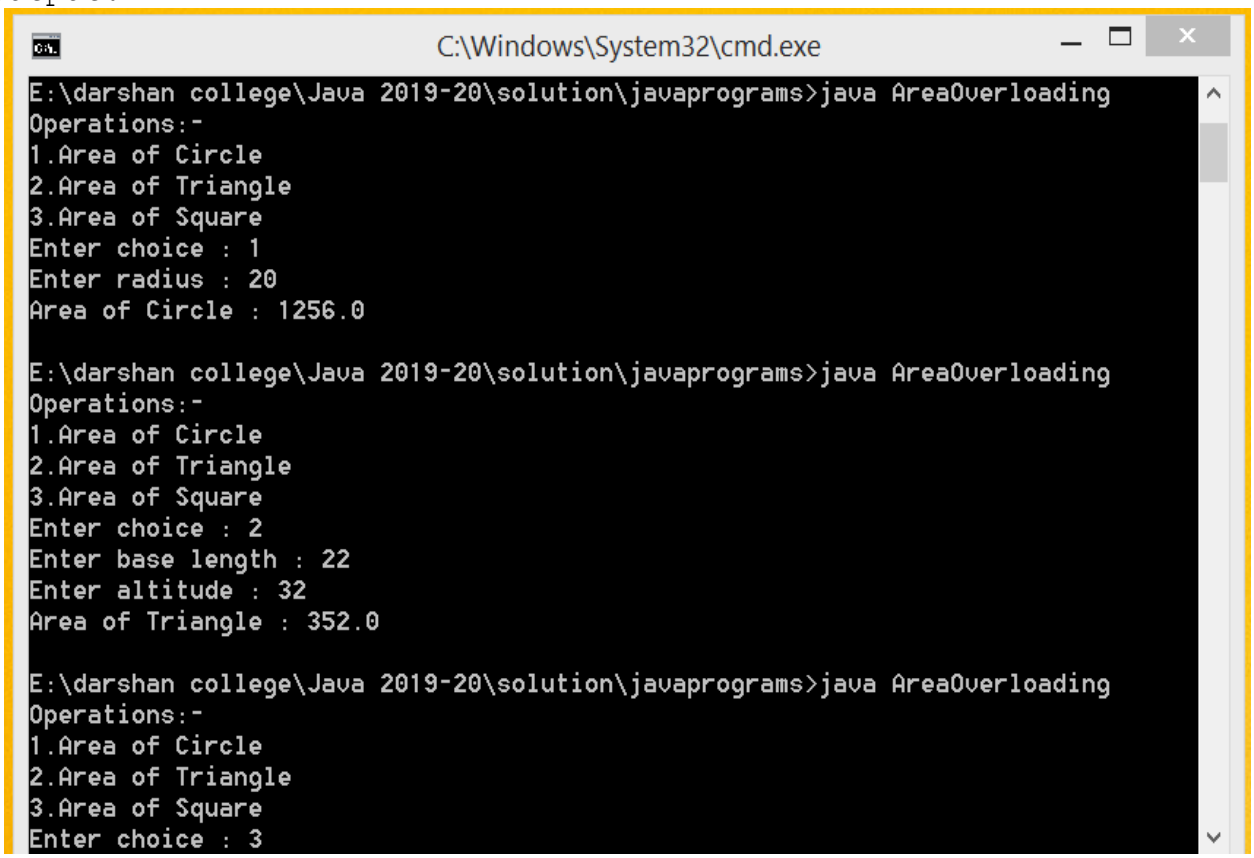
5. WAP that calculates area of circle, triangle and square using method overloading.

```
import java.util.*;

class AreaOverloading{
      //Method
      void area(double radius){
```

```
        double aoc;
        aoc = 3.14 * radius * radius;
        System.out.println("Area of Circle : "+ aoc);
    }
    void area(double base, double altitude){
        double aot;
        aot = 0.5 * base * altitude;
        System.out.println("Area of Triangle : "+ aot);
    }
    void area(float side){
        double aos;
        aos = side * side;
        System.out.println("Area of Square : "+ aos);
    }

    //Main Method
    public static void main(String[] args) {
        int ch;
        double radius, base, altitude;
        float side;
        Scanner sc = new Scanner(System.in);

        AreaOverloading ao = new AreaOverloading();

        //Get details
        System.out.print("Operations:-\n1.Area of Circle\n2.Area of
        Triangle\n3.Area of Square\nEnter choice : ");
        ch = sc.nextInt();
        switch(ch){
            case 1:
                System.out.print("Enter radius : ");
                radius = sc.nextDouble();
                ao.area(radius);
                break;
            case 2:
                System.out.print("Enter base length : ");
                base = sc.nextDouble();
                System.out.print("Enter altitude : ");
                altitude = sc.nextDouble();
                ao.area(base,altitude);
                break;
            case 3:
                System.out.print("Enter side length : ");
                side = sc.nextFloat();
                ao.area(side);
```

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

Output:

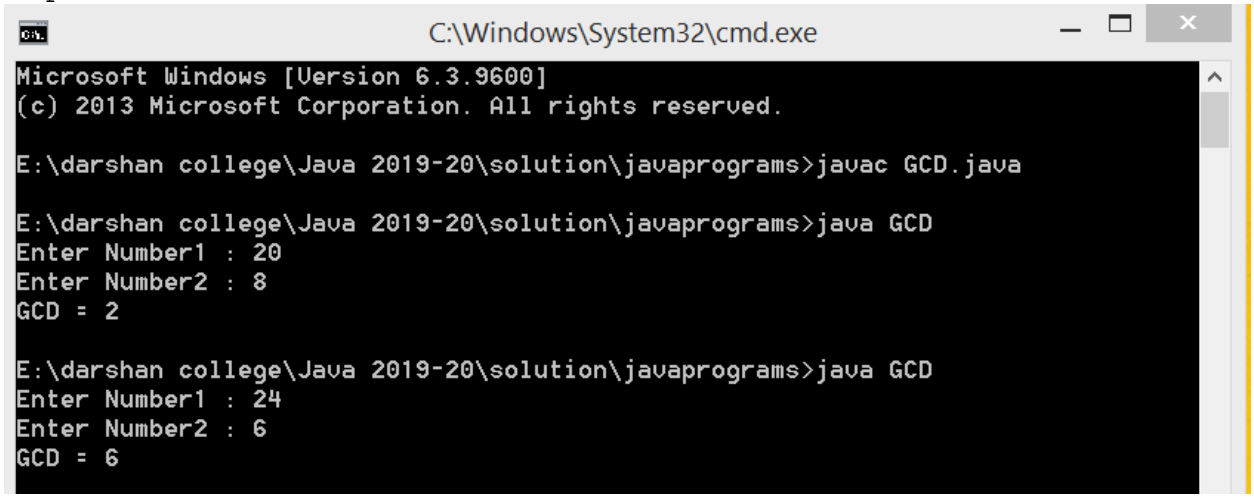


6. Write a method with following method header: public int gcd (int num1, int num2). Write a program that prompts the user to enter two integers and compute the gcd of two integers. [Note:The greatest common divisor (GCD) of two numbers is the largest number that divides them both.]

```
import java.util.*;

class GCD{
   //Method
   static void gcd(int num1, int num2){
        int ans = 1, flag = 0;
```

```
        for(int i = 2; i<=num1 || i<=num2; i++){
            for(int j = 2; j < i; j++){
                if(i % j == 0)
                    flag = 1;
            }
            if(flag == 0 && num1 % i == 0 && num2 % i == 0){
                ans = ans * i;
            }
            flag = 0;
        }
        System.out.println("GCD = "+ ans);
    }

    //Main Method
    public static void main(String[] args) {
        int num1, num2;
        Scanner sc = new Scanner(System.in);

        //Get details
        System.out.print("Enter Number1 : ");
        num1 = sc.nextInt();
        System.out.print("Enter Number2 : ");
        num2 = sc.nextInt();

        //Method call
        gcd(num1, num2);
    }
}
```

Output:

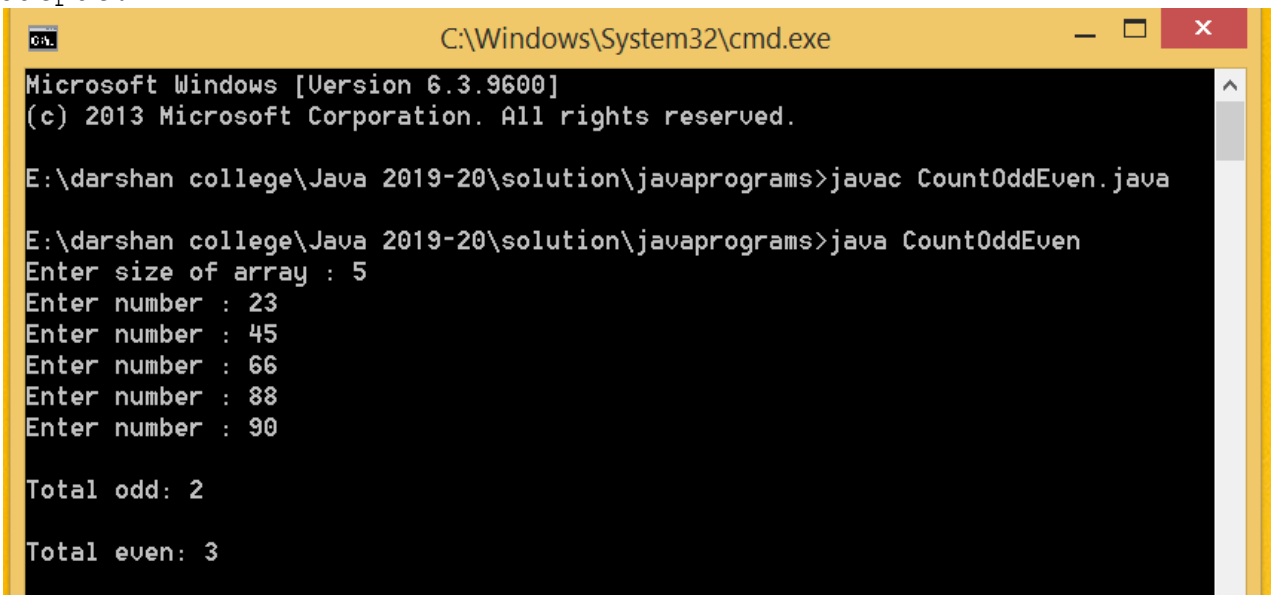


Practical-6

1. WAP to count number of even or odd number from an array of n numbers.

```
import java.util.*;
class CountOddEven {
   public static void main(String[] args) {
        int a[], n, odd=0, even=0;
        Scanner sc = new Scanner(System.in);
        //Get size of array
        System.out.print("Enter size of array : ");
        n = sc.nextInt();
        a = new int[n];
        //Get elements of array
        for(int i = 0; i < a.length; i++) {
             System.out.print("Enter number : ");
             a[i] = sc.nextInt();
        }
        //Count number of odd and even numbers
        for(int i = 0; i < a.length; i++) {
             if(a[i]%2==0)
                  even++;
             else
                  odd++;
        }
        //Displaying result
        System.out.println("\nTotal odd: " + odd);
        System.out.println("\nTotal even: " + even);
   }
}
```

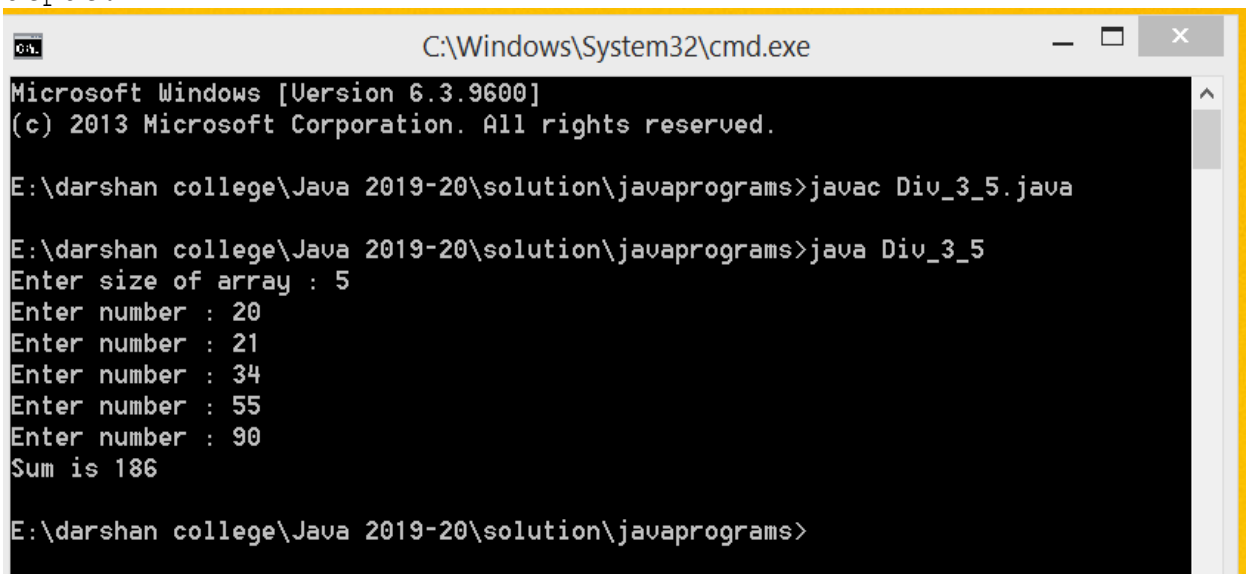
Output:



2. WAP to accept n numbers in an array. Display the sum of all the numbers which are divisible by either 3 or 5.

```
import java.util.*;
class Div_3_5{
   public static void main(String[] args) {
        int a[], n, sum = 0;
        Scanner sc = new Scanner(System.in);
        //Get size of array
        System.out.print("Enter size of array : ");
        n = sc.nextInt();
        a = new int[n];
        //Get elements of array
        for(int i = 0; i < a.length; i++){
             System.out.print("Enter number : ");
             a[i] = sc.nextInt();

             //Add numbers divisible by 3 or 5
             if(a[i] % 3 == 0 || a[i] % 5 == 0){
                  sum += a[i];
             }
        }
        System.out.println("Sum is "+ sum);
   }
}
```

Output:

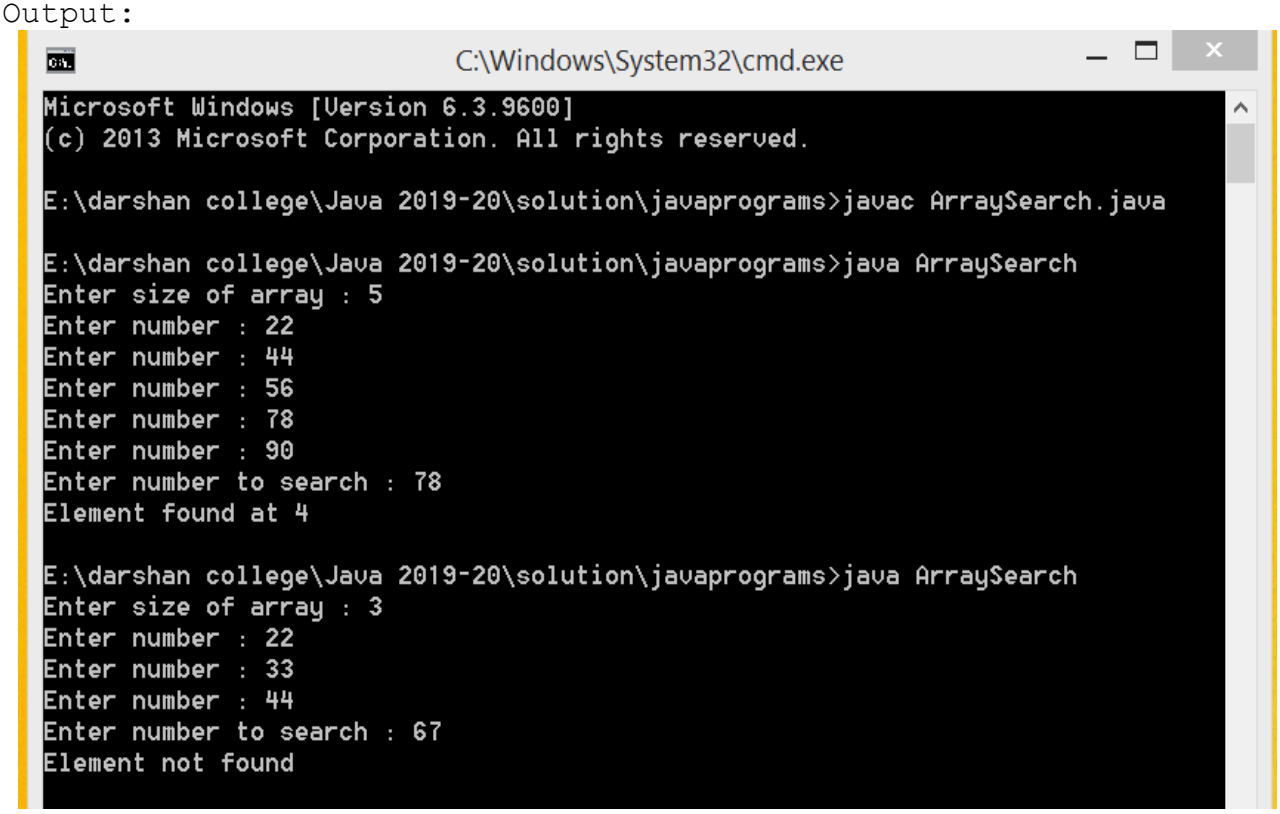


3. WAP to accept n numbers in an array. Now, enter a number and search whether the number is present or not in the list of array elements by using linear search.

```
import java.util.*;
class ArraySearch{
   public static void main(String[] args) {
        int a[], n, x;
        String message = "not found";
        Scanner sc = new Scanner(System.in);
        //Get size of array
        System.out.print("Enter size of array : ");
        n = sc.nextInt();
        a = new int[n];
        //Get elements of array
        for(int i = 0; i < a.length; i++){
             System.out.print("Enter number : ");
             a[i] = sc.nextInt();
        }
        System.out.print("Enter number to search : ");
        x = sc.nextInt();
        for(int i = 0; i < a.length; i++){
             if(a[i] == x){
                  message = "found at "+(i+1);
                  break;
             }
        }
```

```
            System.out.println("Element "+message);
      }
}
```

Output:

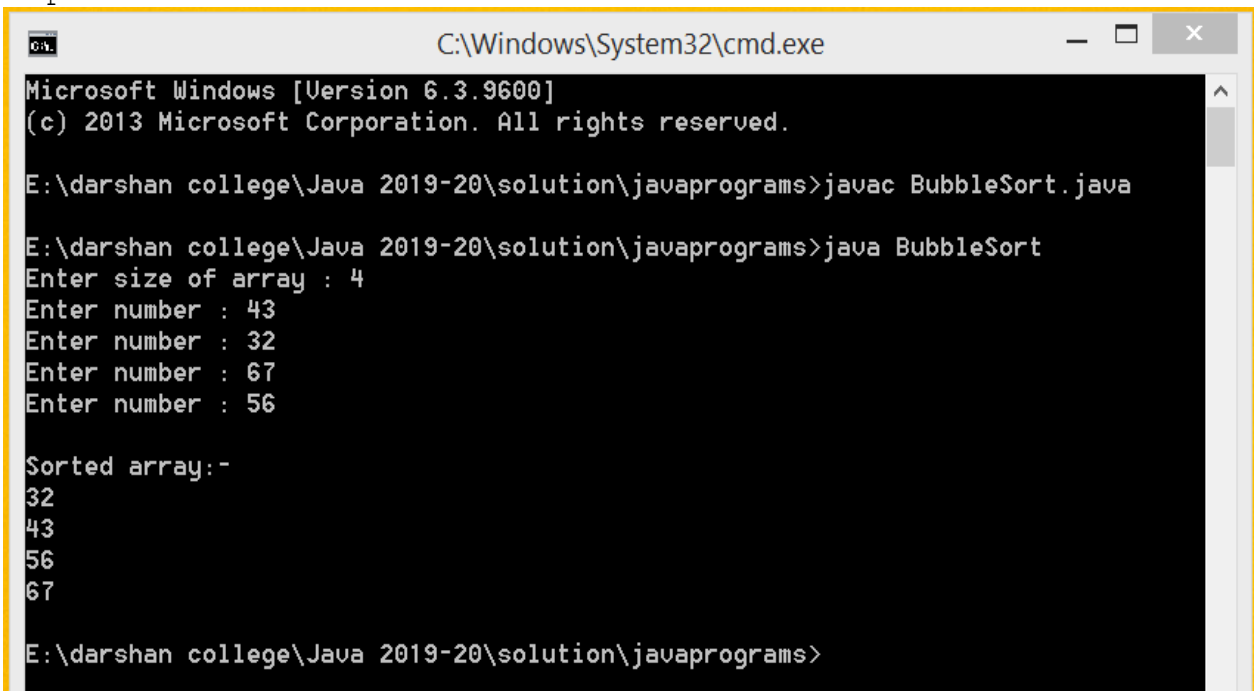


4. WAP to accept 10 numbers in an array. Pass this array to a function name bubble_sort (int m []). Arrange all the numbers in ascending order using bubble sort and display them.

```
import java.util.*;
class BubbleSort {
   public static void main(String[] args) {
         int a[], n, temp;
         Scanner sc = new Scanner(System.in);
         //Get size of array
         System.out.print("Enter size of array : ");
         n = sc.nextInt();
         a = new int[n];
         //Get elements of array
         for(int i = 0; i < a.length; i++) {
               System.out.print("Enter number : ");
               a[i] = sc.nextInt();
```

```
            }
            //Bubble Sort
            for(int i = 1; i <= a.length; i++) {
                 for(int j = 0; j < a.length-i; j++){
                      if(a[j]>a[j+1]) {
                           temp = a[j];
                           a[j] = a[j+1];
                           a[j+1] = temp;
                      }
                 }
            }
            //Displaying Sorted Array
            System.out.println("\nSorted array:-");
            for(int i = 0; i < a.length; i++){
                 System.out.println(a[i]);
            }
       }
}
```

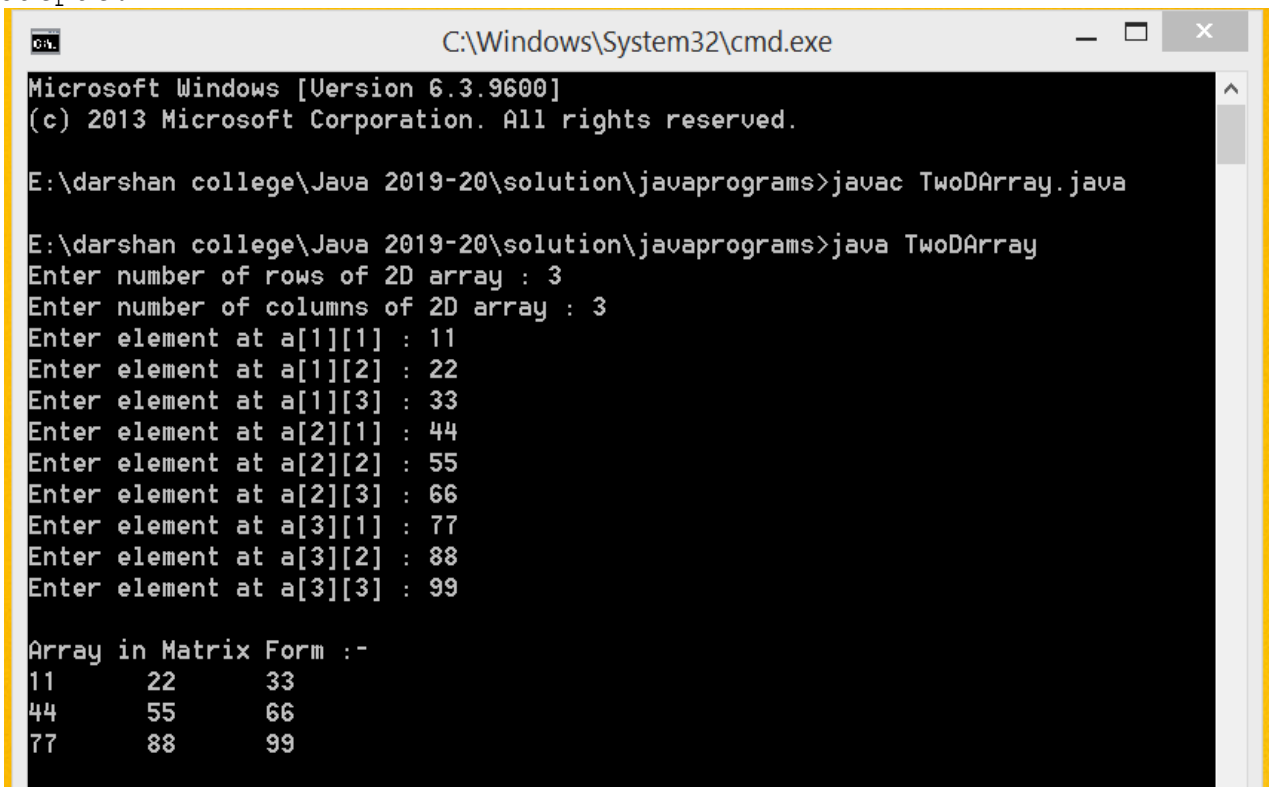
Output:



5. WAP to read values in two-dimensional array and print them in matrix form.

```
//2D array
import java.util.*;

class TwoDArray{
   public static void main(String[] args) {
        int a[][], row, column;
        Scanner sc = new Scanner(System.in);
        //Get row and column
        System.out.print("Enter number of rows of 2D array : ");
        row = sc.nextInt();
        System.out.print("Enter number of columns of 2D array : ");
        column = sc.nextInt();
        a = new int[row][column];
        //Getting elements of 2D array
        for(int i = 0; i < row; i++){
             for(int j = 0; j < column; j++){
                  System.out.print("Enter element at a["+(i+1)+"]
                  ["+(j+1)+"] : ");
                 a[i][j] = sc.nextInt();
             }
        }

        //Displaying 2D array
        System.out.println("\nArray in Matrix Form :-");
        for(int i = 0; i < row; i++){
             for(int j = 0; j < column; j++){
                  System.out.print(a[i][j]+"\t");
             }
             System.out.println();
        }
   }
}
```

Output:

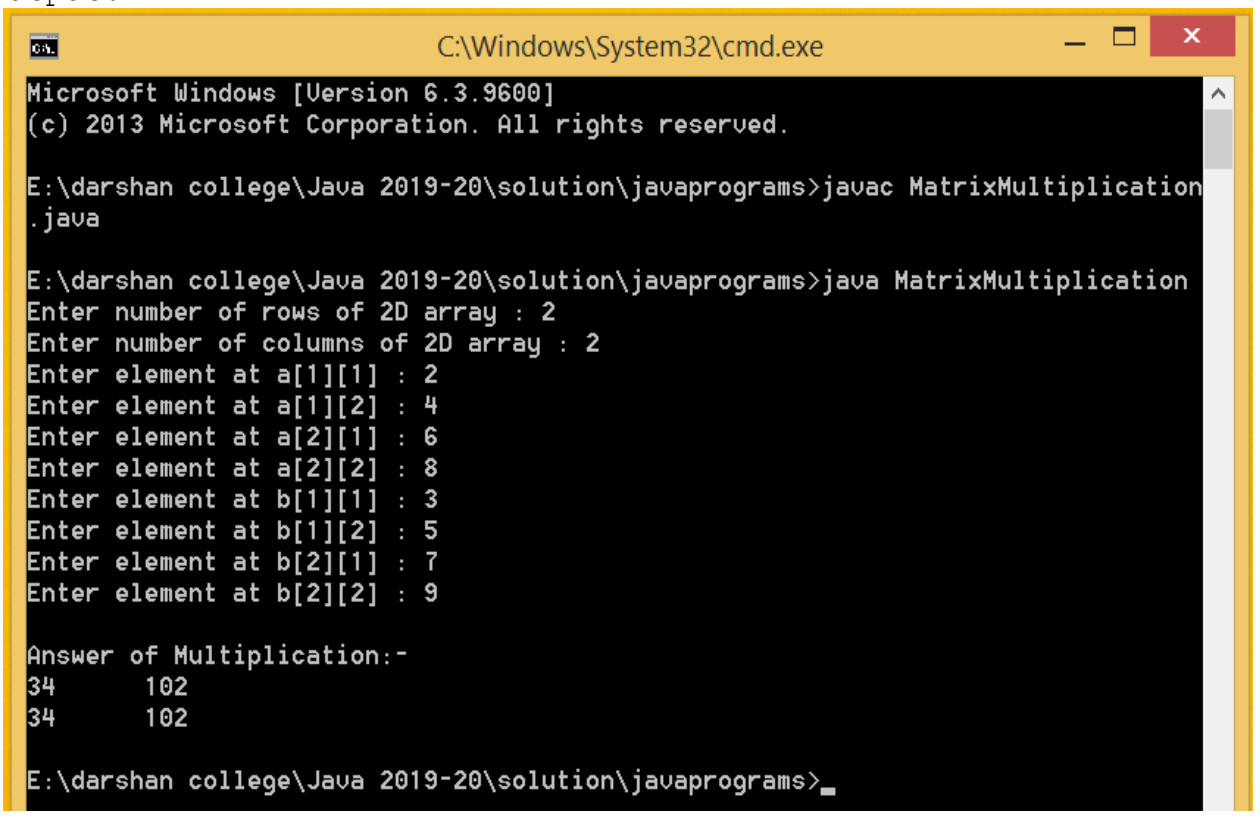


6. WAP to read two matrices of size n X n, perform multiplication operation and store result in third matrix and print it.

```
//Matrix multiplication
import java.util.*;

class MatrixMultiplication{
   public static void main(String[] args) {
        int a[][], b[][],c[][], row, column;
        Scanner sc = new Scanner(System.in);
        //Get row and column
        System.out.print("Enter number of rows of 2D array : ");
        row = sc.nextInt();
        System.out.print("Enter number of columns of 2D array : ");
        column = sc.nextInt();

        a = new int[row][column];
        b = new int[row][column];
        c = new int[row][column];
        //Getting elements of 1st matrix
```

```
            for(int i = 0; i < row; i++){
                 for(int j = 0; j < column; j++){
                      System.out.print("Enter element at a["+(i+1)+"]
                      ["+(j+1)+"] : ");
                      a[i][j] = sc.nextInt();
                 }
            }

            //Getting elements of 2nd matrix
            for(int i = 0; i < row; i++){
                 for(int j = 0; j < column; j++){
                      System.out.print("Enter element at b["+(i+1)+"]
                      ["+(j+1)+"] : ");
                     b[i][j] = sc.nextInt();
                 }
            }

            //Multiplication
            for(int k = 0; k < row; k++){
                 for(int i = 0; i < row; i++){
                      c[k][i] = 0;
                      for(int j = 0; j < column; j++){

                           c[k][i] = c[k][i] + (a[i][j] * b[j][i]);
                      }

                 }
            }

            //Displaying answer of multiplication
            System.out.println("\nAnswer of Multiplication:-");
            for(int i = 0; i < row; i++){
                 for(int j = 0; j < column; j++){
                      System.out.print(c[i][j]+"\t");
                 }
                 System.out.println();
            }

       }
  }
```

Output:

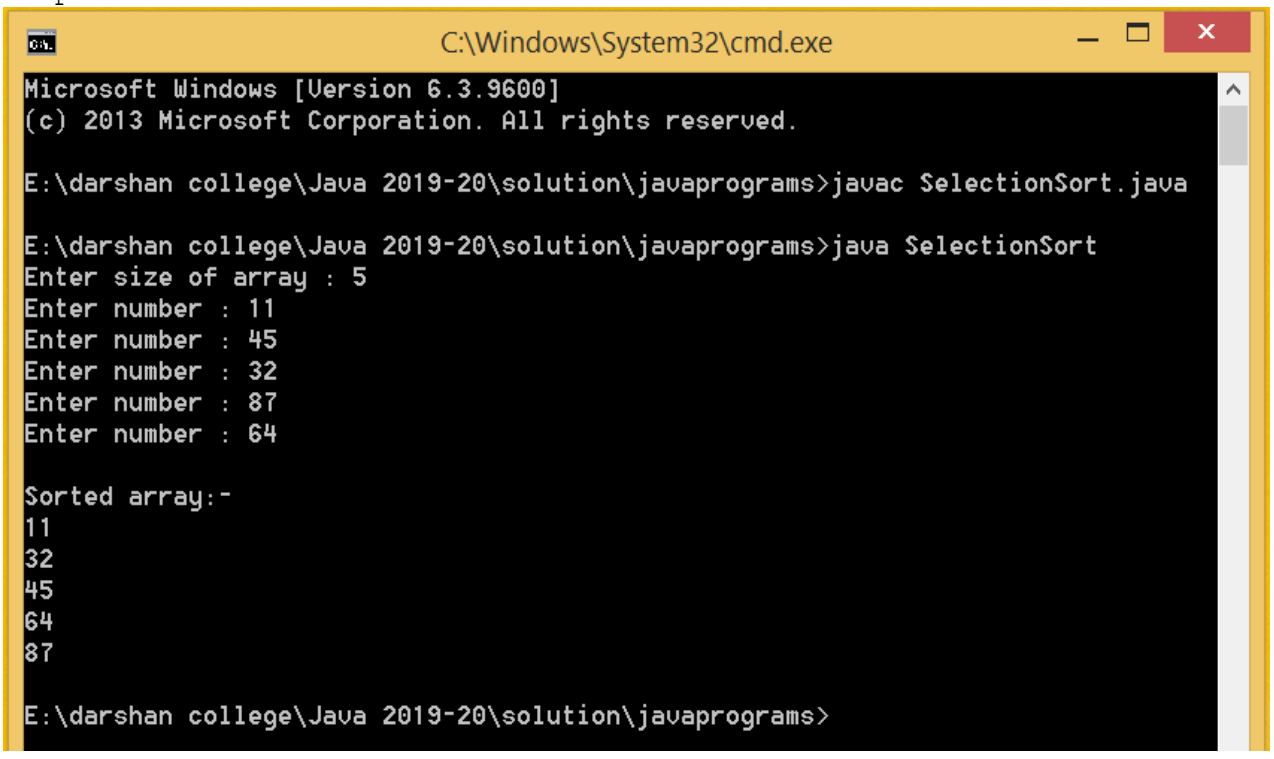


7. WAP to accept n numbers in an array. Pass this array to a function name selection_sort (int m []). Arrange all the numbers in ascending order using selection sort and display them.

```
import java.util.*;
class SelectionSort{
   public static void main(String[] args) {
        int a[], n, temp;

        Scanner sc = new Scanner(System.in);

        //Get size of array
        System.out.print("Enter size of array : ");
        n = sc.nextInt();
        a = new int[n];

        //Get elements of array
        for(int i = 0; i < a.length; i++){
             System.out.print("Enter number : ");
             a[i] = sc.nextInt();
        }
```

```
        //Selection Sort
        for(int i = 0; i < a.length; i++){
             for(int j = i+1; j < a.length; j++){
                  if(a[i]>a[j]){
                       temp = a[i];
                       a[i] = a[j];
                       a[j] = temp;
                  }
             }
        }

        //Displaying Sorted Array
        System.out.println("\nSorted array:-");
        for(int i = 0; i < a.length; i++){
             System.out.println(a[i]);
        }
   }
}
```

Output:

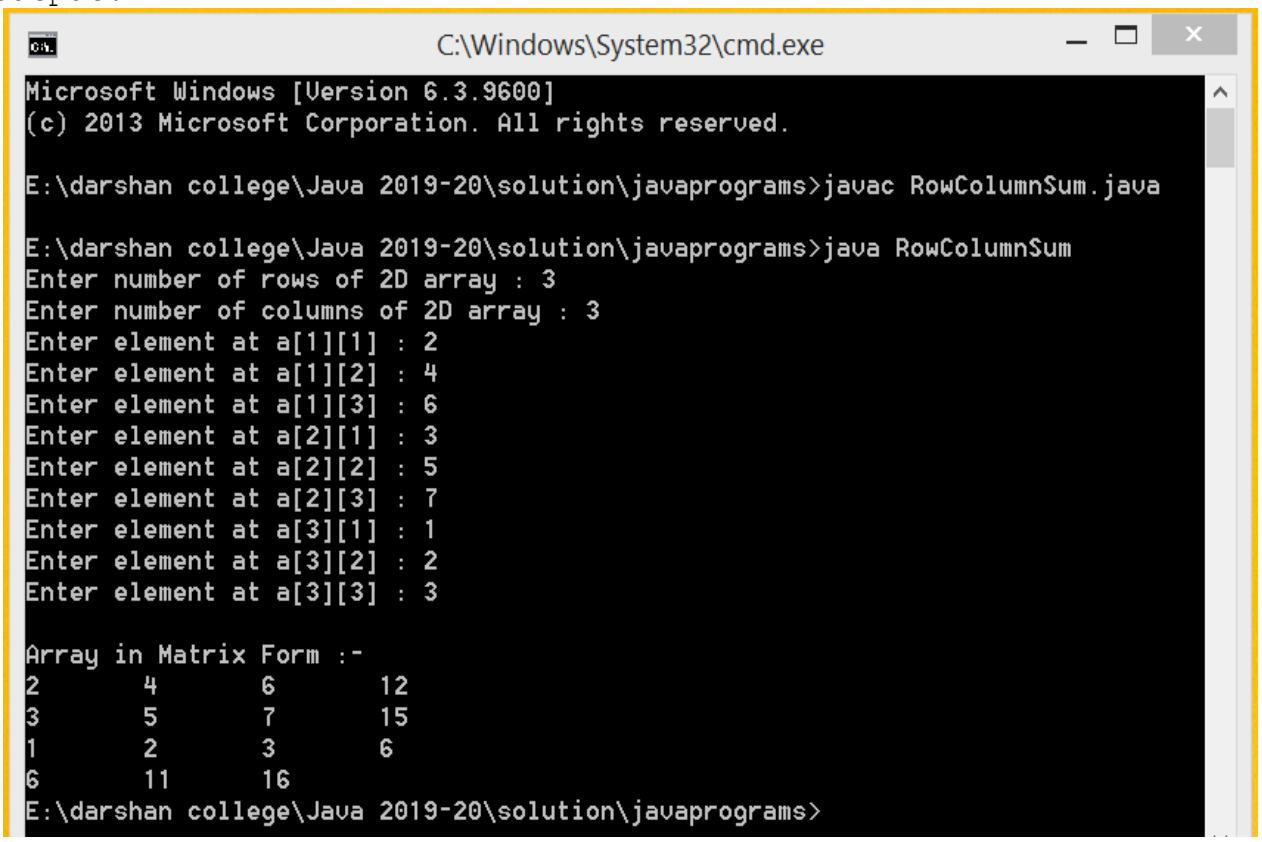


8. WAP to store numbers in 4 X 4 matrix in a two-dimensional array. Find the sum of the numbers of each row and the sum of numbers of each column of the matrix.

```
import java.util.*;

class RowColumnSum{
   public static void main(String[] args) {
        int a[][], row, column, columnSum[], rowSum[];
        Scanner sc = new Scanner(System.in);

        //Get row and column
        System.out.print("Enter number of rows of 2D array : ");
        row = sc.nextInt();
        System.out.print("Enter number of columns of 2D array : ");
        column = sc.nextInt();

        a = new int[row][column];
        rowSum = new int[row];
        columnSum = new int[column];

        //Getting elements of 2D array
        for(int i = 0; i < row; i++){
             for(int j = 0; j < column; j++){
                  System.out.print("Enter element at a["+(i+1)+"]
                  ["+(j+1)+"] : ");
                  a[i][j] = sc.nextInt();
             }
        }

        //Adding Sum
        for(int i = 0; i < row; i++){
             rowSum[i] = columnSum[i] = 0;
             for(int j = 0; j < column; j++){
                  rowSum[i] += a[i][j];
                  columnSum[i] += a[j][i];
             }
        }

        //Displaying 2D array with sums
        System.out.println("\nArray in Matrix Form :-");
        for(int i = 0; i <= row ; i++){
             for(int j = 0; j < column; j++){
                  if(i == row)
                       System.out.print(columnSum[j]+"\t");
```

```
                    else
                        System.out.print(a[i][j]+"\t");
                }

                if(i != row)
                    System.out.println(rowSum[i]);
            }
        }
    }
```

Output:



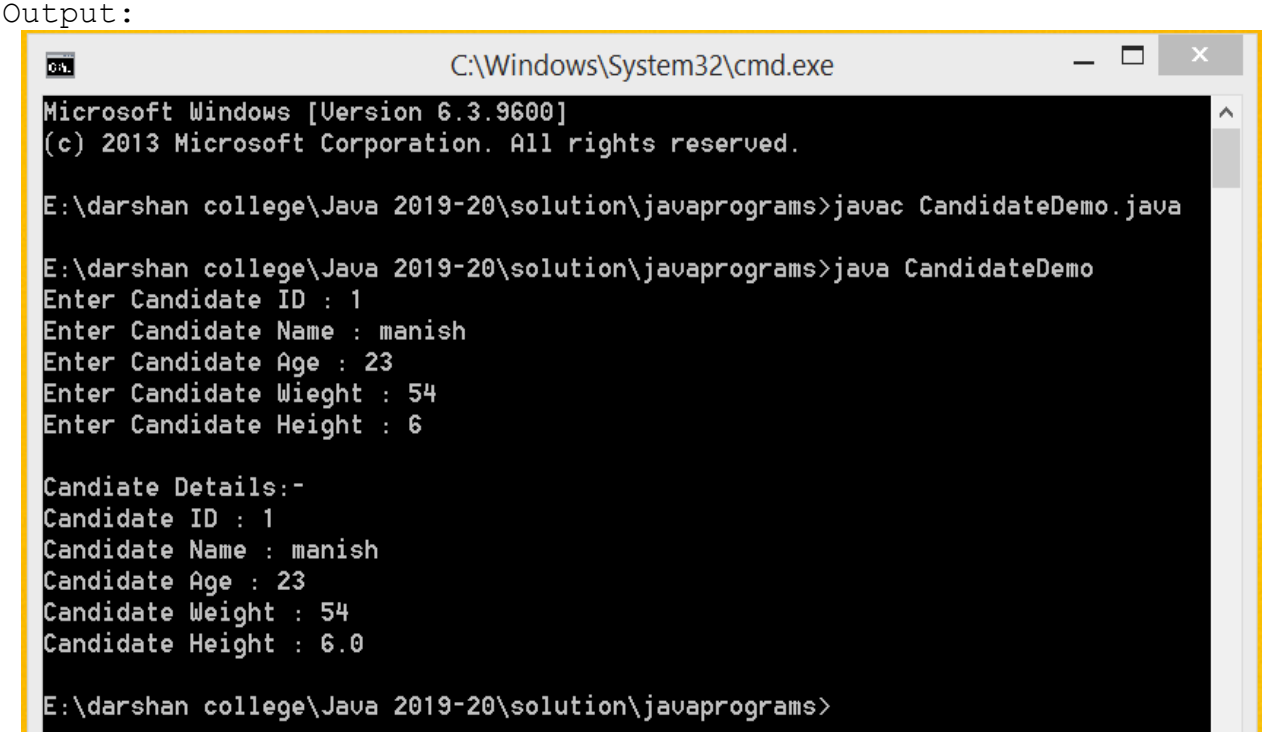
Practical-7

1. Create a class named Candidate with Candidate_ID, Candidate_Name, Candidate_Age, Candidate_Weight and Candidate_Height data members. Also create a method GetCandidateDetails() and DisplayCandidateDetails(). Create main method to demonstrate the Candidate class.

```
import java.util.Scanner;

class Candidate{
   //Declare Variables
   int CandidateID;
   int CandidateAge;
   int CandidateWeight;
   String CandidateName;
   double CandidateHeight;
   Scanner sc = new Scanner(System.in);

   //Get Details method
   void getCandidateDetails(){
        System.out.print("Enter Candidate ID : ");
        CandidateID = sc.nextInt();
        System.out.print("Enter Candidate Name : ");
        sc.nextLine();
        CandidateName = sc.nextLine();
        System.out.print("Enter Candidate Age : ");
        CandidateAge = sc.nextInt();
        System.out.print("Enter Candidate Wieght : ");
        CandidateWeight = sc.nextInt();
        System.out.print("Enter Candidate Height : ");
        CandidateHeight = sc.nextDouble();
   }

   //Display Details method
   void displayCandidateDetails(){
        System.out.println("\nCandiate Details:-");
        System.out.println("Candidate ID : "+CandidateID);
        System.out.println("Candidate Name : "+CandidateName);
        System.out.println("Candidate Age : "+CandidateAge);
        System.out.println("Candidate Weight : "+CandidateWeight);
        System.out.println("Candidate Height : "+CandidateHeight);
   }
}
```

```
//Main Class
class CandidateDemo{
   //Main method
   public static void main(String[] args) {
        //Object Initialization
        Candidate cn = new Candidate();
        //Call method
        cn.getCandidateDetails();
        cn.displayCandidateDetails();
   }
}
```

Output:



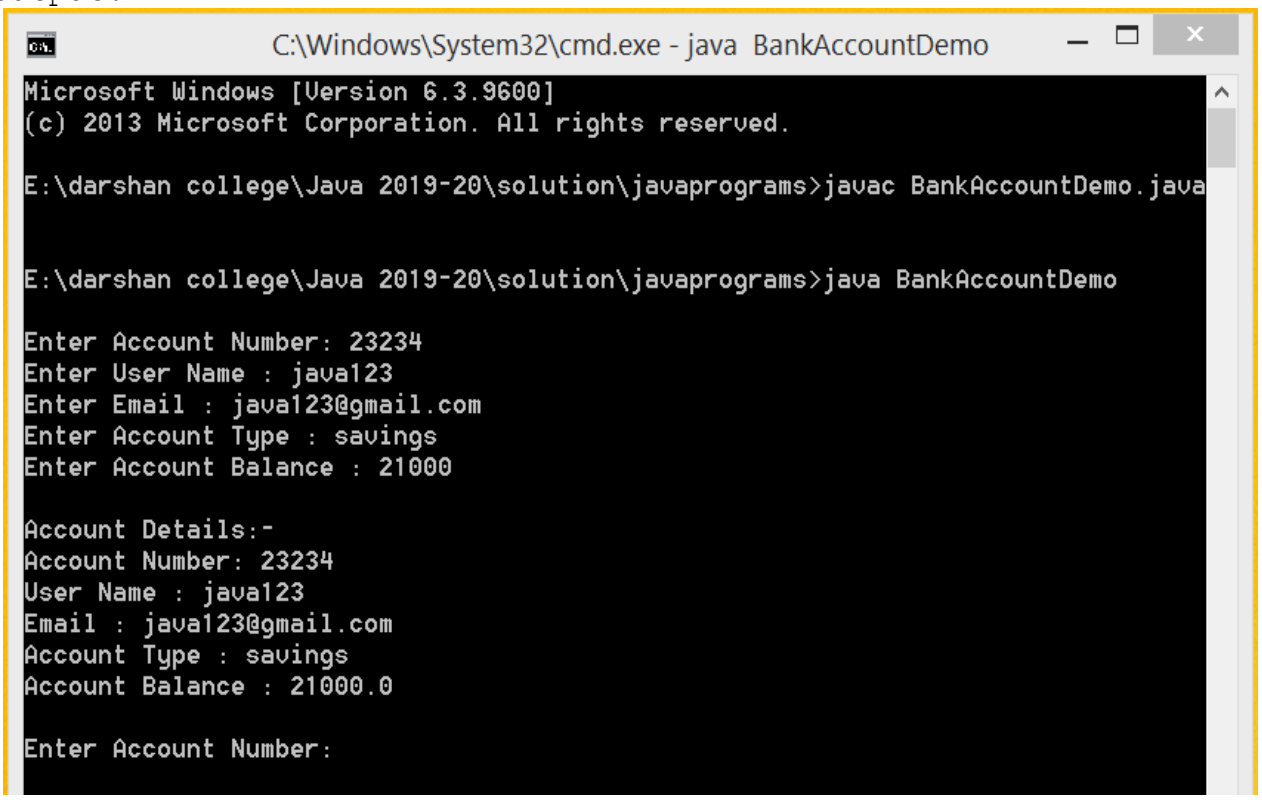
2. Create a class named Bank_Account with Account_No, User_Name, Email, Account_Type and Account_Balance data members. Also create a method GetAccountDetails() and DisplayAccountDetails(). Create main method to demonstrate the Bank_Account class.

```
import java.util.Scanner;

class BankAccount{
   //Declare Variables
   String AccountNumber;
```

```
    String UserName;
    String Email;
    String AccountType;
    double AccountBalance;
    Scanner sc = new Scanner(System.in);

    //Get Details method
    void getAccountDetails(){
         System.out.print("\nEnter Account Number: ");
         AccountNumber = sc.next();
         System.out.print("Enter User Name : ");
         UserName = sc.next();
         System.out.print("Enter Email : ");
         Email = sc.next();
         System.out.print("Enter Account Type : ");
         AccountType = sc.next();
         System.out.print("Enter Account Balance : ");
         AccountBalance = sc.nextDouble();
    }

    //Display Details method
    void displayAccountDetails(){
         System.out.println("\nAccount Details:-");
         System.out.println("Account Number: "+AccountNumber);
         System.out.println("User Name : "+UserName);
         System.out.println("Email : "+Email);
         System.out.println("Account Type : "+AccountType);
         System.out.println("Account Balance : "+AccountBalance);
    }

    //Search Method
    String   searchAccount(String   message,   String   AccountNo,
    BankAccount bns){
         //Compare Account Numbers
         if(AccountNo.equals(bns.AccountNumber)){
              message = "Found";
         }
         return message;
    }
}

//Main Class
class BankAccountDemo{
    //Main method
    public static void main(String[] args) {
```

```
        Scanner sc = new Scanner(System.in);
        //Object Initialization
        BankAccount bn1 = new BankAccount();
        BankAccount bn2 = new BankAccount();
        BankAccount bn3 = new BankAccount();
        BankAccount bn4 = new BankAccount();
        BankAccount bn5 = new BankAccount();

        //Call method
        bn1.getAccountDetails();
        bn1.displayAccountDetails();
        bn2.getAccountDetails();
        bn2.displayAccountDetails();
        bn3.getAccountDetails();
        bn3.displayAccountDetails();
        bn4.getAccountDetails();
        bn4.displayAccountDetails();
        bn5.getAccountDetails();
        bn5.displayAccountDetails();

        String message = "Not Found";
        System.out.print("\nEnter Account Number to search: ");
        String AccountNo = sc.next();
        message = bn1.searchAccount(message,AccountNo,bn1);
        message = bn2.searchAccount(message,AccountNo,bn2);
        message = bn3.searchAccount(message,AccountNo,bn3);
        message = bn4.searchAccount(message,AccountNo,bn4);
        message = bn5.searchAccount(message,AccountNo,bn5);

        //Displaying Search Results
        System.out.println(message);
    }
}
```

Output:

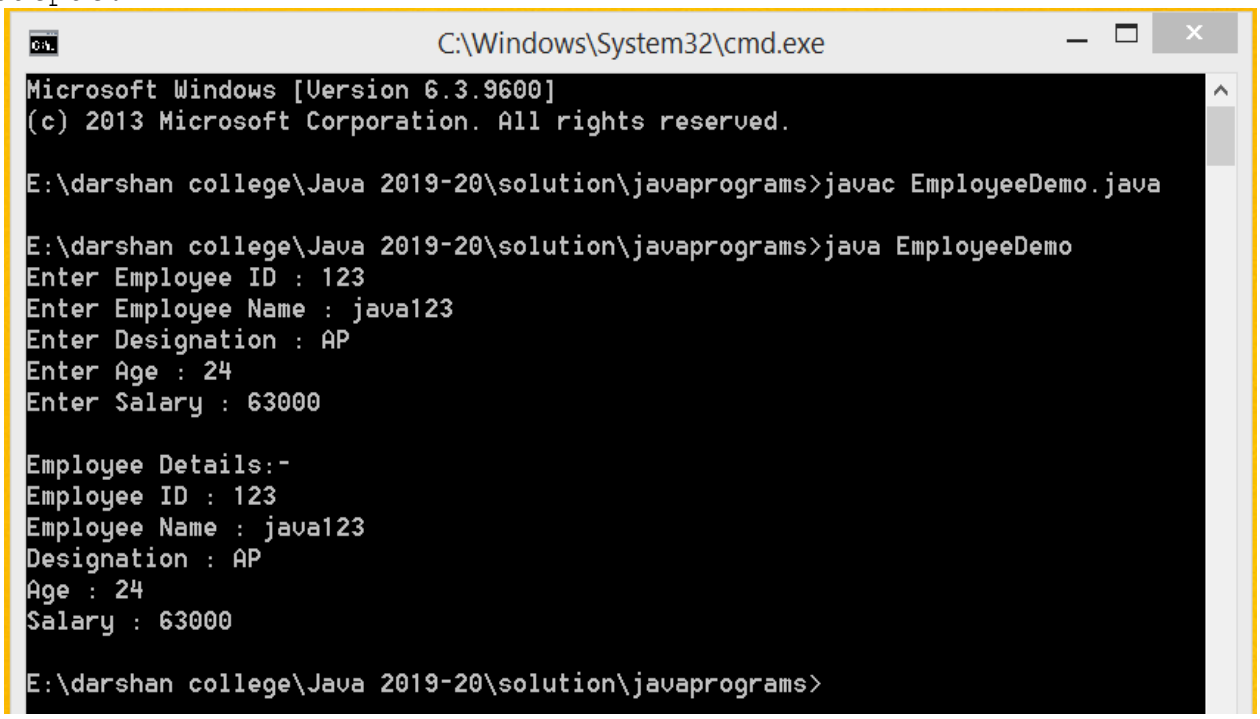


3. WAP with following specifications:
   Class Name: Employee
   Data Members: Employee_ID, Employee_Name, Designation, Age, Salary
   Member Functions: GetEmployeeDetails () and DisplayEmpolyeeDetails ().

```
import java.util.Scanner;

class Employee{
   //Declare Variables
   int EmployeeID;
   int Age;
   int Salary;
   String EmployeeName, Designation;
   Scanner sc = new Scanner(System.in);

   //Get Details method
   void getEmployeeDetails(){
        System.out.print("Enter Employee ID : ");
        EmployeeID = sc.nextInt();
        System.out.print("Enter Employee Name : ");
```

```
            EmployeeName = sc.next();
            System.out.print("Enter Designation : ");
            Designation = sc.next();
            System.out.print("Enter Age : ");
            Age = sc.nextInt();
            System.out.print("Enter Salary : ");
            Salary = sc.nextInt();
      }

      //Display Details method
      void displayEmployeeDetails(){
            System.out.println("\nEmployee Details:-");
            System.out.println("Employee ID : "+EmployeeID);
            System.out.println("Employee Name : "+EmployeeName);
            System.out.println("Designation : "+Designation);
            System.out.println("Age : "+Age);
            System.out.println("Salary : "+Salary);
      }
   }

   //Main Class
   class EmployeeDemo{
      //Main method
      public static void main(String[] args) {
            //Object Initialization
            Employee e = new Employee();
            //Call method
            e.getEmployeeDetails();
            e.displayEmployeeDetails();
      }
   }
```

Output:

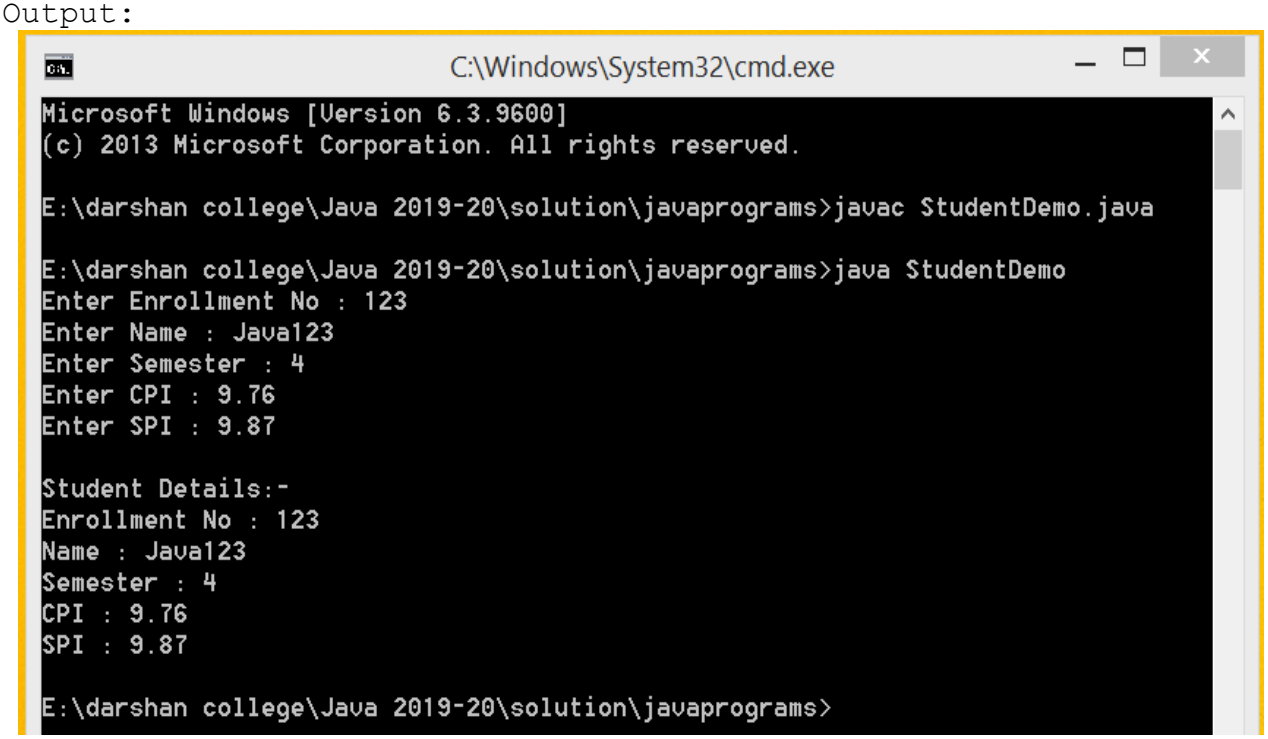


4. Write a class program with following specifications:
   Class Name: Student
   Data Members: Enrollment_No, Student_Name, Semester, CPI and SPI
   Member Functions: GetStudentDetails () and DisplayStudentDetails ().

```
import java.util.Scanner;

class Student{
   //Declare Variables
   int EnrollmentNo;
   int Semester;
   String Name;
   double CPI;
   double SPI;
   Scanner sc = new Scanner(System.in);

   //Get Details method
   void getStudentDetails(){
        System.out.print("Enter Enrollment No : ");
        EnrollmentNo = sc.nextInt();
        System.out.print("Enter Name : ");
        Name = sc.next();
```

```
            System.out.print("Enter Semester : ");
            Semester = sc.nextInt();
            System.out.print("Enter CPI : ");
            CPI = sc.nextDouble();
            System.out.print("Enter SPI : ");
            SPI = sc.nextDouble();
      }

      //Display Details method
      void displayStudentDetails(){
            System.out.println("\nStudent Details:-");
            System.out.println("Enrollment No : "+EnrollmentNo);
            System.out.println("Name : "+Name);
            System.out.println("Semester : "+Semester);
            System.out.println("CPI : "+CPI);
            System.out.println("SPI : "+SPI);
      }
}

//Main Class
class StudentDemo{
      //Main method
      public static void main(String[] args) {
            //Object Initialization
            Student st = new Student();
            //Call method
            st.getStudentDetails();
            st.displayStudentDetails();
      }
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
E:\darshan college\Java 2019-20\solution\javaprograms>javac StudentDemo.java
E:\darshan college\Java 2019-20\solution\javaprograms>java StudentDemo
Enter Enrollment No : 123
Enter Name : Java123
Enter Semester : 4
Enter CPI : 9.76
Enter SPI : 9.87
Student Details:-
Enrollment No : 123
Name : Java123
Semester : 4
CPI : 9.76
SPI : 9.87
E:\darshan college\Java 2019-20\solution\javaprograms>

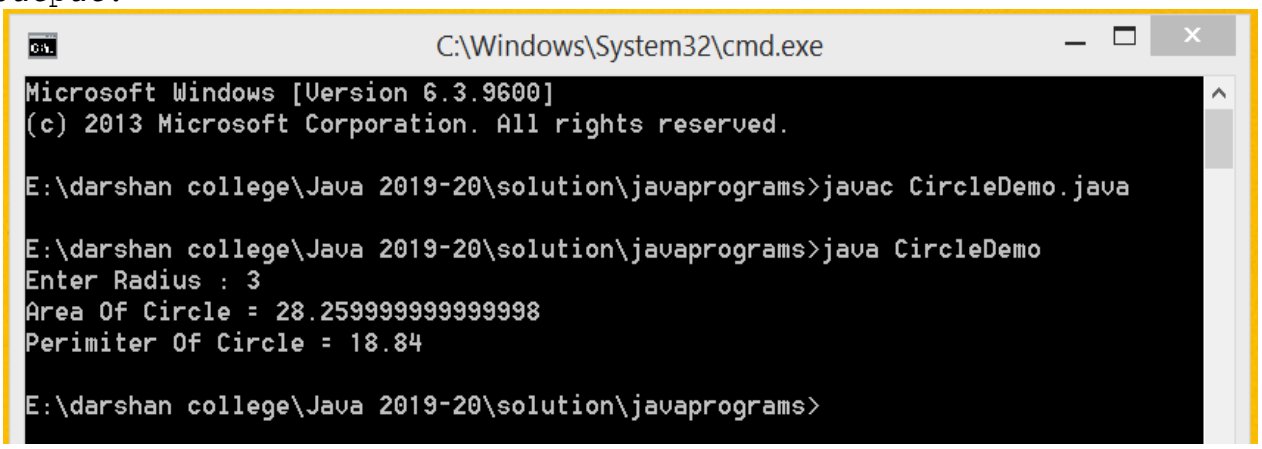
Practical-8

1. WAP to create Circle class with area and perimeter function to find area and perimeter of circle.

```
import java.util.Scanner;

// Class Circle
class Circle{
   //Declare variables
   double radius;
   double areaOfCircle;
   double perimiterOfCircle;
   final double pi = 3.14;
   Scanner sc = new Scanner(System.in);

   //Get Radius Method
   void getRadius(){
        System.out.print("Enter Radius : ");
        radius = sc.nextDouble();
   }

   //Find Area Method
   void areaOfCircle(){
        areaOfCircle = pi * radius * radius;
   }

   //Find Perimiter Method
   void perimiterOfCircle(){
        perimiterOfCircle = 2 * pi * radius;
   }

   //Display Results
   void display(){
        System.out.println("Area Of Circle = "+areaOfCircle);
        System.out.println("Perimiter    Of    Circle    =    "    +
        perimiterOfCircle);
   }
}

//Main Class
class CircleDemo{
   //Main Method
   public static void main(String[] args) {
```

```
        //Object Intiatlization
        Circle c = new Circle();

        //Call Method
        c.getRadius();
        c.areaOfCircle();
        c.perimiterOfCircle();
        c.display();
    }
}
```

Output:

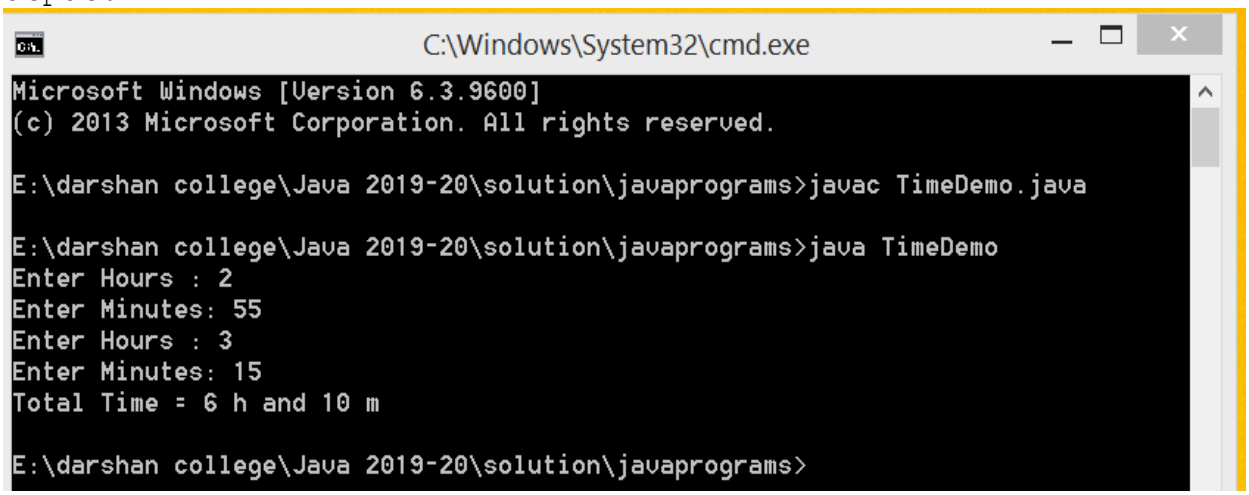


2. Define Time class with hour and minute as data member. Also define addition method to add two time objects.

```
import java.util.Scanner;

// Class Time
class Time{
   //Declare variables
   int hours;
   int minutes;
   Scanner sc = new Scanner(System.in);

   //Get Details Method
   void getDetails(){
        do{
             System.out.print("Enter Hours : ");
             hours = sc.nextInt();
             System.out.print("Enter Minutes: ");
             minutes = sc.nextInt();
```

```
            }while(minutes >= 60);
      }

      //Add Time objects Method
      Time addTime(Time t2){
            //Object Initialization
            Time t3 = new Time();
            //Add Logic
            t3.hours = hours + t2.hours;
            t3.minutes = minutes + t2.minutes;
            if(t3.minutes >= 60){
                  t3.hours++;
                  t3.minutes -= 60;
            }
            return t3;
      }

      //Display Results
      void display(){
             System.out.println("Total  Time  =  "+hours+"  h  and  "  +
             minutes + " m");
      }
   }

   //Main Class
   class TimeDemo{
      //Main Method
      public static void main(String[] args) {
            //Object Intiatlization
            Time t1 = new Time();
            Time t2 = new Time();
            Time t3;
            //Call Method
            t1.getDetails();
            t2.getDetails();
            t3 = t1.addTime(t2);
            t3.display();
      }
   }
```

Output:

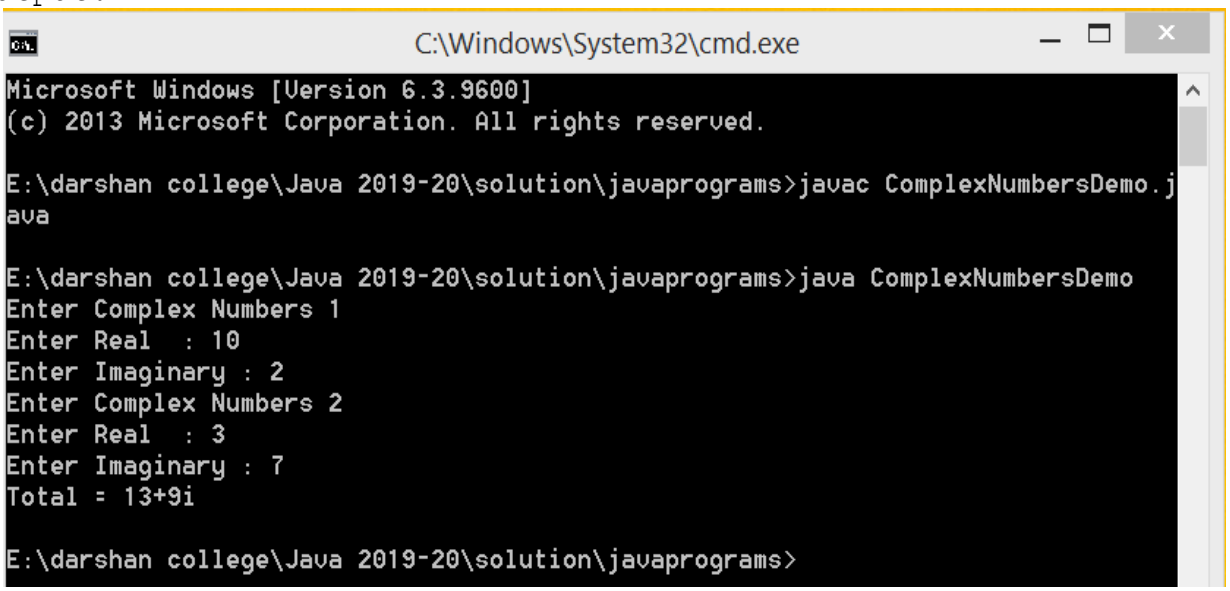


3. Define class for Complex number with real and imaginary part. Describe its constructor, overload the constructors and instantiate its object. Also define addition method to add two Complex objects.

```
import java.util.Scanner;

// Class ComplexNumbers
class ComplexNumbers{
   //Declare variables
   int real;
   int imaginary;
   int totalReal, totalImaginary;
   Scanner sc = new Scanner(System.in);

   //Constructor
   ComplexNumbers(int i){
        System.out.println("Enter Complex Numbers "+i);
        System.out.print("Enter Real  : ");
        real = sc.nextInt();
        System.out.print("Enter Imaginary : ");
        imaginary = sc.nextInt();
   }

   //Add Time objects Method
   void addComplexNumbers(ComplexNumbers cn2){
        //Add Logic
        totalReal = real + cn2.real;
        totalImaginary = imaginary + cn2.imaginary;
```

```
    }

    //Display Results
    void display(){
          System.out.println("Total   =   "+   totalReal   +   "+"   +
          totalImaginary + "i");
    }
}

//Main Class
class ComplexNumbersDemo{
    //Main Method
    public static void main(String[] args) {
          //Object Intiatlization
          ComplexNumbers cn1 = new ComplexNumbers(1);
          ComplexNumbers cn2 = new ComplexNumbers(2);
          //Call Method
          cn1.addComplexNumbers(cn2);
          cn1.display();
    }
}
```

Output:



Practical-9

1. Create first class with following specifications:
   Class Name: Student
   Data Members: Enrollment_No, Student_Name, Semester
   Member Functions: GetStudentDetails ()

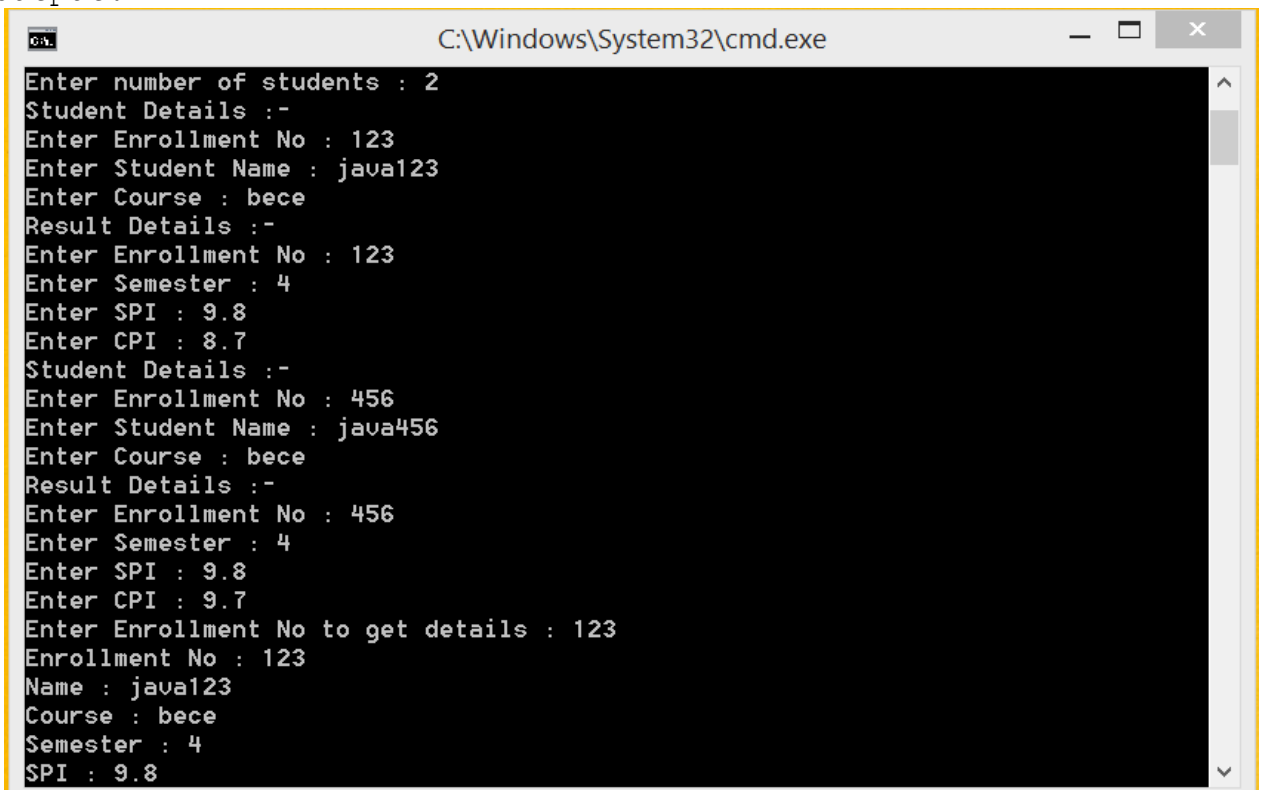
   Create second class with following specifications:
   Class Name: Result
   Data Members: Enrollment_No, CPI and SPI
   Member Functions: GetResultDetails () and DisplayResult ()
   DisplayResult method header must be: public void DisplayResult (Student s).

```
import java.util.*;

//Class Student
class Student{
   //Declare Variables
   int enrollmentNo;
   String studetName;
   String course;
   Scanner sc = new Scanner(System.in);
   //Method get student details
   void getStudentDetails(){
        System.out.println("Student Details :-");
        System.out.print("Enter Enrollment No : ");
        enrollmentNo = sc.nextInt();
        System.out.print("Enter Student Name : ");
        studetName = sc.next();
        System.out.print("Enter Course : ");
        course = sc.next();
   }
}

//Class Result
class Result{
   //Declare Variables
   int enrollmentNo;
   int sem;
   double CPI;
   double SPI;
   Scanner sc = new Scanner(System.in);
```

```
    //Method Get Result Details
    void getResultDetails(){
         System.out.println("Result Details :-");
         System.out.print("Enter Enrollment No : ");
         enrollmentNo = sc.nextInt();
         System.out.print("Enter Semester : ");
         sem = sc.nextInt();
         System.out.print("Enter SPI : ");
         SPI = sc.nextDouble();
         System.out.print("Enter CPI : ");
         CPI = sc.nextDouble();
    }

    //Method Display Result Details
    void displayResultDetails(Student st[], int i){
         System.out.println("Enrollment No : "+enrollmentNo);
         System.out.println("Name : "+st[i].studetName);
         System.out.println("Course : "+st[i].course);
         System.out.println("Semester : "+sem);
         System.out.println("SPI : "+SPI);
         System.out.println("CPI : "+CPI);
    }
}

//Main Class
class ResultDemo{
    //Main Method
    public static void main(String[] args) {
         //Declare Variables
         int n;
         int enrollmentNumber;
         int i;
         boolean found = false;
         Scanner sc = new Scanner(System.in);
         //Get number of students
         System.out.print("Enter number of students : ");
         n = sc.nextInt();
         //Object Initialization
         Student st[] = new Student[n];
         Result rs[] = new Result[n];
         for(i = 0; i < n; i++){
              st[i] = new Student();
              rs[i] = new Result();
              st[i].getStudentDetails();
              rs[i].getResultDetails();
```

```
            }

            //Find Student if exist
            System.out.print("Enter Enrollment No to get details : ");
            enrollmentNumber = sc.nextInt();
            for(i = 0; i < n; i++){
                 if(enrollmentNumber == st[i].enrollmentNo){
                      found = true;
                      break;
                 }
            }

            //Display Result
            if(found == true){
                 rs[i].displayResultDetails(st, i);
            }
            else{
                 System.out.print("Not Found!");
            }
       }
  }
```

Output:

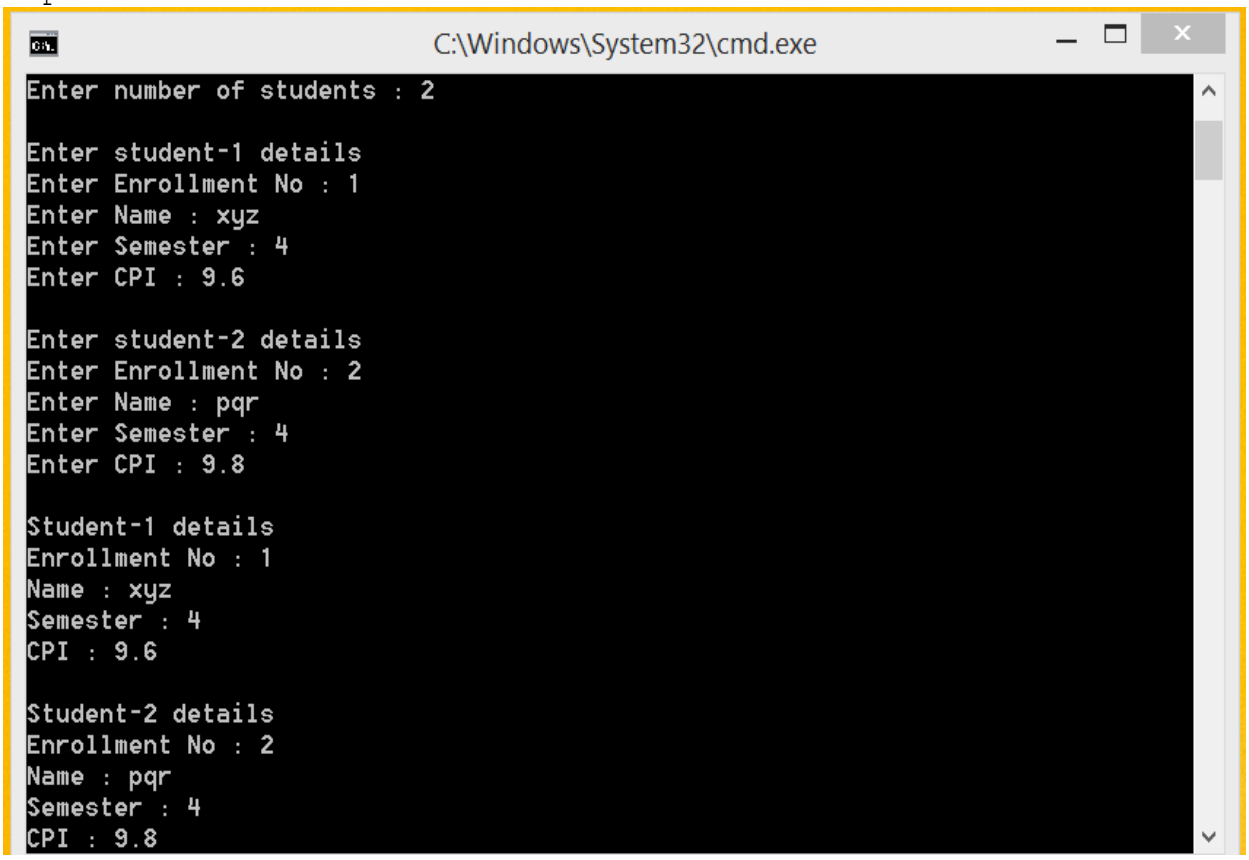


2. Create array of object for Student_Detail (Enrollment_no, Name, Sem, CPI) class for 5 students, read their information and print it.

```
import java.util.Scanner;

class Student_Detail{
   //Declare Variables
   int EnrollmentNo;
   int Semester;
   String Name;
   double CPI;
   Scanner sc = new Scanner(System.in);

   //Get Details method
   void getStudentDetails(){
        System.out.print("Enter Enrollment No : ");
        EnrollmentNo = sc.nextInt();
        System.out.print("Enter Name : ");
        Name = sc.next();
        System.out.print("Enter Semester : ");
        Semester = sc.nextInt();
        System.out.print("Enter CPI : ");
        CPI = sc.nextDouble();
   }

   //Display Details method
   void displayStudentDetails(){
        System.out.println("Enrollment No : "+EnrollmentNo);
        System.out.println("Name : "+Name);
        System.out.println("Semester : "+Semester);
        System.out.println("CPI : "+CPI);
   }
}

//Main Class
class ArrayStudent{
   //Main method
   public static void main(String[] args) {
        //Declare Variables
        int i, numberOfStudents;
        Scanner sc = new Scanner(System.in);
        //Get number of students
        System.out.print("Enter number of students : ");
        numberOfStudents = sc.nextInt();
```

```
            //Object Initialization
            Student_Detail st[] = new Student_Detail[numberOfStudents];

            //Get students details
            for(i = 0; i < numberOfStudents; i++){
                 st[i] = new Student_Detail();
                  System.out.println("\nEnter  student-"+  (i+1)  +  "
                  details");
                 st[i].getStudentDetails();
            }

            //Print students details
            for(i = 0; i < numberOfStudents; i++){
                 System.out.println("\nStudent-"+ (i+1) + " details");
                 st[i].displayStudentDetails();
            }
      }
}
```

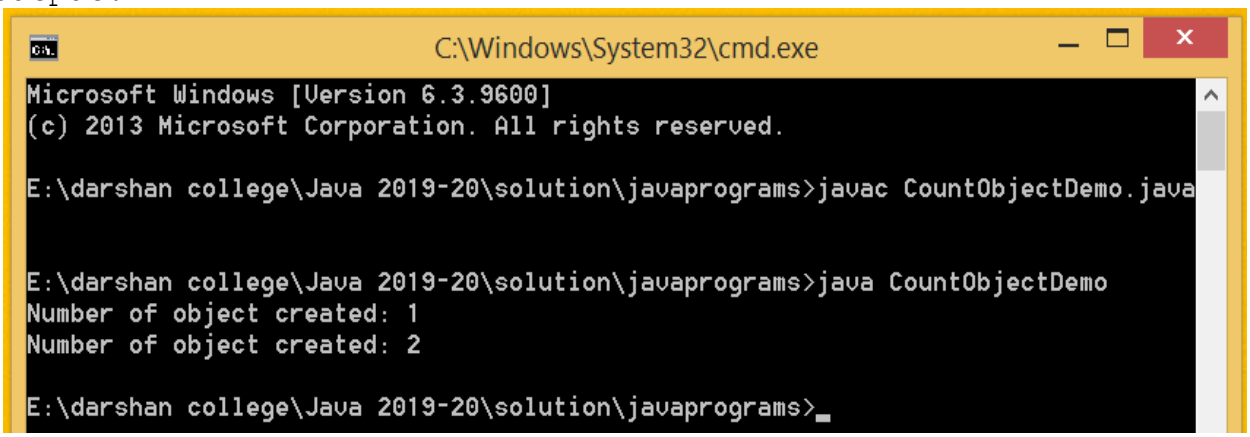
Output:



3. WAP that counts the number of objects created by using static variable.

```
import java.util.Scanner;

class CountObject{
   //Declare Variables
   static int noOfObjects = 0;

   // Instead of performing increment in the constructor
   // instance block is preferred to make this program generic.
   {
        noOfObjects += 1;
   }

   public static void printObjectCreated()
   {
        System.out.println("Number   of   object   created:   "   +
        noOfObjects);
   }
}

//Main Class
class CountObjectDemo{

   //Main method
   public static void main(String[] args) {
        //Object Initialization
        CountObject o1 = new CountObject();

        //Call method to print number of objects created
        CountObject.printObjectCreated();

        CountObject o2 = new CountObject();
        CountObject.printObjectCreated();
   }
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
E:\darshan college\Java 2019-20\solution\javaprograms>javac CountObjectDemo.java
E:\darshan college\Java 2019-20\solution\javaprograms>java CountObjectDemo
Number of object created: 1
Number of object created: 2
E:\darshan college\Java 2019-20\solution\javaprograms>

Practical-10

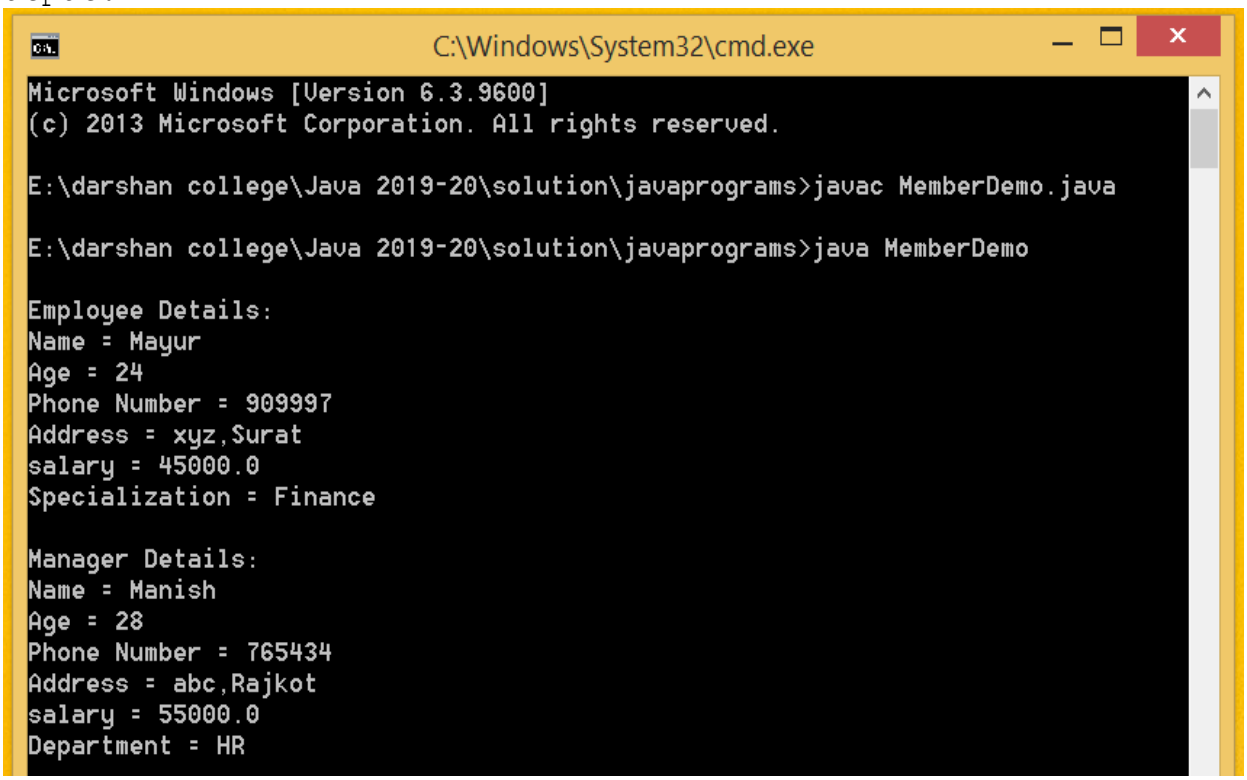
1. Create a class named 'Member' having the following members:
   1 - Name
   2 - Age
   3 - Phone number
   4 - Address
   5 - Salary
   It also has a method named 'printSalary' which prints the salary of the members.
   Two classes 'Employee' and 'Manager' inherits the 'Member' class. The 'Employee' and 'Manager' classes have data members 'specialization' and 'department' respectively. Now, assign name, age, phone number, address and salary to an employee and a manager by making an object of both of these classes and print the same along with specialization and department respectively.

```
import java.util.Scanner;

//Class Member
class Member{
   //Declare variables
   String name;
   int age;
   int phoneNumber;
   String address;
   double salary;

   //printSalary Method
   void printSalary(){
        System.out.println("salary = "+salary);
   }
}

//Class Employee
class Employee extends Member{
   //Declare variables
   String specialization;

   //Parameterized Contructor
   Employee(String n, int a, int ph, String add, double s, String
   spe){
        name=n;
```

```
            age=a;
            phoneNumber=ph;
            address=add;
            salary=s;
            specialization=spe;
      }

      //Method for display employee details
      void displayEmployeeDetails(){
            System.out.println("\nEmployee Details:");
            System.out.println("Name = "+name);
            System.out.println("Age = "+age);
            System.out.println("Phone Number = "+phoneNumber);
            System.out.println("Address = "+address);
            printSalary();
            System.out.println("Specialization = "+specialization);
      }
   }

   //Class Manager
   class Manager extends Member{
      //Declare variables
      String department;

      //Parameterized Contructor
      Manager(String n, int a, int ph,String add, double s,String
      dept){
            name=n;
            age=a;
            phoneNumber=ph;
            address=add;
            salary=s;
            department=dept;
      }

      //Method for display manager details
      void displayManagerDetails(){
            System.out.println("\nManager Details:");
            System.out.println("Name = "+name);
            System.out.println("Age = "+age);
            System.out.println("Phone Number = "+phoneNumber);
            System.out.println("Address = "+address);
            printSalary();
            System.out.println("Department = "+department);
      }
```

```
}

//Main Class
class MemberDemo{
   //Main Method
   public static void main(String[] args) {
        Employee e1 = new Employee("Mayur", 24,909997,"xyz, Surat",
        45000,"Finance");
         Manager m1 = new Manager("Manish",28,765434, "abc,Rajkot",
         55000,"HR");
        e1.displayEmployeeDetails();
        m1.displayManagerDetails();
   }
}
```

Output:



2. Design a class named MyPoint to represent a point with x- and y-coordinates. The class contains:

   The data fields x and y that represent the coordinates with getter methods.

   - a no-arg constructor that creates a point (0, 0).
   - a constructor that constructs a point with specified coordinates.
   - a method named distance that returns the distance from this point to a specified point of the MyPoint type.
   - a method named distance that returns the distance from this point to another point with specified x- and y-coordinates.

   Create a class named ThreeDPoint to model a point in a three-dimensional space. Let ThreeDPoint be derived from MyPoint with following additional features:

   - a data fields named z that represents the z-coordinate.
   - a no-arg constructor that creates a point (0, 0, 0).
   - a constructor that constructs a point with three specified coordinates.
   - a get method that returns the z value.
   - Override the distance method to return the distance between two points in the three-dimensional space.

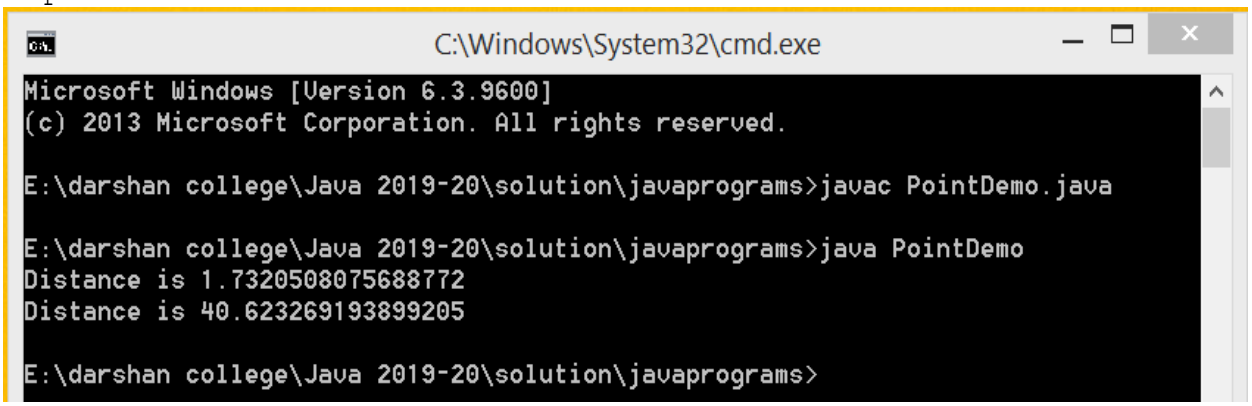
   Write a program that creates two points (0, 0, 0) and (10, 30, 25.5) and display the distance between the two points.

```
import java.util.Scanner;
import java.lang.Math;

//Class MyPoint
class MyPoint{
   //Declare Variables
   double x;
   double y;
   Scanner sc = new Scanner(System.in);

   //Default Contructor
   MyPoint(){
        x = 0;
        y = 0;
   }

   //Parameterized Contructor
   MyPoint(double x, double y){
        this.x = x;
        this.y = y;
```

```
    }

    //Get co-ordinates method
    void getter(){
         System.out.print("X = "+x+"\nY = "+y);
    }
    //Distance Method
    void distance(double x, double y){
         double   distance   =   Math.sqrt((this.x-x)*(this.x-x)   +
         (this.y-y) *(this.y-y));
         System.out.println("Distance is "+distance);
    }

    //Distance Method
    void distance(MyPoint mp2){
          double  distance  =  Math.sqrt((x-mp2.x)*(x-mp2.x)  +  (y-
          mp2.y)*(y-mp2.y));
         System.out.println("Distance is "+distance);
    }
}

//Class ThreeDPoints
class ThreeDPoints extends MyPoint{
    //Declare Variables
    double z;
    //Default Constructor
    ThreeDPoints(){
         super(0,0);
         z = 0;
    }

    //Parameterized Constructor
    ThreeDPoints(double x, double y, double z){
         super(x,y);
         this.z = z;
    }

    //Distance Method
    void distance(double x, double y, double z){
          double  distance  =  Math.pow((Math.pow(this.x  -  x,  2)  +
          Math.pow(this.y - y, 2) + Math.pow(this.z - z, 2) * 1.0),
          0.5);
         System.out.println("Distance is "+distance);
    }
```

```
    //Distance Method
    void distance(ThreeDPoints tp2){
         double distance = Math.pow((Math.pow(x - tp2.x, 2) +
         Math.pow(y - tp2.y, 2) + Math.pow(z - tp2.z, 2) * 1.0),
         0.5);
         System.out.println("Distance is "+distance);
    }
}

//Main Class
class PointDemo{
    //Main Method
    public static void main(String[] args) {
         ThreeDPoints tp1 = new ThreeDPoints();
         ThreeDPoints tp2 = new ThreeDPoints(10,30,25.5);
         tp1.distance(1,1,1);
         tp1.distance(tp2);
    }
}
```

Output:

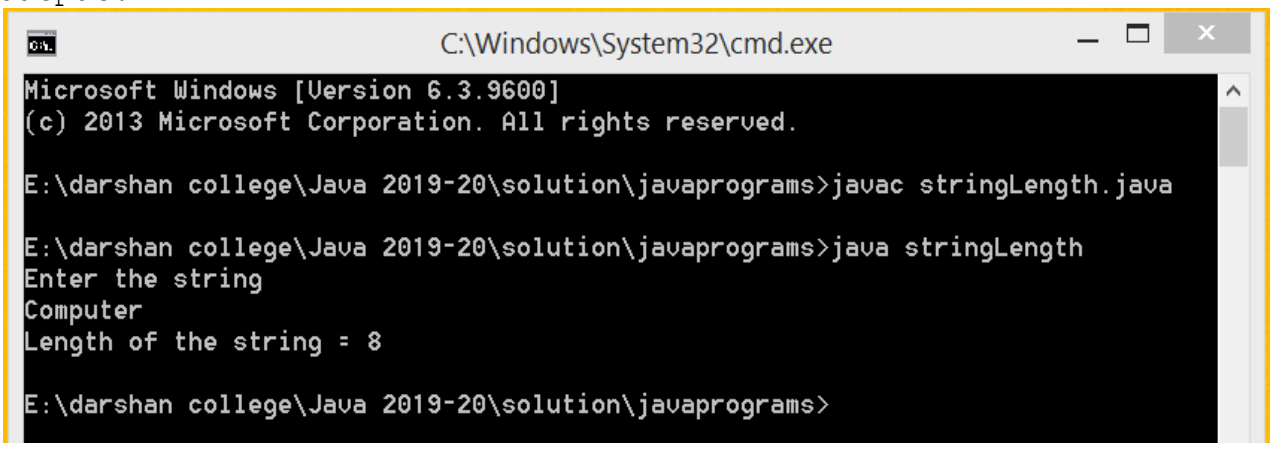


Practical-11

1. WAP to find length of a string without using built-in function.

```
import java.util.*;
//Main class
class stringLength{
   public static void main(String args[]){
        //Declare Variables
        int i=0;
        String str;
        Scanner sc = new Scanner(System.in);

        //Get String
        System.out.println("Enter the string");
        str=sc.nextLine();
        char ch[]=str.toCharArray();

        for(char c : ch){
             i++;
        }
         System.out.println("Length of the string = "+i);
   }
}
```

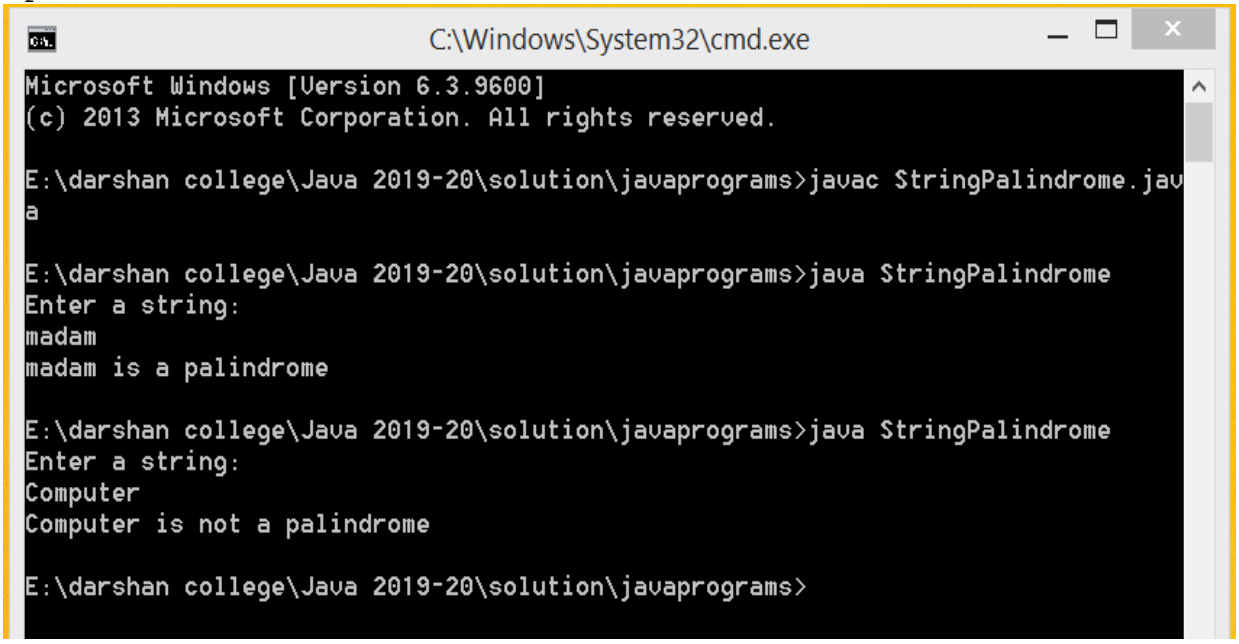
Output:



2. WAP that checks whether a given string is a palindrome or not.

```
import java.util.Scanner;

//Main class
class StringPalindrome{
   public static void main(String[ ] arg){
        //Declare Variables
        String str, rev = "";
        Scanner sc = new Scanner(System.in);

        System.out.println("Enter a string:");
        str = sc.nextLine();

        int length = str.length();

        for ( int i = length - 1; i >= 0; i-- )
             rev = rev + str.charAt(i);

        if (str.equals(rev))
             System.out.println(str+" is a palindrome");
        else
             System.out.println(str+" is not a palindrome");
   }
}
```

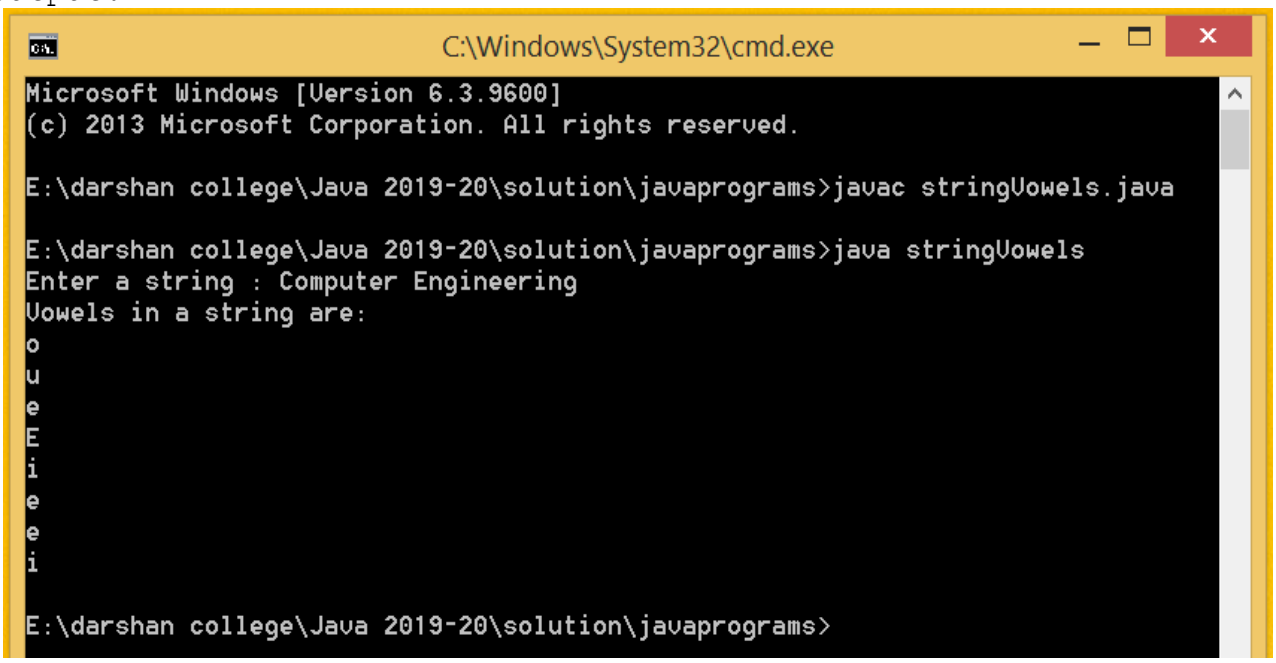
Output:



3. WAP to accept a string and display all the vowels present in the word.

```
import java.util.Scanner;

//Main class
class stringVowels{
   public static void main(String[ ] arg){
        //Declare Variables
        String s;
        char ch;
        int i=0;
        Scanner sc=new Scanner(System.in);

        //Get String
        System.out.print("Enter a string : ");
        s=sc.nextLine();
        System.out.println("Vowels in a string are:");
        for(int j=0;j<s.length();j++){
             ch=s.charAt(j);
             switch(ch){
                  case  'a' :
                  case 'e'  :
                  case 'i'   :
                  case 'o'  :
                  case 'u'  :
                  case  'A' :
                  case 'E'  :
                  case 'I'   :
                  case 'O'  :
                  case 'U'  :i=1;
                      System.out.println(ch);
             }
        }
        if(i==0)
             System.out.println("There are no vowels in a string");
   }
}
```

Output:

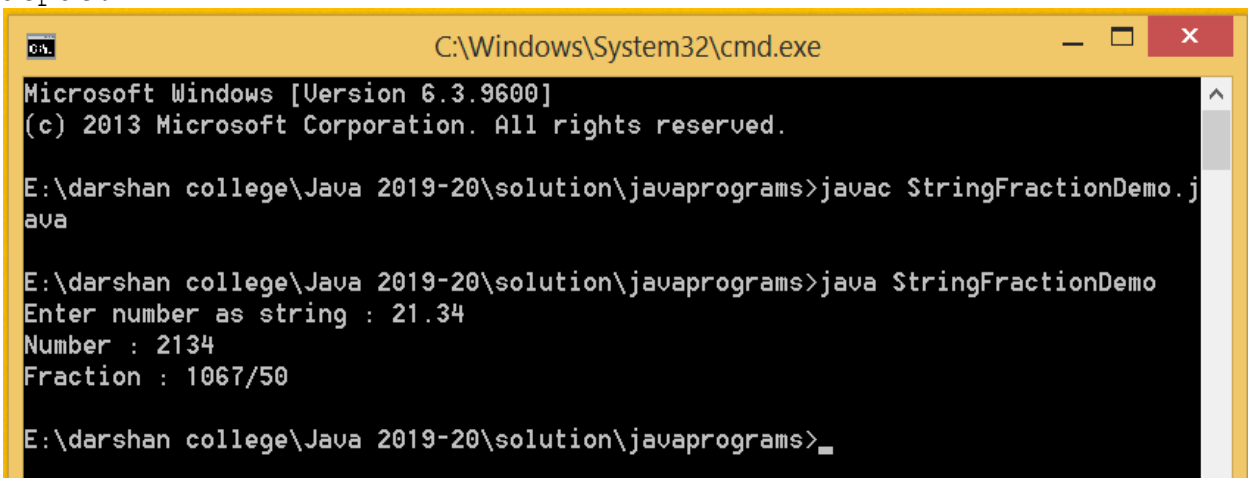


4. WAP that prompts the user to enter a decimal number and displays the number in a fraction.
   Hint: Read the decimal number as a string, extract the integer part and fractional part from the string.

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

//CLass StringFraction
class StringFraction{
   //Declare Variables
   String strnum;
   int count;
   int number;
   int exponent;
   int numerator;
   int denominator;
   Scanner sc = new Scanner(System.in);

   void getStringNumber(){
        System.out.print("Enter number as string : ");
        strnum = sc.next();
   }
```

```
    void convert(){
        for(int i = 0; i < strnum.length() ; i++){
            if(strnum.charAt(i) == '.'){
                count = strnum.length() - (i+1);
                break;
            }
        }

        number      =      (int)(Double.parseDouble(strnum)      *
        Math.pow(10,count));
        exponent = (int)Math.pow(10,count);
        System.out.println("Number : "+number);

        //Getting GCD
        int gcd = 1, flag = 0;
        for(int i = 2; i<=number || i<=exponent; i++){
            for(int j = 2; j < i; j++){
                if(i % j == 0)
                    flag = 1;
            }
            if(flag == 0 && number % i == 0 && exponent % i == 0){
                gcd = gcd * i;
            }
            flag = 0;
        }

        //Actual Fraction
        numerator = number / gcd;
        denominator = exponent / gcd;
        System.out.println("Fraction  :  "  +  numerator  +  "/"  +
        denominator);
    }
}

//Main Class
class StringFractionDemo{
    //Main Method
    public static void main(String[] args) {
        StringFraction sf = new StringFraction();
        sf.getStringNumber();
        sf.convert();
    }
}
```

Output:

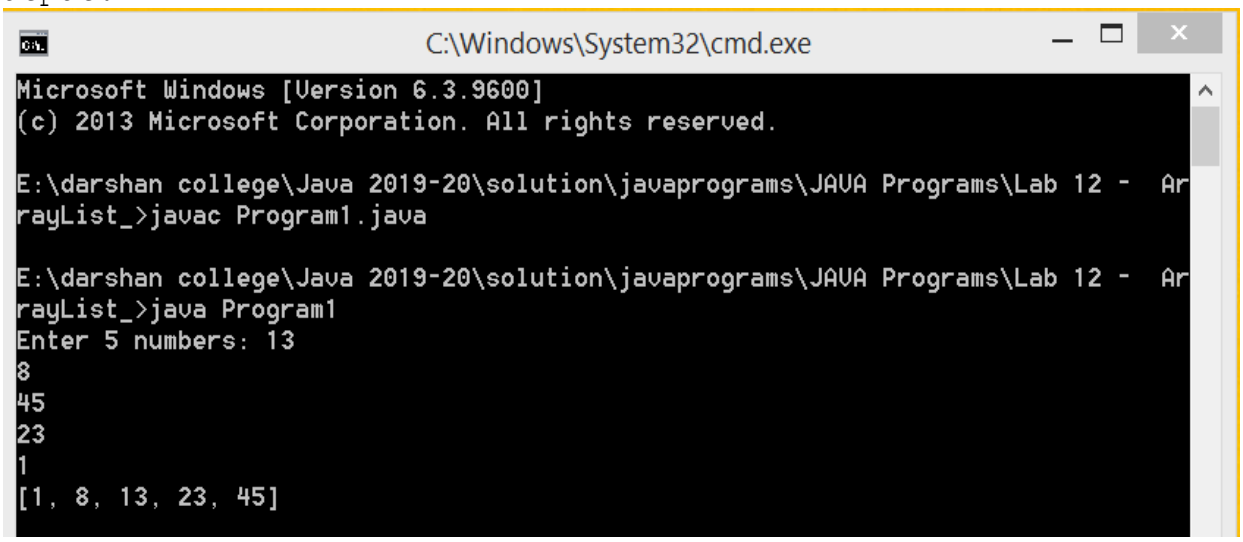

C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
E:\darshan college\Java 2019-20\solution\javaprograms>javac StringFractionDemo.java
E:\darshan college\Java 2019-20\solution\javaprograms>java StringFractionDemo
Enter number as string : 21.34
Number : 2134
Fraction : 1067/50
E:\darshan college\Java 2019-20\solution\javaprograms>

Practical-12

1. WAP that prompts the user to enter 5 numbers, stores them in an ArrayList, and displays them in increasing order.

```
import java.util.Scanner;
import java.util.ArrayList;

class Program1 {

    public static void main(String[] args) {
        // Create a Scanner
        Scanner sc = new Scanner(System.in);

        // Create an ArrayList of Integers
        ArrayList<Integer> list = new ArrayList<Integer>();

        // Prompt the user to enter 5 numbers
        System.out.print("Enter 5 numbers: ");
        for (int i = 0; i < 5; i++) {
            list.add(sc.nextInt());
        }
        // Stort numbers
        sort(list);

        // Display list in increasing order
        System.out.println(list.toString());
    }

    /** Sorts an ArrayList of Integers */
    public static void sort(ArrayList<Integer> list) {
        java.util.Collections.sort(list);
    }
}
```

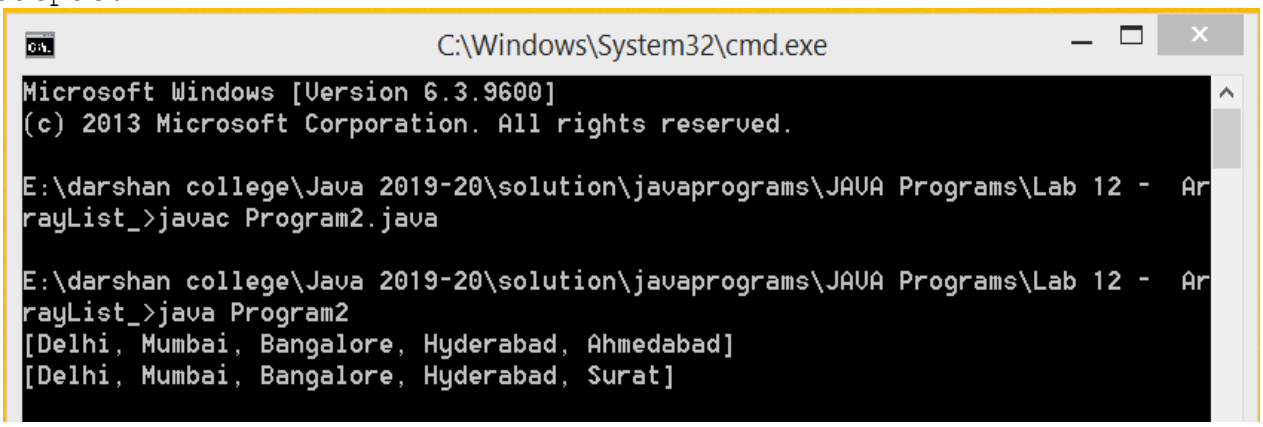
Output:



2. WAP that creates ArrayList with following value:
"Delhi", "Mumbai", "Bangalore", "Hyderabad" and "Ahmedabad"
Replace "Ahmedabad" with "Surat" in above ArrayList.

```
import java.util.ArrayList;
class Program2 {
    public static void main(String[] args) {

        // Create an ArrayList of City
        ArrayList<String> list = new ArrayList<>();

        list.add("Delhi");
        list.add("Mumbai");
        list.add("Bangalore");
        list.add("Hyderabad");
        list.add("Ahmedabad");
        System.out.println(list);

        // Replace "Ahmedabad" with "Surat" in above ArrayList.
        list.set(list.indexOf("Ahmedabad"), "Surat");
        System.out.println(list);

    }
}
```

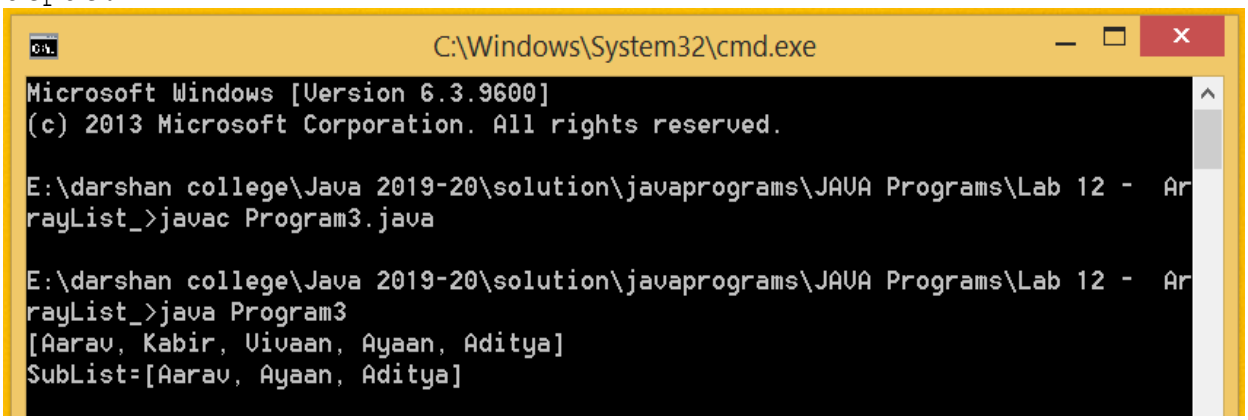
Output:



3. WAP that creates ArrayList with following value:
"Aarav", "Kabir", "Vivaan", "Ayaan" and "Aditya"
Create a sublist with string from above ArrayList which start with 'A'.

```
import java.util.ArrayList;

class Program3 {
    public static void main(String[] args) {

        // Create an ArrayList of Name
        ArrayList<String> list = new ArrayList<>();

        list.add("Aarav");
        list.add("Kabir");
        list.add("Vivaan");
        list.add("Ayaan");
        list.add("Aditya");
        System.out.println(list);

       // Create a sublist with string from above ArrayList which
       strart with 'A'.
        ArrayList<String> sublist = new ArrayList<>();
        for (int i = 0; i < list.size(); i++) {
            if (list.get(i).charAt(0) == 'A') {
                sublist.add(list.get(i));
            }
        }
        System.out.println("SubList="+sublist);
    }
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
E:\darshan college\Java 2019-20\solution\javaprograms\JAVA Programs\Lab 12 - ArrayList_>javac Program3.java
E:\darshan college\Java 2019-20\solution\javaprograms\JAVA Programs\Lab 12 - ArrayList_>java Program3
[Aarav, Kabir, Vivaan, Ayaan, Aditya]
SubList=[Aarav, Ayaan, Aditya]

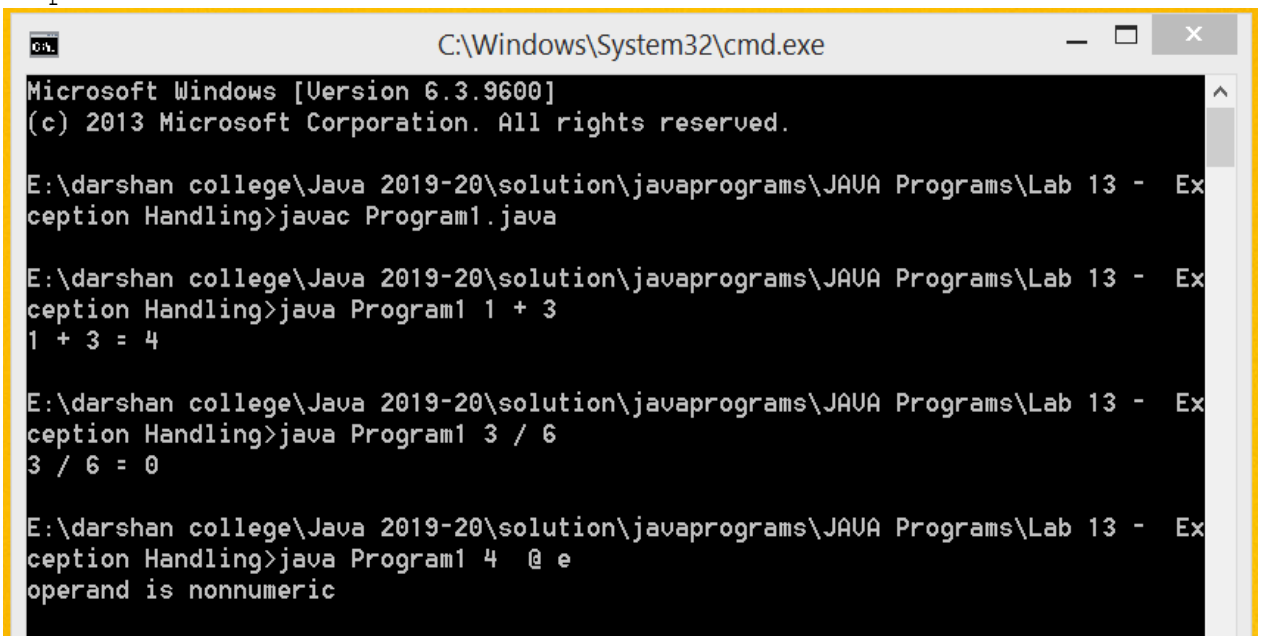
Practical-13

1. WAP to develop a simple command-line calculator which takes operand and operator as a command-line argument, here program terminates if any operand is nonnumeric. Add exception handler to achieve the exception handling with nonnumeric operand and display a message that informs the user of the wrong operand type before exiting.

```
class Program1 {
    public static void main(String args[]) {
        int result = 0;
        try {
            //Scan operator and operand from command line argument
            int firstNumber = Integer.parseInt(args[0]);
            int secondNumber = Integer.parseInt(args[2]);
            char operator = args[1].charAt(0);

            // perform operation
            switch (operator) {
                case ('+'):
                    result = firstNumber + secondNumber;
                    System.out.println(args[0] + " " + args[1] + "
                    " + args[2] + " = " + result);
                    break;

                case ('-'):
                    result = firstNumber - secondNumber;
                    System.out.println(args[0] + " " + args[1] + "
                    " + args[2] + " = " + result);
                    break;

                case ('*'):
                    result = firstNumber * secondNumber;
                    System.out.println(args[0] + " " + args[1] + "
                    " + args[2] + " = " + result);
                    break;

                case ('/'):
                    result = firstNumber / secondNumber;
                    System.out.println(args[0] + " " + args[1] + "
                    " + args[2] + " = " + result);
                    break;
```

```
                default:
                    System.out.print("Invalid Operator selected ");
            }

        } catch (ArithmeticException e) {
            System.out.println(e.getMessage());
        } catch (NumberFormatException e) {
            System.out.println("operand is nonnumeric");
        } catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("please enter operand");
        }
    }
}
```

Output:



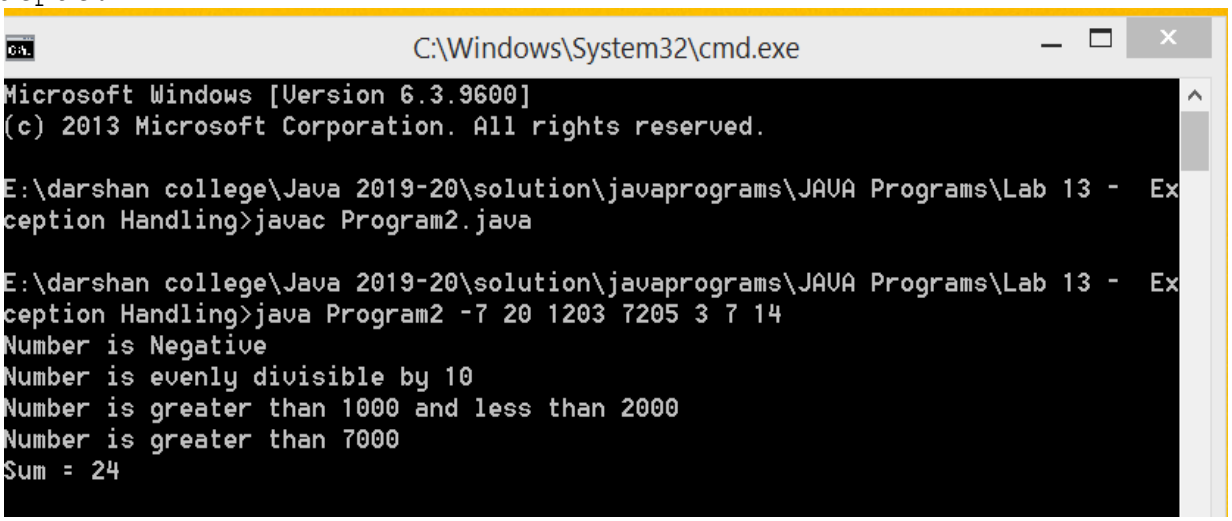
2. WAP to accept N integer numbers from the command line. Raise and handle exceptions for following cases :
   - when a number is –ve
   - when a number is evenly divisible by 10
   - when a number is greater than 1000 and less than 2000
   - when a number is greater than 7000

   Skip the number if an exception is raised for it, otherwise add it to find total sum.

```
class Program2 {
    public static void main(String args[]) {
```

```
            int sum = 0;

            for (int i = 0; i < args.length; i++) {

                // Scan number from Commandline
                int number = Integer.parseInt(args[i]);

                try {
                    // a. - when a number is -ve
                    if (number < 0) {
                        throw new Exception("Number is Negative");
                    }

                    // b. - when a number is evenly divisible by 10
                    if (number % 10 == 0) {
                        throw new Exception("Number is evenly
                        divisible by 10");
                    }

                    // c. - when a number is greater than 1000 and
                    less than 2000
                    if (number > 1000 && number < 2000) {
                        throw new Exception("Number is greater than
                        1000 and less than 2000");
                    }

                    // d. - when a number is greater than 7000
                    if (number > 7000) {
                        throw new Exception("Number is greater than
                        7000");
                    }

                    // add number
                    sum = sum + number;
                } catch (Exception e) {
                    System.out.println(e.getMessage());
                }

            }
            System.out.println("Sum = " + sum);

        }
    }
```

Output:

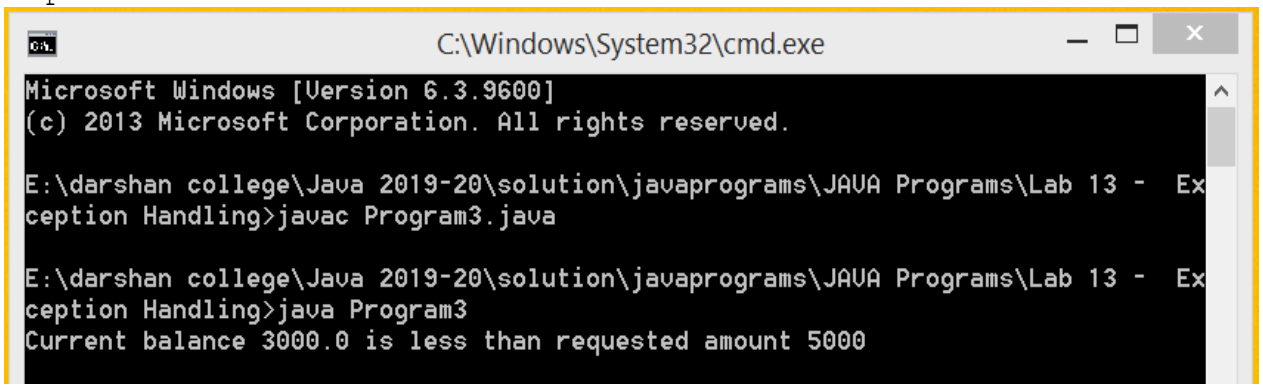


3. WAP to create Account class, which is representing a bank account where we can deposit and withdraw money. if we want to withdraw money which exceed our bank balance? We will not be allowed, create InSufficientFundException to handle above situation and display proper error message.

```
// custom InSufficientFundException
class InSufficientFundException extends Exception {
    InSufficientFundException(String msg) {
        super(msg);
    }
}

class Account {
    double balance = 0;

    Account(int bal) {
        this.balance = bal;
    }

    void checkBalance() {
        System.out.println("Current balance" + balance);
    }

    void depositMoney(int bal) {
        if (bal > 0) {
            balance = balance + bal;
        }
```

```
    }

    void withdrawMoney(int bal) throws InSufficientFundException {
        if (bal > balance) {
            // throw custom InSufficientFundException exception
            throw new InSufficientFundException("Current balance "
            + balance + " is less than requested amount " + bal);
        }
        balance = balance - bal;
    }
}

public class Program3 {
    public static void main(String args[]) {
        Account a = new Account(3000);
        // handle InSufficientFundException
        try {
            a.withdrawMoney(5000);
        } catch (InSufficientFundException e) {

            System.out.println(e.getMessage());
        }

    }
}
```

Output:



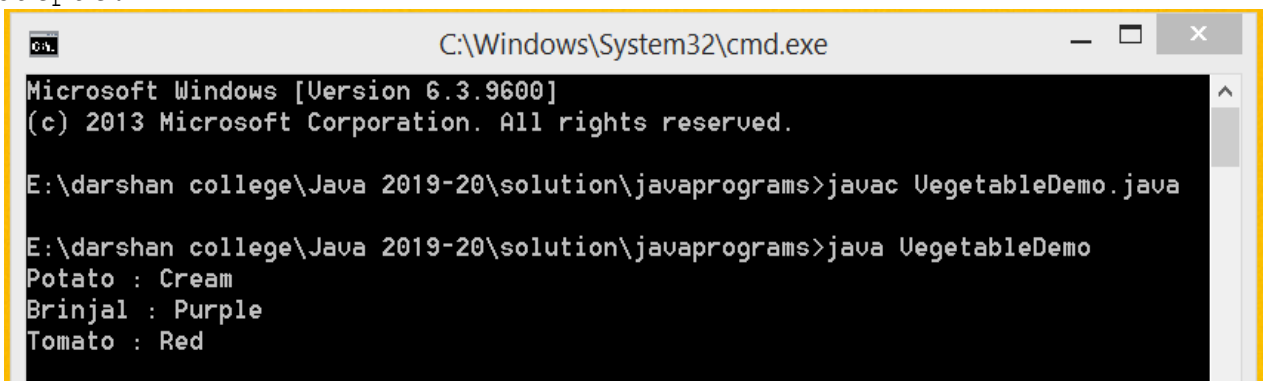
Practical-14

1. The abstract Vegetable class has three subclasses named Potato, Brinjal and Tomato. Write a program that demonstrates how to establish this class hierarchy. Declare one instance variable of type String that indicates the color of a vegetable. Create and display instances of these objects. Override the toString() method of object to return a string with the name of vegetable and its color.

```
//Class Vegetable
abstract class Vegetable{
   String color;
   Vegetable(String color){
        this.color = color;
   }
}

//Class Potato
class Potato extends Vegetable{
   Potato(){
        super("Cream");
   }
   public String toString(){
        return ("Potato : "+color);
   }
}

//Class Brinjal
class Brinjal extends Vegetable {
   Brinjal(){
        super("Purple");
   }
   public String toString(){
        return ("Brinjal : "+color);
   }
}

//Class Tomato
class Tomato extends Vegetable{
   Tomato(){
        super("Red");
   }
   public String toString(){
        return ("Tomato : "+color);
```

```
    }
}

//Main Class
class VegetableDemo{
    //Main Method
    public static void main(String[] args) {
        Potato p = new Potato();
        Brinjal b = new Brinjal();
        Tomato t = new Tomato();
        //Display Vegetables with their color
        System.out.println(p.toString());
        System.out.println(b.toString());
        System.out.println(t.toString());
    }
}
```

Output:



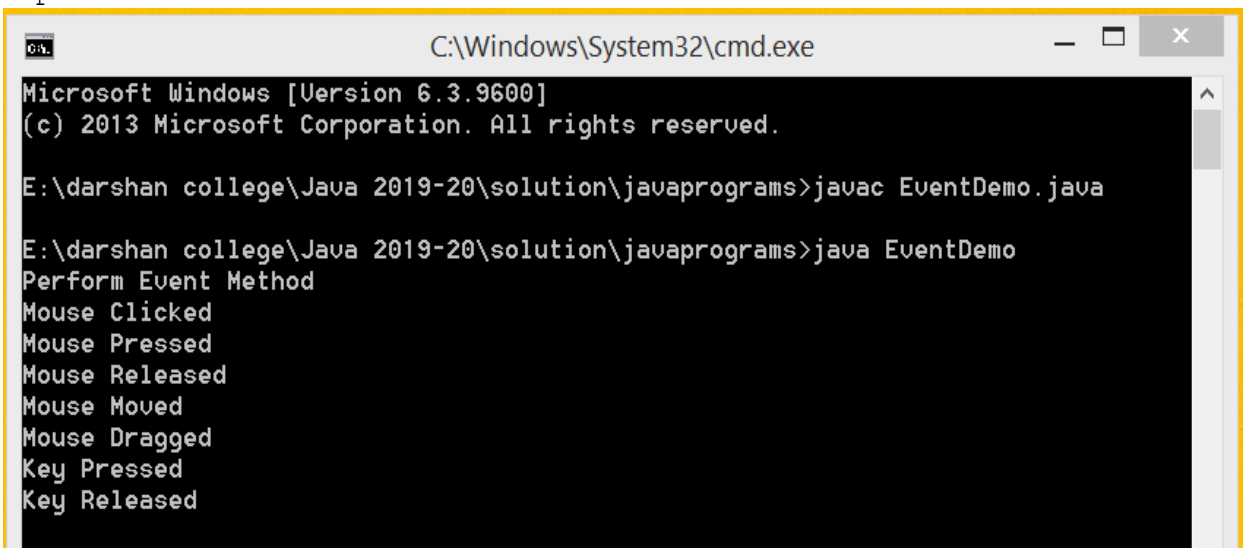
2. Create interface EventListener with performEvent() method. Create MouseListener interface which inherits EventListener along with mouseClicked(), mousePressed(), mouseReleased(), mouseMoved(), mouseDragged() methods. Also create KeyListener interface which inherits EventListener along with keyPressed(), keyReleased() methods. WAP to create EventDemo class which implements MouseListener and KeyListener and demonstrate all the methods of the interfaces.

```
interface EventListener{
    //performEvent Method
    void performEvent();
}
interface MouseListener extends EventListener{
    //mouseClicked Method
    void mouseClicked();
```

```
    //mousePressed Method
    void mousePressed();
    //mouseReleased Method
    void mouseReleased();
    //mouseMoved Method
    void mouseMoved();
    //mouseDragged Method
    void mouseDragged();
}

interface KeyListener extends EventListener{
    //keyPressed Method
    void keyPressed();
    //keyReleased Method
    void keyReleased();
}

//Main Class
class EventDemo implements MouseListener, KeyListener{
    //performEvent Method
    public void performEvent(){
        System.out.println("Perform Event Method");
    }
    //mouseClicked Method
    public void mouseClicked(){
        System.out.println("Mouse Clicked");
    }
    //mousePressed Method
    public void mousePressed(){
        System.out.println("Mouse Pressed");
    }
    //mouseReleased Method
    public void mouseReleased(){
        System.out.println("Mouse Released");
    }
    //mouseMoved Method
    public void mouseMoved(){
        System.out.println("Mouse Moved");
    }
    //mouseDragged Method
    public void mouseDragged(){
        System.out.println("Mouse Dragged");
    }
    //keyPressed Method
    public void keyPressed(){
```

```
        System.out.println("Key Pressed");
    }
    //keyReleased Method
    public void keyReleased(){
        System.out.println("Key Released");
    }

    //Main Method
    public static void main(String[] args) {
        EventDemo e = new EventDemo();
        e.performEvent();
        e.mouseClicked();
        e.mousePressed();
        e.mouseReleased();
        e.mouseMoved();
        e.mouseDragged();
        e.keyPressed();
        e.keyReleased();
    }
}
```

Output:

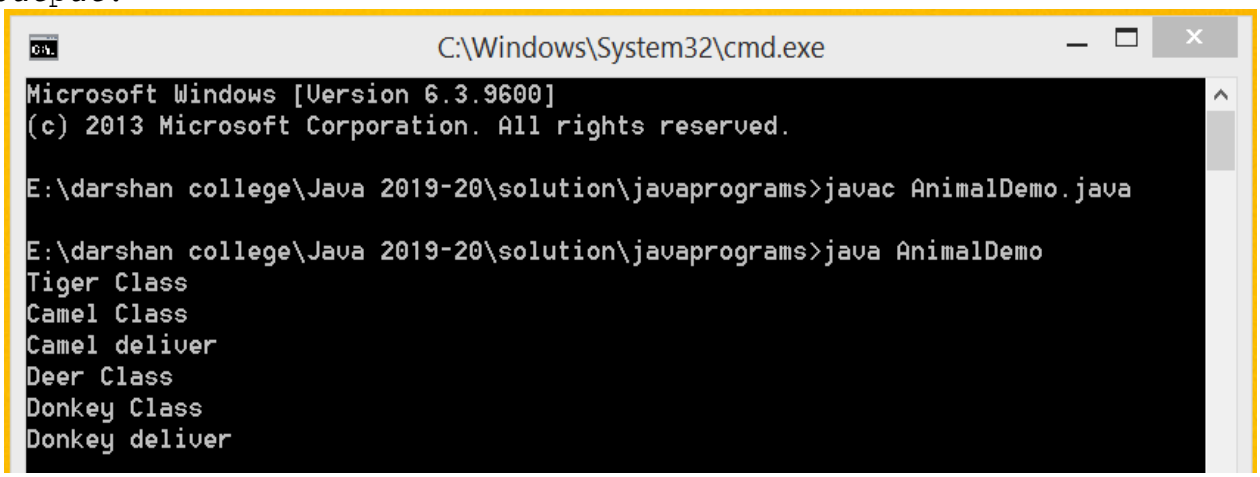


3. The Transport interface declares a deliver () method. The abstract class Animal is the super class of the Tiger, Camel, Deer and Donkey classes. The Transport interface is implemented by the Camel and Donkey classes. Write a test program that initialize an array of four Animal objects. If the object implements the Transport interface, the deliver () method is invoked.

```
interface Transport{
   void deliver();
}
abstract class Animal{
   abstract void display();
}

//Tiger Class
class Tiger extends Animal{
   void display(){
        System.out.println("Tiger Class");
   }
}

//Camel Class
class Camel extends Animal implements Transport{
   void display(){
        System.out.println("Camel Class");
   }
   public void deliver(){
        System.out.println("Camel deliver");
   }
}

//Deer Class
class Deer extends Animal{
   void display(){
        System.out.println("Deer Class");
   }
}

//Donkey Class
class Donkey extends Animal implements Transport{
   void display(){
        System.out.println("Donkey Class");
   }
   public void deliver(){
```

```
        System.out.println("Donkey deliver");
    }
}

//Main Class
class AnimalDemo{
    public static void main(String[] args) {
        Tiger t = new Tiger();
        t.display();

        Camel c = new Camel();
        c.display();
        c.deliver();

        Deer d= new Deer();
        d.display();

        Donkey don= new Donkey();
        don.display();
        don.deliver();
    }
}
```

Output:

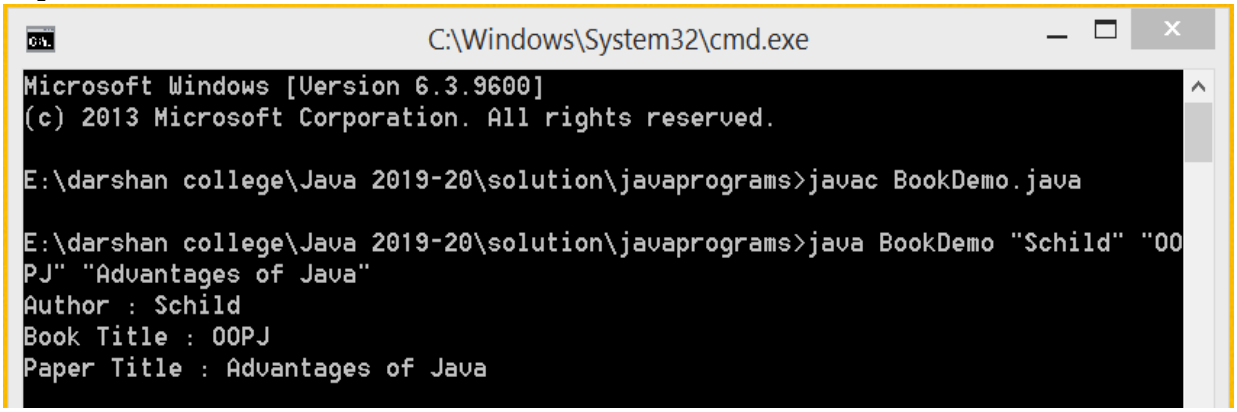


4. Declare a class called book having author_name as private data member. Extend book class to have two sub classes called book_publication & paper_publication. Each of these classes have private member called title. Write a program to show usage of dynamic method dispatch (dynamic polymorphism) to display book or paper publications of given author. Use command line arguments for inputting data.

```
//class Book
class Book{
   private String authorName;

   Book(String a){
        authorName = a;
   }
   void display(){
        System.out.println("Author : "+authorName);
   }
}

//class BookPublication
class BookPublication extends Book{
   private String title;
   BookPublication(String a,String t){
        super(a);
        title = t;
   }
   void display(){
        System.out.println("Book Title : "+title);
   }
}

//class PaperPublication
class PaperPublication extends Book{
   private String title;
   PaperPublication(String a,String t){
        super(a);
        title = t;
   }
   void display(){
        System.out.println("Paper Title : "+title);
   }
}
```

```
//class Main class
class BookDemo{
   public static void main(String[] args) {
        Book b = new Book(args[0]);
        BookPublication bp = new BookPublication(args[0],args[1]);
        PaperPublication pp = new
PaperPublication(args[0],args[2]);

        Book bs = b;
        bs.display();
        bs = bp;
        bs.display();
        bs = pp;
        bs.display();
   }
}
```

Output:



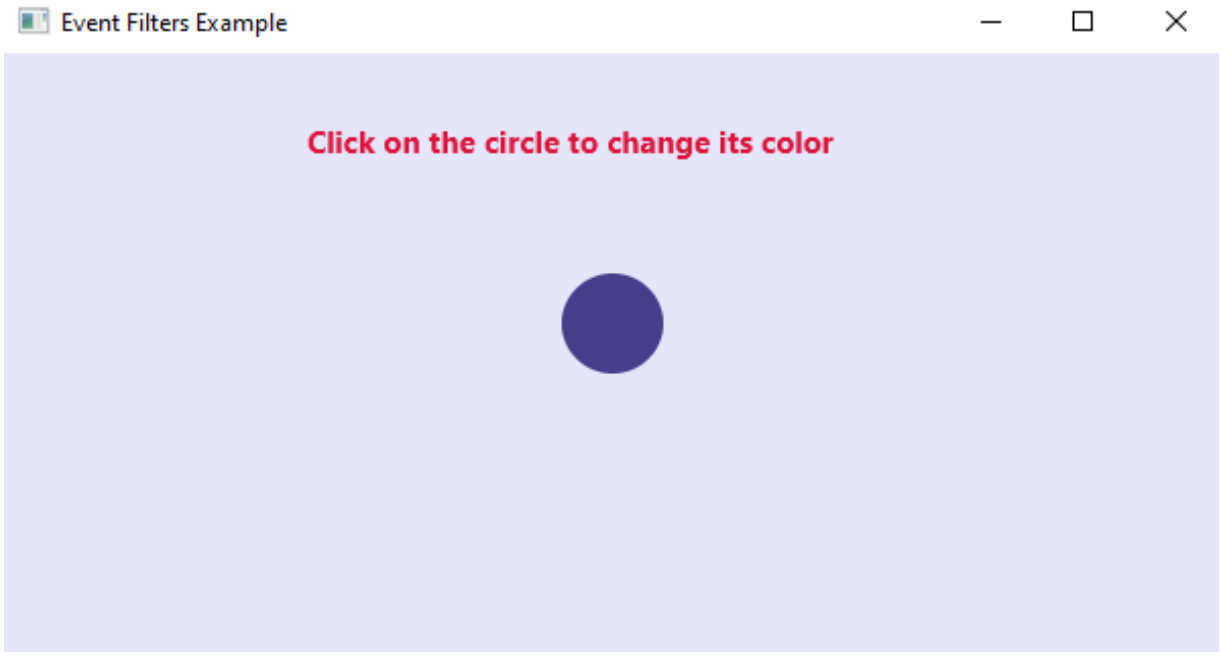
Practical-15

1. Write a program to change the color of the circle from red to blue when mouse is clicked on the circle.

```
import javafx.application.Application;
import static javafx.application.Application.launch;
import javafx.event.EventHandler;

import javafx.scene.Group;
import javafx.scene.Scene;
import javafx.scene.input.MouseEvent;
import javafx.scene.paint.Color;
import javafx.scene.shape.Circle;

import javafx.scene.text.Font;
import javafx.scene.text.FontWeight;
import javafx.scene.text.Text;
import javafx.stage.Stage;

public class CircleDemo extends Application {
   @Override
   public void start(Stage stage) {
      //Drawing a Circle
      Circle circle = new Circle();

      //Setting the position of the circle
      circle.setCenterX(300.0f);
      circle.setCenterY(135.0f);

      //Setting the radius of the circle
      circle.setRadius(25.0f);

      //Setting the color of the circle
      circle.setFill(Color.BROWN);

      //Setting the stroke width of the circle
      circle.setStrokeWidth(20);

      //Setting the text
      Text text = new Text("Click on the circle to change its
      color");

      //Setting the font of the text
```

```
        text.setFont(Font.font(null, FontWeight.BOLD, 15));

        //Setting the color of the text
        text.setFill(Color.CRIMSON);

        //setting the position of the text
        text.setX(150);
        text.setY(50);

        //Creating the mouse event handler
        EventHandler<MouseEvent> eventHandler = new EventHandler
        <MouseEvent>() {
           @Override
           public void handle(MouseEvent e) {
              System.out.println("Hello World");
              circle.setFill(Color.DARKSLATEBLUE);
           }
        };
        //Registering the event filter
        circle.addEventFilter(MouseEvent.MOUSE_CLICKED,
        eventHandler);

        //Creating a Group object
        Group root = new Group(circle, text);

        //Creating a scene object
        Scene scene = new Scene(root, 600, 300);

        //Setting the fill color to the scene
        scene.setFill(Color.LAVENDER);

        //Setting title to the Stage
        stage.setTitle("Event Filters Example");

        //Adding scene to the stage
        stage.setScene(scene);

        //Displaying the contents of the stage
        stage.show();
     }
     public static void main(String args[]){
        launch(args);
     }
}
```

Output:

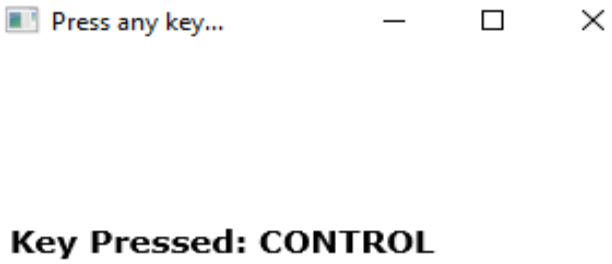


2. Write a program to detect and display the key pressed on the keyboard.

```
import javafx.application.Application;
import javafx.event.EventHandler;
import javafx.scene.Group;
import javafx.scene.Scene;
import javafx.scene.input.KeyEvent;
import javafx.scene.text.Font;
import javafx.scene.text.FontPosture;
import javafx.scene.text.FontWeight;
import javafx.scene.text.Text;
import javafx.stage.Stage;

public class KeyEvents extends Application {
    public static void main(String[] args) {
        launch(args);
    }
    @Override
    public void start(Stage primaryStage) {
        Text text = new Text();
        text.setX(10.0);
        text.setY(100.0);
        text.setFont(Font.font("verdana",          FontWeight.BOLD,
        FontPosture.REGULAR, 15));
```

```
            Group root = new Group(text);
            Scene scene = new Scene(root, 300, 250);
            scene.setOnKeyPressed(new EventHandler<KeyEvent>() {
                public void handle(KeyEvent ke) {
                    text.setText("Key        Pressed:        "        +
                    ke.getCode().toString());
                }
            });
            primaryStage.setScene(scene);
            primaryStage.setTitle("Press any key...");
            primaryStage.show();
        }
    }
```

Output:



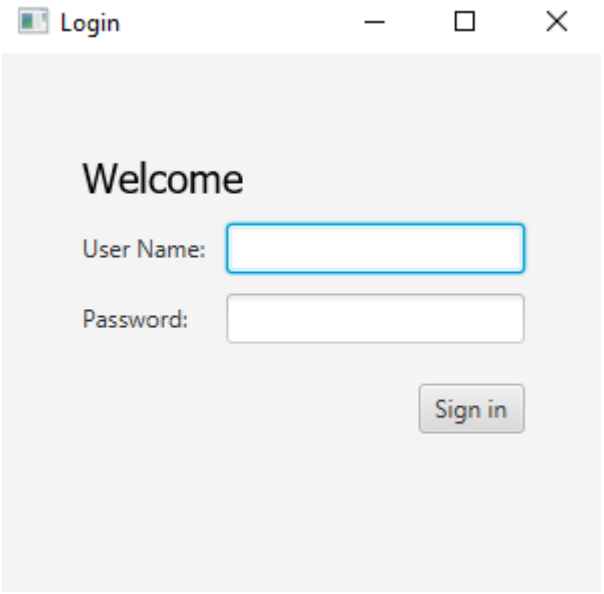
Practical-16

1. Write a program to design login screen.

```
import javafx.application.Application;
import javafx.event.*;
import static javafx.geometry.HPos.RIGHT;
import javafx.geometry.*;
import javafx.scene.Scene;
import javafx.scene.control.*;
import javafx.scene.layout.*;
import javafx.scene.paint.Color;
import javafx.scene.text.*;
import javafx.stage.Stage;

public class Login extends Application {

    @Override
    public void start(Stage primaryStage) {
        primaryStage.setTitle("Login");
        GridPane grid = new GridPane();
        grid.setAlignment(Pos.CENTER);
        grid.setHgap(10);
        grid.setVgap(10);
        grid.setPadding(new Insets(25, 25, 25, 25));

        Text scenetitle = new Text("Welcome");
        scenetitle.setFont(Font.font("Tahoma",  FontWeight.NORMAL,
        20));
        grid.add(scenetitle, 0, 0, 2, 1);

        Label userName = new Label("User Name:");
        grid.add(userName, 0, 1);

        TextField userTextField = new TextField();
        grid.add(userTextField, 1, 1);

        Label pw = new Label("Password:");
        grid.add(pw, 0, 2);

        PasswordField pwBox = new PasswordField();
        grid.add(pwBox, 1, 2);

        Button btn = new Button("Sign in");
```

```
            HBox hbBtn = new HBox(10);
            hbBtn.setAlignment(Pos.BOTTOM_RIGHT);
            hbBtn.getChildren().add(btn);
            grid.add(hbBtn, 1, 4);

            final Text actiontarget = new Text();
            grid.add(actiontarget, 0, 6);
            grid.setColumnSpan(actiontarget, 2);
            grid.setHalignment(actiontarget, RIGHT);
            actiontarget.setId("actiontarget");

            btn.setOnAction(new EventHandler<ActionEvent>() {

                @Override
                public void handle(ActionEvent e) {
                    actiontarget.setFill(Color.FIREBRICK);
                    actiontarget.setText("Sign in button pressed");
                }
            });

            Scene scene = new Scene(grid, 300, 275);
            primaryStage.setScene(scene);
            primaryStage.show();
        }

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

Output:



2. Write a program to design registration screen.

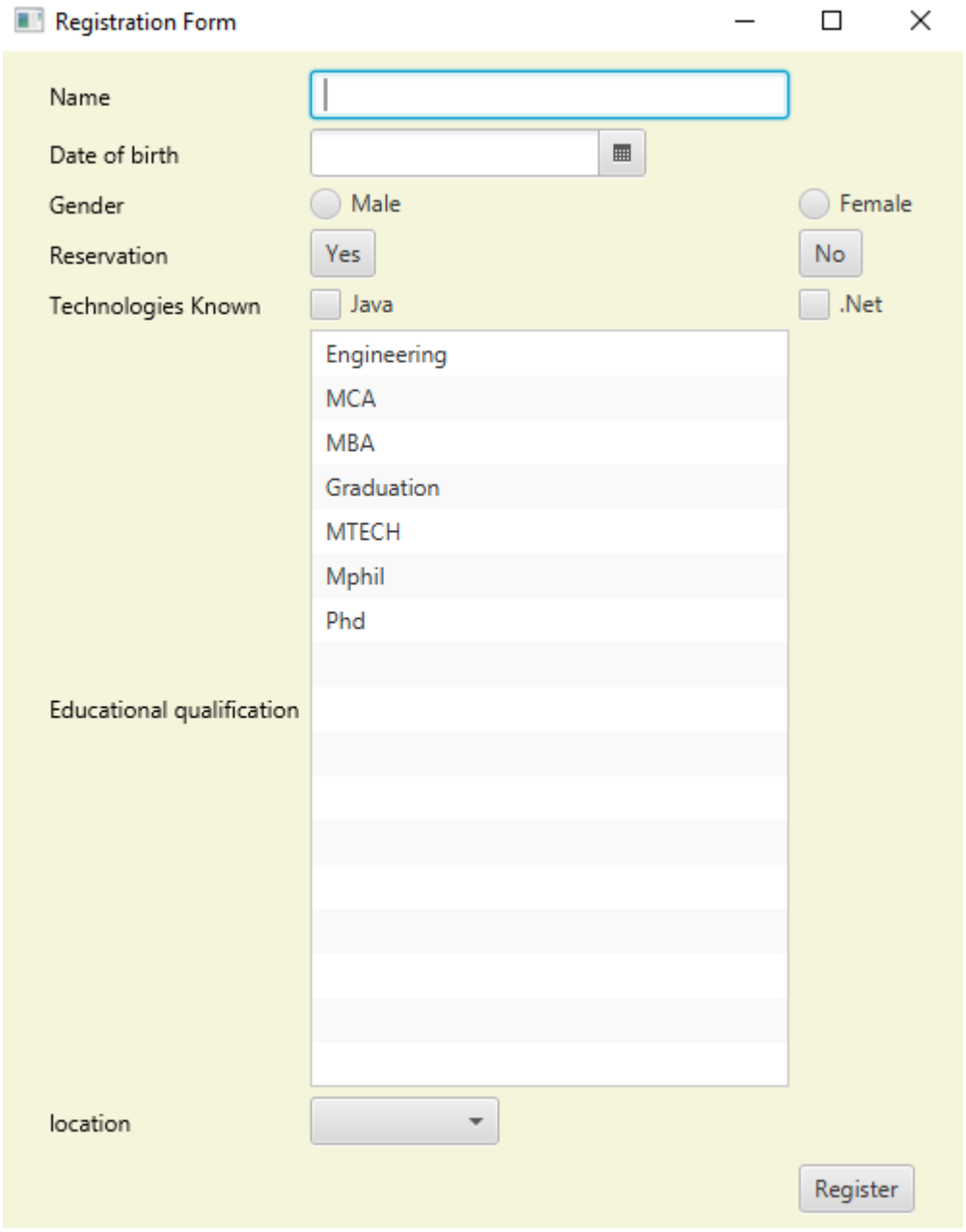
```
import javafx.application.Application;
import javafx.collections.*;
import javafx.geometry.*;
import javafx.scene.Scene;
import javafx.scene.control.*;
import javafx.scene.layout.GridPane;
import javafx.scene.text.Text;
import javafx.stage.Stage;

public class Registration extends Application {
   @Override
   public void start(Stage stage) {
      //Label for name
      Text nameLabel = new Text("Name");

      //Text field for name
      TextField nameText = new TextField();

      //Label for date of birth
      Text dobLabel = new Text("Date of birth");

      //date picker to choose date
      DatePicker datePicker = new DatePicker();
```

```
//Label for gender
Text genderLabel = new Text("Gender");

//Toggle group of radio buttons
ToggleGroup groupGender = new ToggleGroup();
RadioButton maleRadio = new RadioButton("Male");
maleRadio.setToggleGroup(groupGender);
RadioButton femaleRadio = new RadioButton("Female");
femaleRadio.setToggleGroup(groupGender);

//Label for reservation
Text reservationLabel = new Text("Reservation");

//Toggle button for reservation
ToggleButton Reservation = new ToggleButton();
ToggleButton yes = new ToggleButton("Yes");
ToggleButton no = new ToggleButton("No");
ToggleGroup groupReservation = new ToggleGroup();
yes.setToggleGroup(groupReservation);
no.setToggleGroup(groupReservation);

//Label for technologies known
Text technologiesLabel = new Text("Technologies Known");

//check box for education
CheckBox javaCheckBox = new CheckBox("Java");
javaCheckBox.setIndeterminate(false);

//check box for education
CheckBox dotnetCheckBox = new CheckBox(".Net");
javaCheckBox.setIndeterminate(false);

//Label for education
Text educationLabel = new Text("Educational qualification");

//list View for educational qualification
ObservableList<String>                    names                    =
FXCollections.observableArrayList(
"Engineering", "MCA", "MBA", "Graduation", "MTECH", "Mphil",
"Phd");

ListView<String>  educationListView  =  new  ListView<String>
 (names);

//Label for location
```

```
Text locationLabel = new Text("location");

//Choice box for location
ChoiceBox locationchoiceBox = new ChoiceBox();
locationchoiceBox.getItems().addAll("Ahmedabad", "Vadodara",
"Rajkot", "Mumbai", "Bangalore");

//Label for register
Button buttonRegister = new Button("Register");

//Creating a Grid Pane
GridPane gridPane = new GridPane();

//Setting size for the pane
gridPane.setMinSize(500, 500);

//Setting the padding
gridPane.setPadding(new Insets(10, 10, 10, 10));

//Setting the vertical and horizontal gaps between the
columns
gridPane.setVgap(5);
gridPane.setHgap(5);

//Setting the Grid alignment
gridPane.setAlignment(Pos.CENTER);

//Arranging all the nodes in the grid
gridPane.add(nameLabel, 0, 0);
gridPane.add(nameText, 1, 0);

gridPane.add(dobLabel, 0, 1);
gridPane.add(datePicker, 1, 1);

gridPane.add(genderLabel, 0, 2);
gridPane.add(maleRadio, 1, 2);
gridPane.add(femaleRadio, 2, 2);
gridPane.add(reservationLabel, 0, 3);
gridPane.add(yes, 1, 3);
gridPane.add(no, 2, 3);

gridPane.add(technologiesLabel, 0, 4);
gridPane.add(javaCheckBox, 1, 4);
gridPane.add(dotnetCheckBox, 2, 4);
```

```
        gridPane.add(educationLabel, 0, 5);
        gridPane.add(educationListView, 1, 5);

        gridPane.add(locationLabel, 0, 6);
        gridPane.add(locationchoiceBox, 1, 6);

        gridPane.add(buttonRegister, 2, 8);

        //Setting the back ground color
        gridPane.setStyle("-fx-background-color: BEIGE;");

        //Creating a scene object
        Scene scene = new Scene(gridPane);

        //Setting title to the Stage
        stage.setTitle("Registration Form");

        //Adding scene to the stage
        stage.setScene(scene);

        //Displaying the contents of the stage
        stage.show();
    }
    public static void main(String args[]){
        launch(args);
    }
}
```

Output:

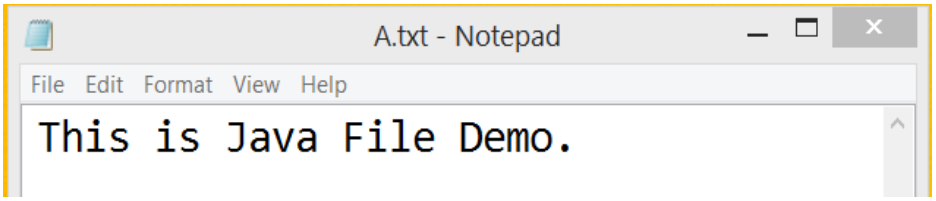

Registration Form
Name
Date of birth
Gender
Male
Female
Reservation
Yes
No
Technologies Known
Java
.Net
Engineering
MCA
MBA
Graduation
MTECH
Mphil
Phd
Educational qualification
location
Register

Practical-17

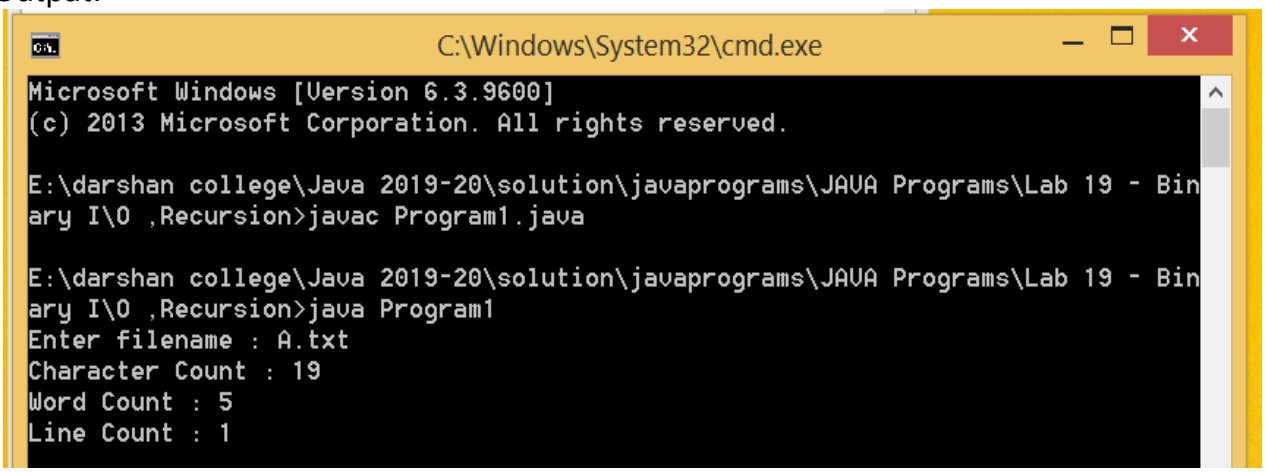
1. WAP that counts number of characters, words, and lines in a file. Use exceptions to check whether the file that is read exists or not.

```
import java.io.*;
import java.util.*;

public class Program1 {
    public static void main(String args[]) throws Exception {
        int char_count = 0;
        int word_count = 0;
        int line_count = 0;
        String filename;
        String line;
        StringTokenizer st;

        Scanner sc = new Scanner(System.in);
        System.out.print("Enter filename : ");
        // Stored the entered file name in variable

        filename = sc.nextLine();
        BufferedReader buf = new BufferedReader(new FileReader
         (filename));

        // read file line by line
        while ((line = buf.readLine()) != null) {
            line_count++;// for no. of lines
            st = new StringTokenizer(line);
            while (st.hasMoreTokens()){
                word_count++; // for no. of words
                String word = st.nextToken();
                char_count += word.length();
                  // for no. of character

            }
        }
        System.out.println("Character Count : " + char_count);
        System.out.println("Word Count : " + word_count);
        System.out.println("Line Count : " + line_count);
        buf.close();

    }
}
```

Input File "A.txt":



Output:

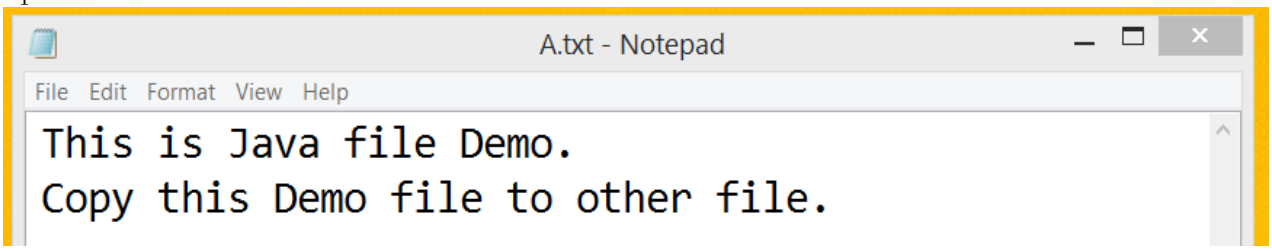


2. WAP to replace all "word1" by "word2" from a file1, and output is written to file2 file and display the no. of replacement.

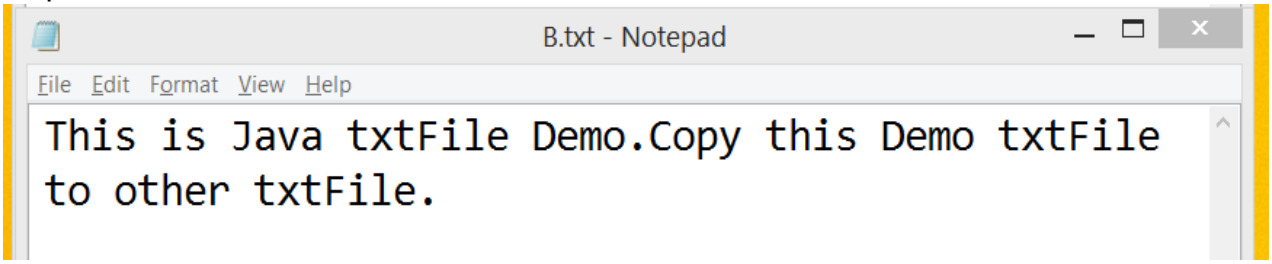
```
import java.io.*;
import java.util.*;

public class Program2 {
    public static void main(String args[]) throws Exception {
        int count = 0;
        File f = new File("A.txt");

        FileWriter writer = new FileWriter("B.txt");
        BufferedReader reader = new BufferedReader(new
        FileReader(f));
        String line = "", oldtxt = "";

        // read file line by line
        while ((line = reader.readLine()) != null) {
            System.out.println("line=" + line);
            // divide line into words
            StringTokenizer words = new StringTokenizer((line));
            oldtxt += line + "\n";
```

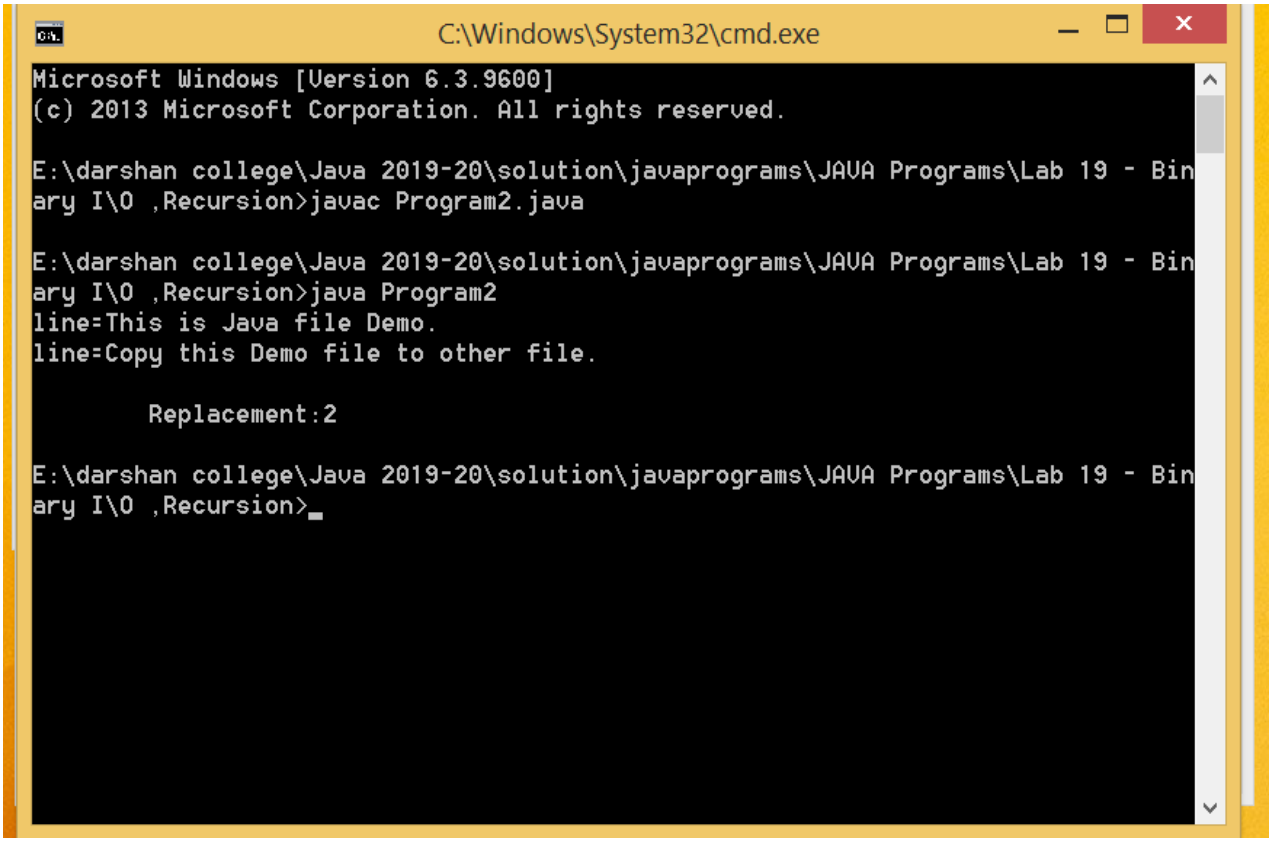
```
                // Count number of replacement
                while (words.hasMoreTokens()) {
                    if (words.nextToken().equals("file"))
                        count++;
                }
            }

            // replace an old word with a new word
            String newtxt = oldtxt.replace("file", "txtFile");
            writer.write(newtxt);
            System.out.println("\n\tReplacement:" + count);

            reader.close();
            writer.flush();
            writer.close();

        }
}
```

Input File "A.txt":



Output:



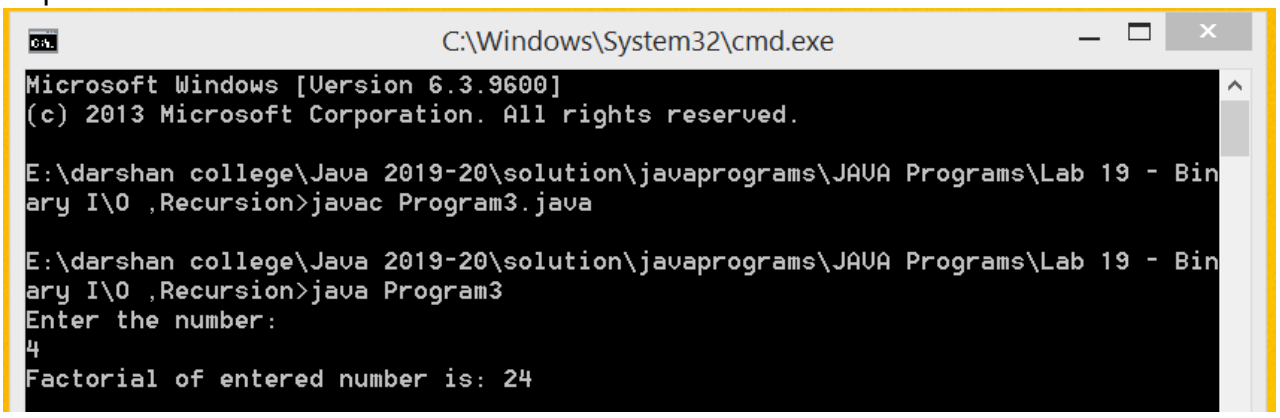


3. WAP to find factorial of given number using recursion.

```
import java.util.Scanner;

public class Program3 {
    public static void main(String args[]) throws Exception {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the number:");
        // Stored the entered value in variable
        int num = scanner.nextInt();

        // Called the user defined function fact
        int factorial = fact(num);
        System.out.println("Factorial of entered number is: " +
       factorial);
    }

    static int fact(int n) {
        int output;
        if (n == 1) {
```

```
            return 1;
        }
        // Recursion: Function calling itself!!
        output = fact(n - 1) * n;
        return output;
    }
}
```

Output:

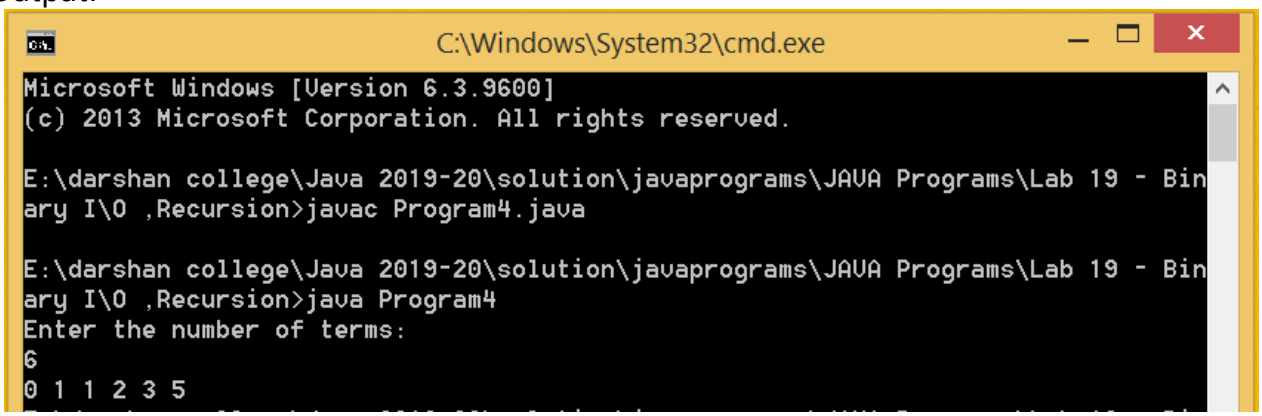


4. WAP to print Fibonacci for given number of terms using recursion.

```
import java.util.Scanner;

public class Program4 {
    static int n1 = 0, n2 = 1, n3 = 0;

    public static void main(String args[]) throws Exception {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the number of terms:");
        // Stored the entered value in variable
        int count = scanner.nextInt();
        System.out.print(n1 + " " + n2);
        // Called the user defined function fibbonacci
        fibbonacci(count - 2);
    }

    static void fibbonacci(int count) {
        if (count > 0) {
            n3 = n1 + n2;
            n1 = n2;
            n2 = n3;
            System.out.print(" " + n3);
```

```
            // Recursion: Function calling itself!!
            fibbonacci(count - 1);
        }
    }
}
```

Output:

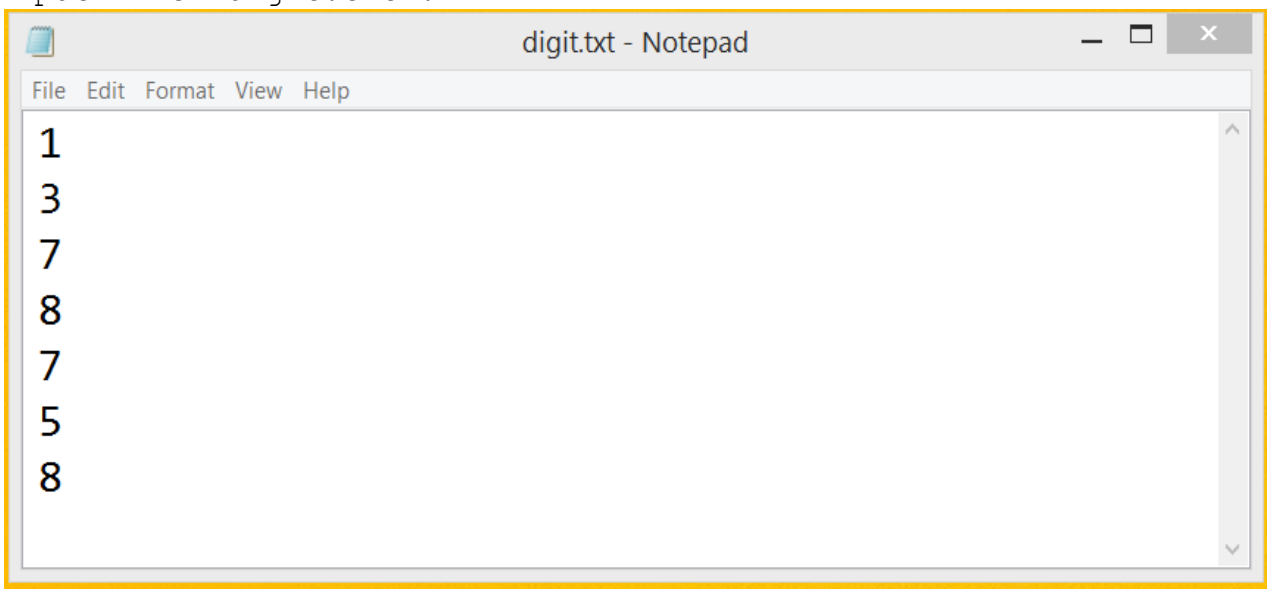


5. WAP that reads a file and counts the number of occurrences of digit enter by user. Supply the file name as a command-line argument.

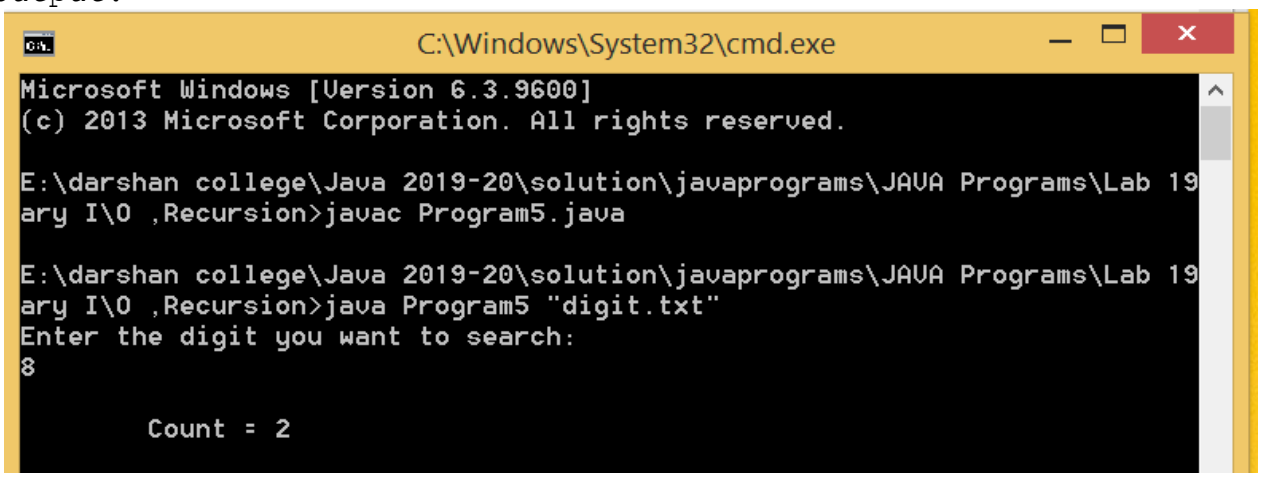
```
import java.io.*;
import java.util.Scanner;

public class Program5 {
    public static void main(String[] args) throws Exception {
        int count = 0, i;
        char ch;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the digit you want to search:");
        // Stored the entered value in variable
        ch = sc.next().charAt(0);
        // File Object Created
        File f = new File(args[0]);
        BufferedReader br = new BufferedReader(new FileReader(f));
        // read file character by character
        while ((i = br.read()) != -1) {
            if (i == ch) {
                count++;
            }
        }
        System.out.println("\n\tCount = " + count);
```

```
        }
    }
```

Input File "digit.txt":



Output:

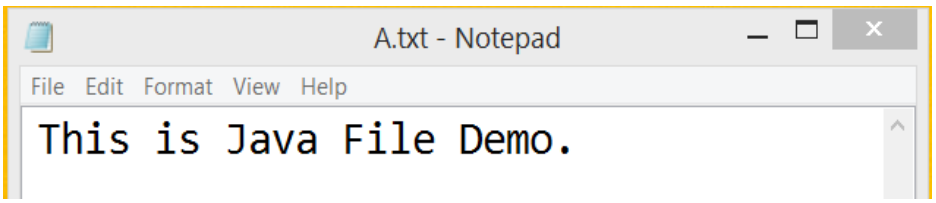


6. WAP to check that whether the name given from command line is file or not? If it is a file then print the size of file and if it is directory then it should display the name of all files in it.

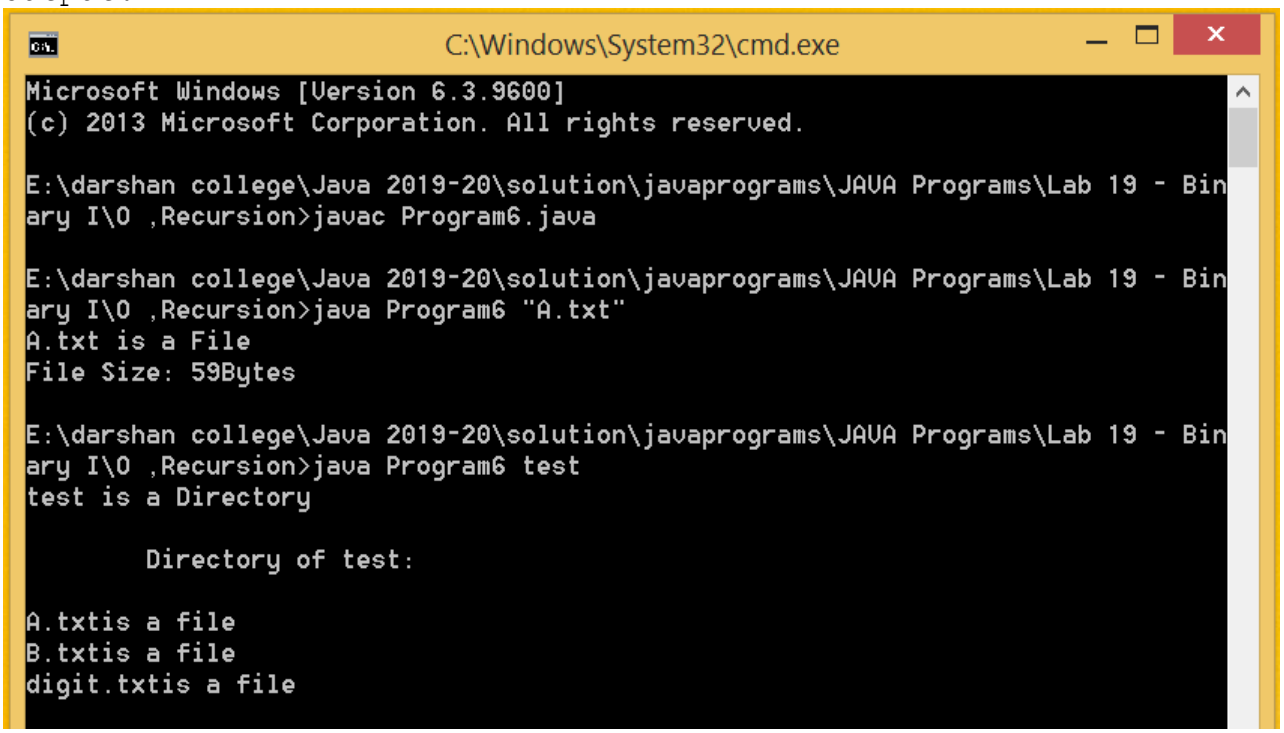
```
import java.io.*;

public class Program6 {
    public static void main(String[] args) throws Exception {
```

```
            String dirname = args[0];
            // File Object Created
            File f1 = new File(dirname);
            if (f1.isFile()) {
                System.out.println(dirname + " is a File");
                System.out.println("File  Size:  "  +  f1.length()  +
                "Bytes");
            } else if (f1.isDirectory()) {
                System.out.println(dirname + " is a Directory");
                System.out.println("\n\tDirectory  of  "  +  dirname  +
                ":\n\t");

                // Stored the file and folder
                String s[] = f1.list();
                for (int i = 0; i < s.length; i++) {
                    File f = new File(dirname + "/" + s[i]);
                    if (f.isDirectory()) {
                        System.out.println(s[i] + " is a directory");
                    } else {
                        System.out.println(s[i] + "is a file");
                    }
                }
            }

        }
    }
```

Input File "A.txt":



Output:

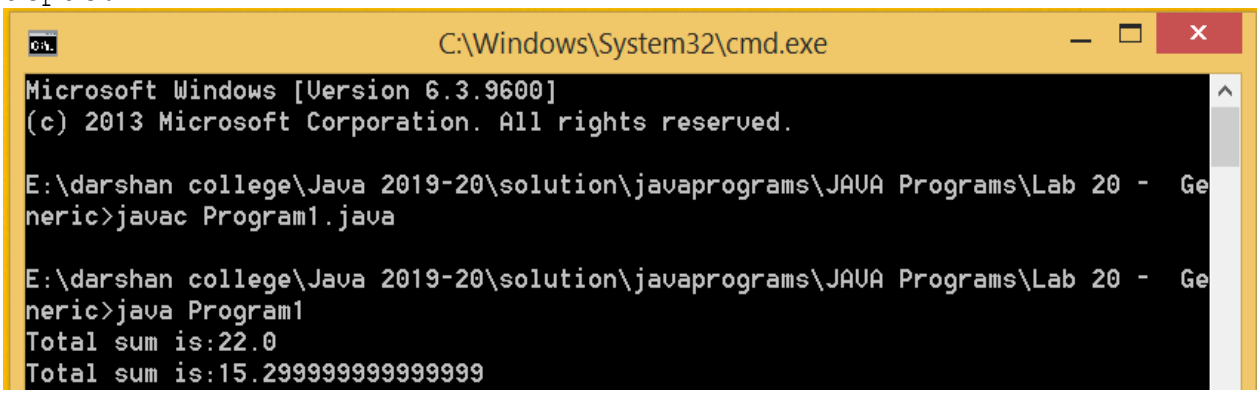

C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
E:\darshan college\Java 2019-20\solution\javaprograms\JAVA Programs\Lab 19 - Bin
ary I\O ,Recursion>javac Program6.java
E:\darshan college\Java 2019-20\solution\javaprograms\JAVA Programs\Lab 19 - Bin
ary I\O ,Recursion>java Program6 "A.txt"
A.txt is a File
File Size: 59Bytes
E:\darshan college\Java 2019-20\solution\javaprograms\JAVA Programs\Lab 19 - Bin
ary I\O ,Recursion>java Program6 test
test is a Directory
Directory of test:
A.txtis a file
B.txtis a file
digit.txtis a file

Practical-18

1. Define generic class WildCard with method sum which add two generic values. Create class NumberDemo to demonstrate WildCard class.

```
import java.util.Arrays;
import java.util.List;

// generic class WildCard
class WildCard {
    public double sum(List<? extends Number> list) {
        double sum = 0.0;
        for (Number i : list) {
            sum += i.doubleValue();
        }

        return sum;
    }
}

class Program1 {
    public static void main(String args[]) {
        WildCard w = new WildCard();
        // Upper Bounded Integer List
        List<Integer> list1 = Arrays.asList(4, 5, 6, 7);

        // printing the sum of elements in list
        System.out.println("Total sum is:" + w.sum(list1));

        // Double list
        List<Double> list2 = Arrays.asList(4.1, 5.1, 6.1);

        // printing the sum of elements in list
        System.out.print("Total sum is:" + w.sum(list2));
    }
}
```

Output:

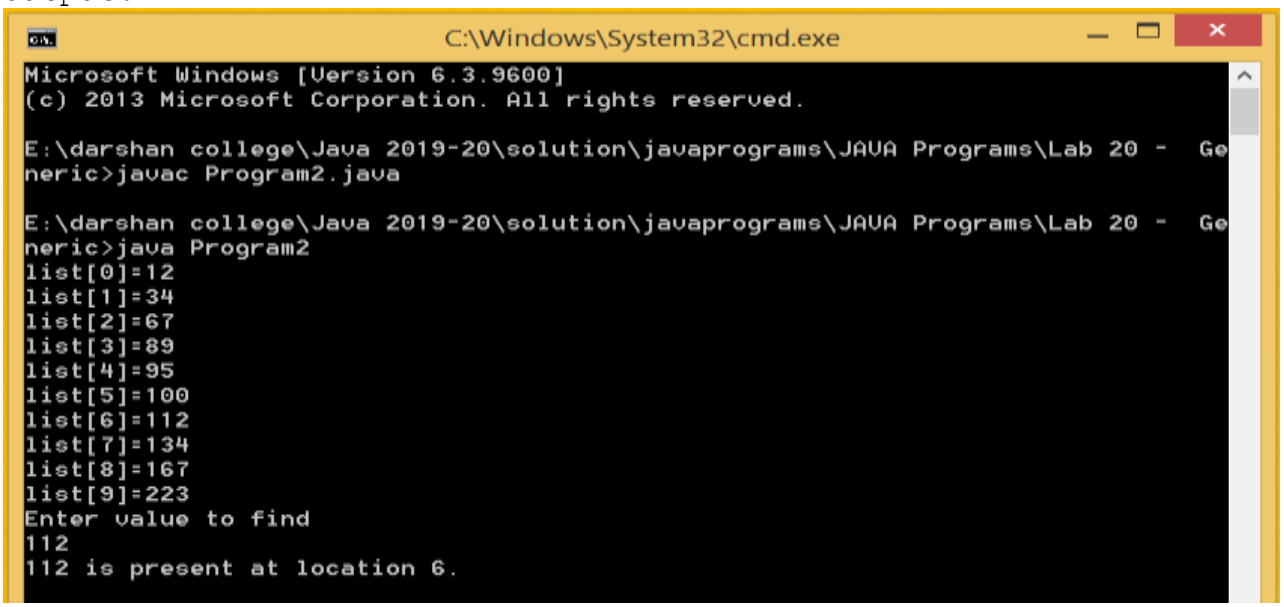


2. Implement the following method using linear search.
   public static <E extends Comparable<E>>
   int linearSearch(E[] list, E key)

```
import java.util.Scanner;

class Program2 {
    public static void main(String args[]) {
        Integer[] list = new Integer[10];
        Scanner sc = new Scanner(System.in);
        int search;
        for (int i = 0; i < list.length; i++) {
            System.out.print("list[" + i + "]=");
            list[i] = sc.nextInt();
        }
        System.out.println("Enter value to find");
        search = sc.nextInt();
        int foundAt = linearSearch(list, search);
        if (foundAt == -1) {
            System.out.println(search + " isn't present in
            array.");
        } else {
            System.out.println(search + " is present at location "
            + foundAt + ".");
        }
    }

    // Public static <E extends Comparable<E>>Int linearsearch(E[]
    list, E key)
    public static <E extends Comparable<E>> int linearSearch(E[]
    list, E value) {
```

```
            for (int i = 0; i < list.length; i++) {
                if (list[i].compareTo(value) == 0) {
                    return i;
                }
            }
            return -1;
        }
}
```

Output:

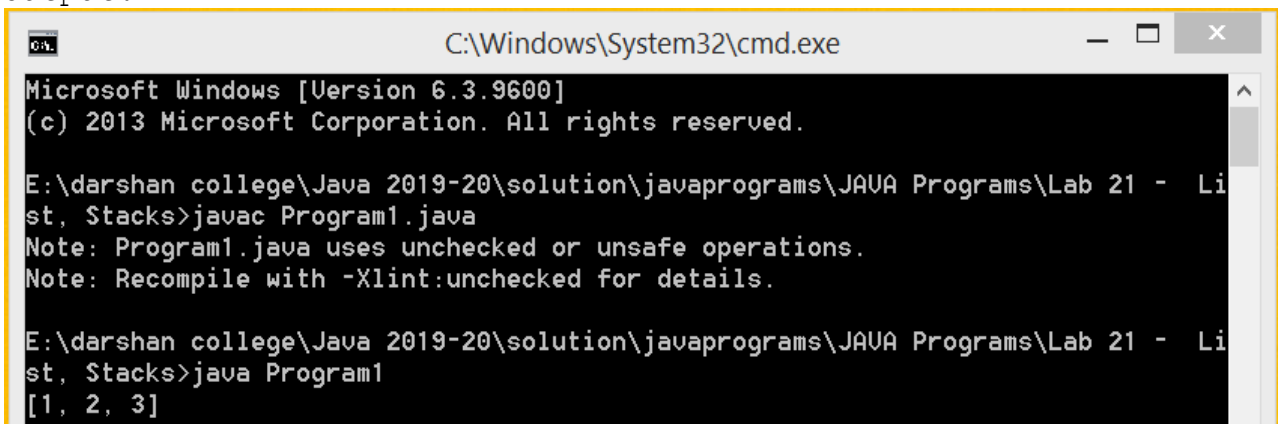


Practical-19

1. Define MYPriorityQueue class that extends Priority Queue to implement the Cloneable interface and implement the clone() method to clone a priority queue.

```
import java.util.PriorityQueue;

//MYPriorityQueue class that extends Priority Queue to implement
the Cloneable interface
class MyPriorityQueue<E> extends PriorityQueue<E> implements
Cloneable {

    // implement the clone() method
    public Object clone() throws CloneNotSupportedException {
        // clone a priority queue
        MyPriorityQueue<E> clone = new MyPriorityQueue<>();
        this.forEach(clone::offer);
        return clone;
    }
}

class Program1 {
    public static void main(String args[]) {
        // MyPriorityQueue object created.
        MyPriorityQueue<String> queue = new MyPriorityQueue<>();
        queue.offer("1");
        queue.offer("2");
        queue.offer("3");

        MyPriorityQueue<String> queue1 = null;
        try {
            queue1 = (MyPriorityQueue<String>) (queue.clone());
        } catch (CloneNotSupportedException e) {
            e.printStackTrace();
        }

        System.out.print(queue1);
    }
}
```

Output:

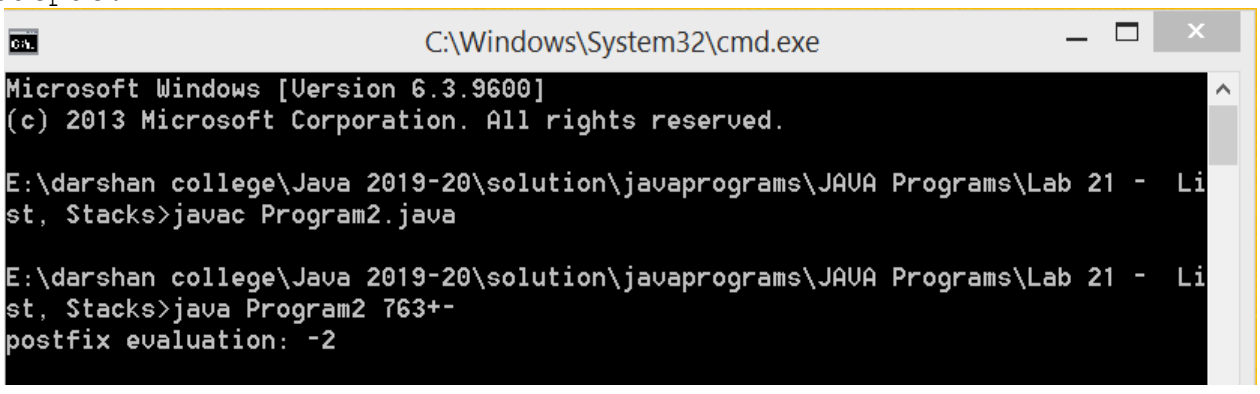


2. WAP to evaluate post-fix expression enter by command line arguments.

```
import java.util.Stack;

class Program2 {
    public static void main(String args[]) {
        if (args.length > 0) {
            String exp = args[0];
            System.out.println("postfix     evaluation:     "     +
           evaluatePostfix(exp));
        } else {
            System.out.println("Enter expression");
        }
    }

    static int evaluatePostfix(String exp) {
        // create a stack
        Stack<Integer> stack = new Stack<>();

        // Scan all characters one by one
        for (int i = 0; i < exp.length(); i++) {
            char c = exp.charAt(i);

            // If the scanned character is an operand (number
            here),
            // push it to the stack.
            if (Character.isDigit(c))
                stack.push(c - '0');

            // If the scanned character is an operator, pop two
            // elements from stack apply the operator
```

```
                else {
                    int val1 = stack.pop();
                    int val2 = stack.pop();

                    switch (c) {
                        case '+':
                            stack.push(val2 + val1);
                            break;

                        case '-':
                            stack.push(val2 - val1);
                            break;

                        case '/':
                            stack.push(val2 / val1);
                            break;

                        case '*':
                            stack.push(val2 * val1);
                            break;
                    }
                }
            }
            return stack.pop();
        }
    }
```

Output:



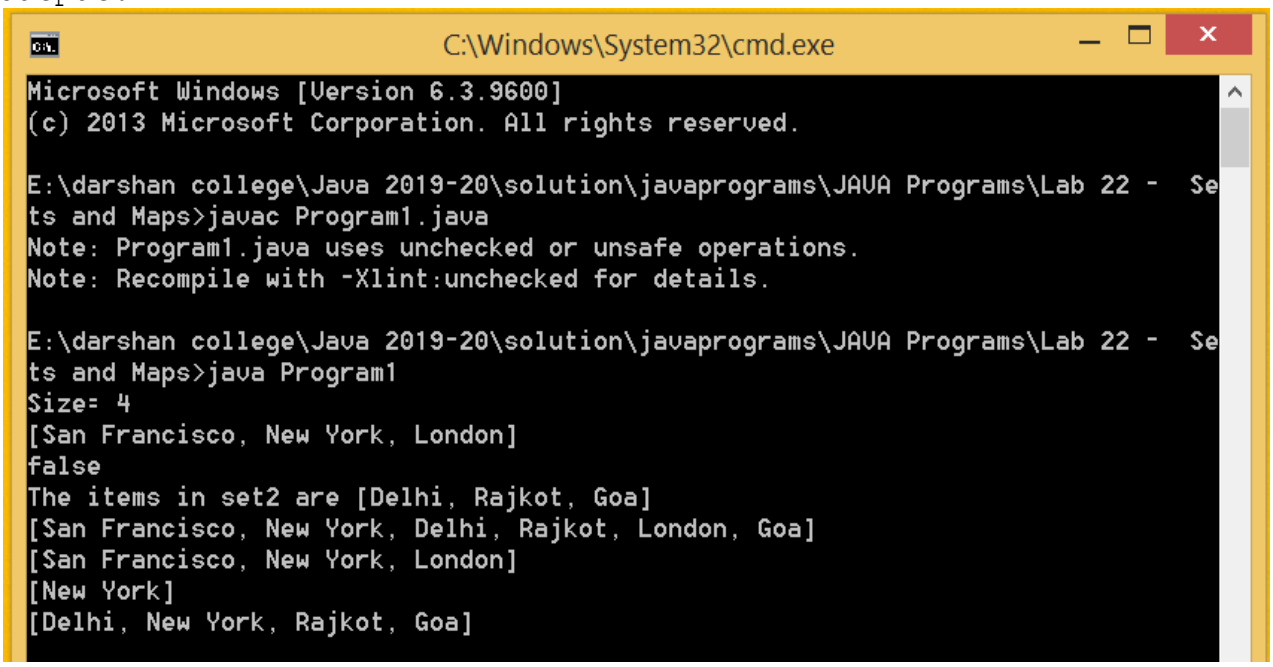
Practical-20

1. WAP to Create Set with following value:
   {"London","New York","San Francisco","Beijing","New York"}
   Perform following operation on above Set
   - add new element
   - get Set size
   - remove element
   - Contains element?
   - addAll
   - removeAll
   - retainAll

```
import java.util.*;
class Program1 {
    public static void main(String args[]) {
        //set created
        Set hs = new HashSet();

        // - add new element
        hs.add("London");
        hs.add("New York");
        hs.add("San Francisco");
        hs.add("Beijing");
        hs.add("New York");

        // - get Set size
        System.out.println("Size= "+hs.size());

        // - remove element
        hs.remove("Beijing");
        System.out.println(hs);

        // - Contains element?
        System.out.println(hs.contains("Beijing"));

        // - addAll
        Set hs1 = new HashSet();
        hs1.add("Rajkot");
        hs1.add("Delhi");
        hs1.add("Goa");
        System.out.println("The items in set2 are "+hs1);
```

```
        hs.addAll(hs1);
        System.out.println(hs);

        // - removeAll
        hs.removeAll(hs1);
        System.out.println(hs);

        // - retainAll
        hs1.add("New York");
        hs.retainAll(hs1);
        System.out.println(hs);
        System.out.println(hs1);
    }
}
```

Output:

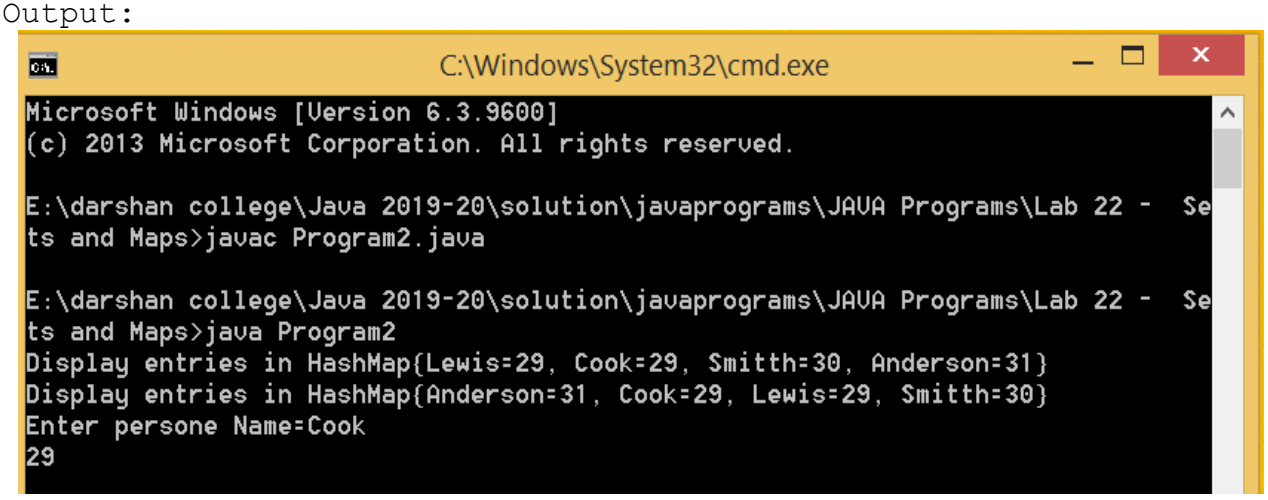


2. WAP to create Map<String, Integer> with following value {("Smith",30),("Anderson",31),("Lewise",29),("Cook",29)}
   Perform following operation on above Map
   - Display entries in ascending order of key.
   - Display age of person entered by user.

```
import java.util.*;
class Program2 {
```

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

        Map<String,Integer>  hasMap  =  new  HashMap  <String,
        Integer>();
        hasMap.put("Smitth", 30);
        hasMap.put("Anderson", 31);
        hasMap.put("Lewis", 29);
        hasMap.put("Cook", 29);
        System.out.println("Display entries in HashMap"+hasMap);

        // - Display entries in ascending order of key.
        Map<String,Integer>  treeMap  =  new  TreeMap<String,
        Integer>(hasMap);
        System.out.println("Display entries in HashMap"+treeMap);

        // - Display age of person entered by user.
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter persone Name=");
        String name = sc.nextLine();
        System.out.println(hasMap.get(name).intValue());

    }
}
```

Output:

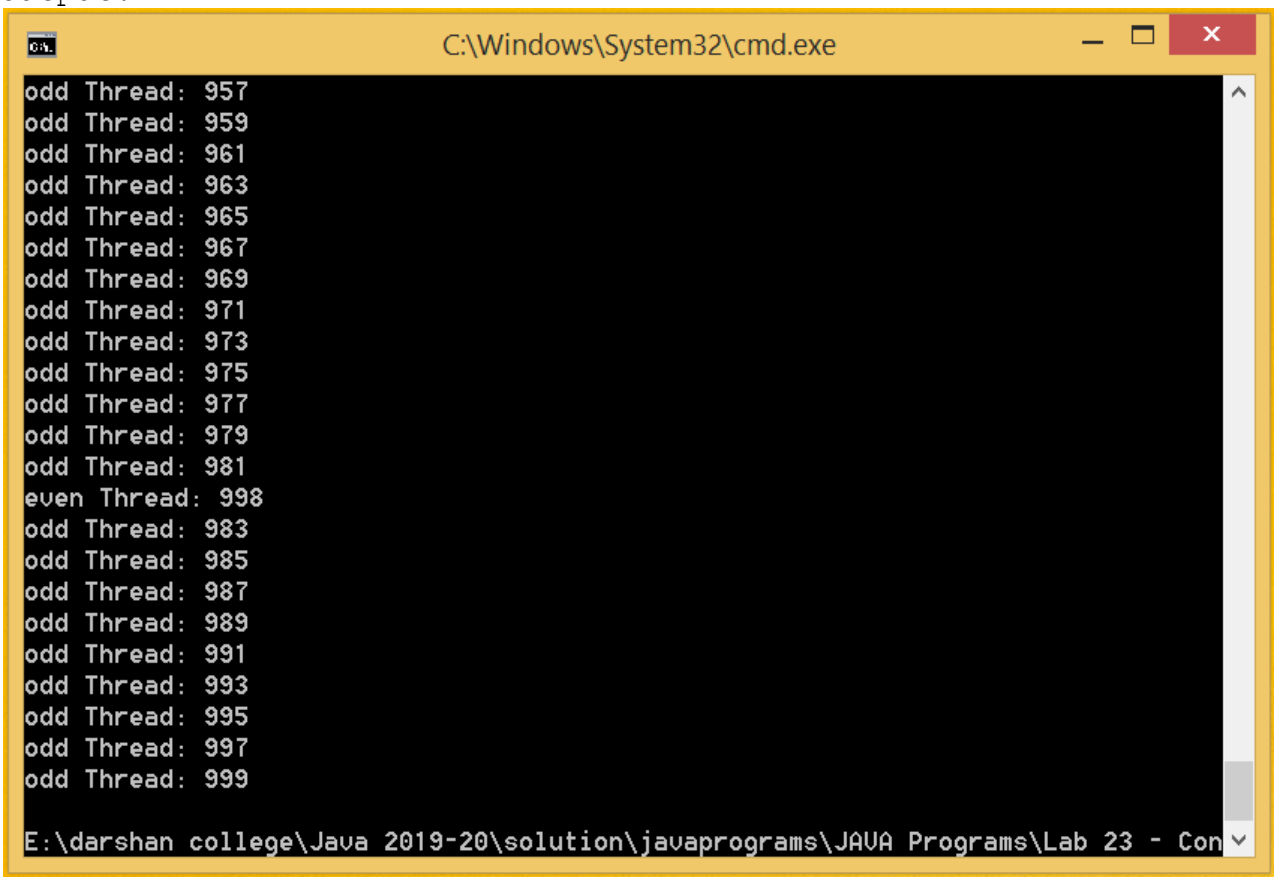


Practical-21

1. WAP to create two threads, one thread will print odd numbers and second thread will print even numbers between 1 to 1000 numbers.

```
class Thread1 extends Thread // implementing thread by class
{
    public Thread1() {
        start();
    }

    public void run() {
        for (int i = 1; i < 1000; i++) {
            if (i % 2 != 0)
                System.out.println("odd Thread: " + i);
        }

    }
}

class Thread2 implements Runnable // implementing thread by
interface
{
    Thread t;

    public Thread2() {
        t = new Thread(this);
        t.start();
    }

    public void run() {
        for (int i = 1; i < 1000; i++) {
            if (i % 2 == 0)
                System.out.println("even Thread: " + i);
        }
    }
}

public class Program1 {
    public static void main(String args[]) {
        Thread1 t1=new Thread1();
        Thread2 t2=new Thread2();
    }
}
```

Output:



2. WAP to implement producer consumer problem.

```
class CI {
    int n;
    boolean valueSet = false;

    synchronized int recieve() {
        while (!valueSet)
            try {
                wait();
            } catch (InterruptedException e) {
                System.out.println("InterruptedException caught");
            }
        System.out.println("Recieve : " + n);
        valueSet = false;
        notify();
        return n;
    }
```

```
    synchronized void send(int n) {
        while (valueSet)
            try {
                wait();
            } catch (InterruptedException e) {
                System.out.println("InterruptedException caught");
            }
        this.n = n;
        valueSet = true;
        System.out.println("Send : " + n);
        notify();
    }
}

class Producer implements Runnable {
    CI ci;

    Producer(CI ci) {
        this.ci = ci;
        new Thread(this, "Producer").start();
    }

    public void run() {
        int i = 0;
        while (true) {
            ci.send(i++);
        }
    }
}

class Consumer implements Runnable {
    CI ci;

    Consumer(CI ci) {
        this.ci = ci;
        new Thread(this, "Consumer").start();
    }

    public void run() {
        while (true) {
            ci.recieve();
        }
    }
}
```

```
public class Program2 {
    public static void main(String args[]) {
        CI ci = new CI();
        new Producer(ci);
        new Consumer(ci);
        System.out.println("Press Control-C to Stop.");

    }
}
```

Output: