

A
Practical File
On
LAB VII: Programming Lab in Java
(BCA-307)
Submitted In

Partial fulfilment of the requirements for the award of the
degree of

Bachelor of Computer Application

For



Session: 2021-22

Guided by

Ms. Nidhi Jaswani
Asst. Prof. (Comp. Dept.)

Submitted by

Dinesh Sindhayach
BCA III

At

Disha College, Raipur

Affiliated to

Pt. Ravishankar Shukla University, Raipur (C. G.)

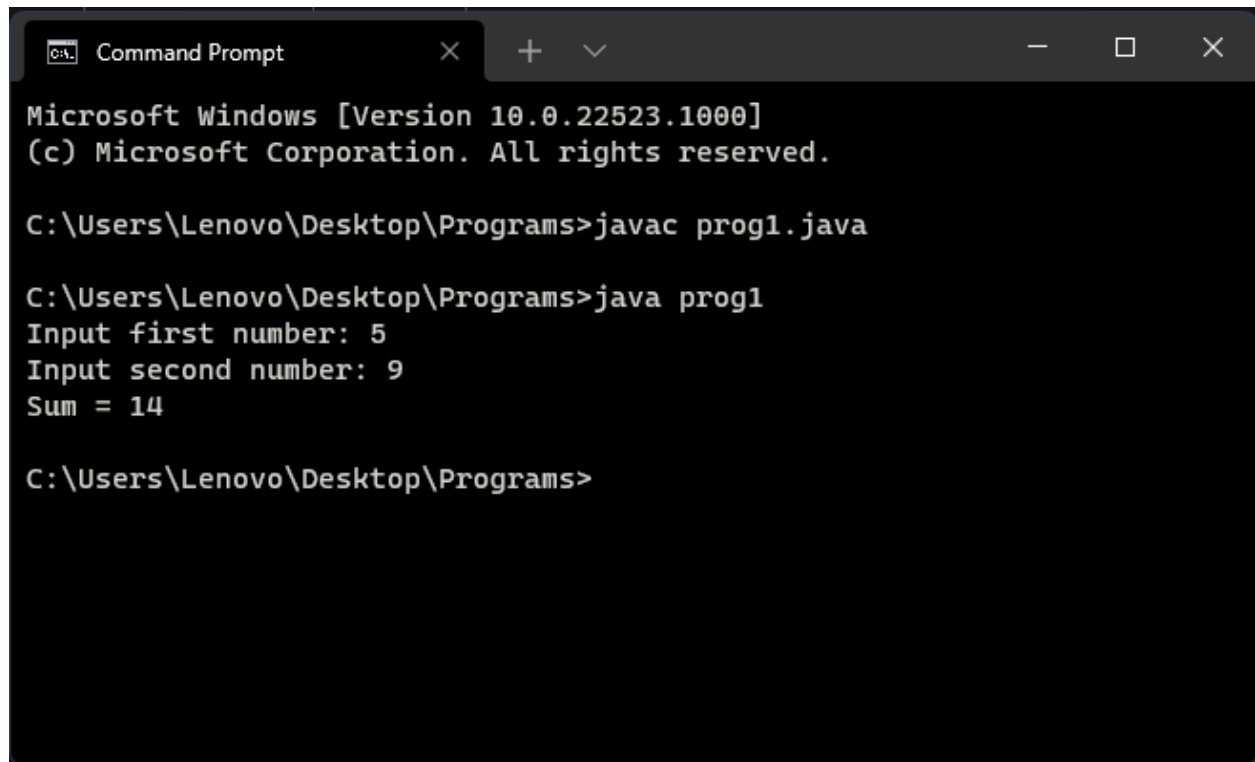
INDEX

S.No.	List of Objectives	Pg. No.
1.	Write a program that implement the concept of Encapsulation.	1-2
2.	Write a program to demonstrate concept of function overloading of polymorphism.	3-6
3.	Write a program to demonstrate concept of constructor overloading of polymorphism.	7-10
4.	Write a program to print first 10 numbers of the following series using do-while loop 0, 1, 1, 2, 3, 5, 8, ...	11-12
5.	Write a program to check the given number is Armstrong number.	13-14
6.	Write a program to find the factorial of number (By recursion).	15-16
7.	Write a program to sort the element of program in 1D array in ascending order.	17-18
8.	Write a program for matrix multiplication using input/output stream.	19-22
9.	Write a program for matrix transpose using input/output stream.	23-26
10.	Write a program to add the elements of Vector as arguments of main method (Run time) and rearrange them, and copy it into an array.	27-28
11.	Write a program to check entered String is palindrome or not	29-32
12.	Write a program for StringBuffer class which perform all methods of that class.	33-36
13.	Write a program to find the entered number is present or not in the array list (Binary Search).	37-40

14.	Write a program to add elements of 1D array and store it in another array	41-44
15.	Write a program to input basic salary of an employee and calculate its Gross salary according to the following: Basic salary <= 10000 : HRA:20% : DRA: 30% Basic salary <= 20000 : HRA:25% : DRA: 35% Basic salary > 20000 : HRA:30% : DRA: 35%	45-46
16.	Write a program to arrange the string in alphabetical order.	47-48
17.	Write a program to calculate simple interest using Wrapper class.	49-50
18.	Write a program to calculate areas of various geometrical figures using the abstract class.	51-54
19.	Write a program where single class implements more than one interfaces and with the help of interface reference variable user call the method.	55-58
20.	Write a program that use the multiple catch statements within the try catch mechanism.	59-60
21.	Write a program where user will create a self-Exception using "throw" keyword.	61-62
22.	Write a program for multithreading using the isAlive(), join() and synchronized() methods of Thread class.	63-66
23.	Write a program to show the life cycle of a thread.	67-70
24.	Write a program to create a package using command and one package will import another class.	71-72
25.	Write a program for JDBC to insert the values into the existing table by using PreparedStatement.	73-76
26.	Write a program for JDBC to display the records from the existing table.	77-78
27.	Write a program for JDBC to create a table.	79-80

28.	Write a program for demonstration of switch and break statement.	81-84
29.	Write a program to perform write operation in the file using input/output stream.	85-86
30.	Write a program to read from file using input/output stream.	87-88

Output 01



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog1.java

C:\Users\Lenovo\Desktop\Programs>java prog1
Input first number: 5
Input second number: 9
Sum = 14

C:\Users\Lenovo\Desktop\Programs>
```


Program 01

Q. Write a program that implements the Concept of Encapsulation.

Coding:

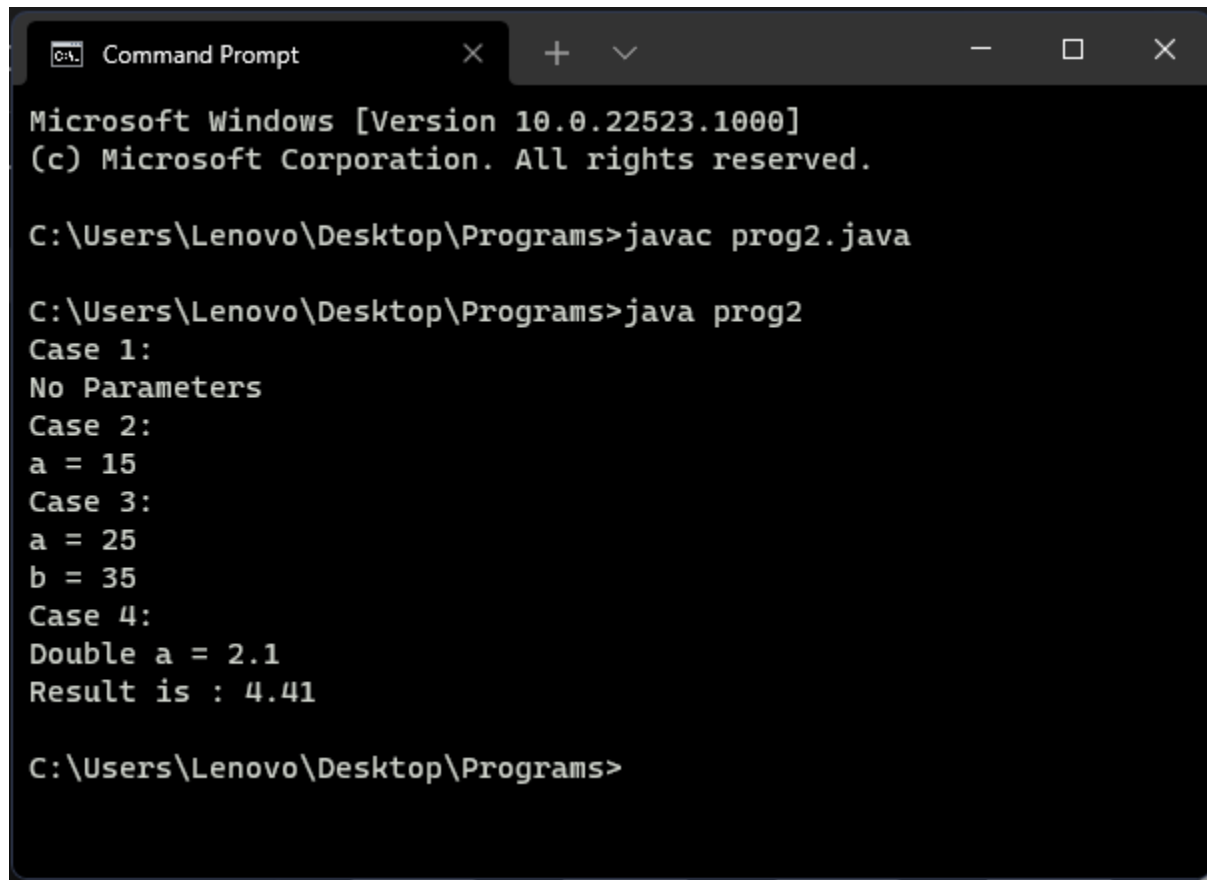
```
import java.util.*;

class demo {
    Scanner in = new Scanner(System.in);
    int a, b, c;

    void getdata() {
        System.out.print("Input first number: ");
        a = in.nextInt();
        System.out.print("Input second number: ");
        b = in.nextInt();
    }
    void show() {
        c = a + b;
        System.out.println("Sum = " + c);
    }
}

class prog1 {
    public static void main(String args[]) {
        demo obj1 = new demo();
        obj1.getdata();
        obj1.show();
    }
}
```

Output 02



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog2.java

C:\Users\Lenovo\Desktop\Programs>java prog2
Case 1:
No Parameters
Case 2:
a = 15
Case 3:
a = 25
b = 35
Case 4:
Double a = 2.1
Result is : 4.41

C:\Users\Lenovo\Desktop\Programs>
```

Program 02

Q. Write a program to demonstrate concept of function overloading of Polymorphism.

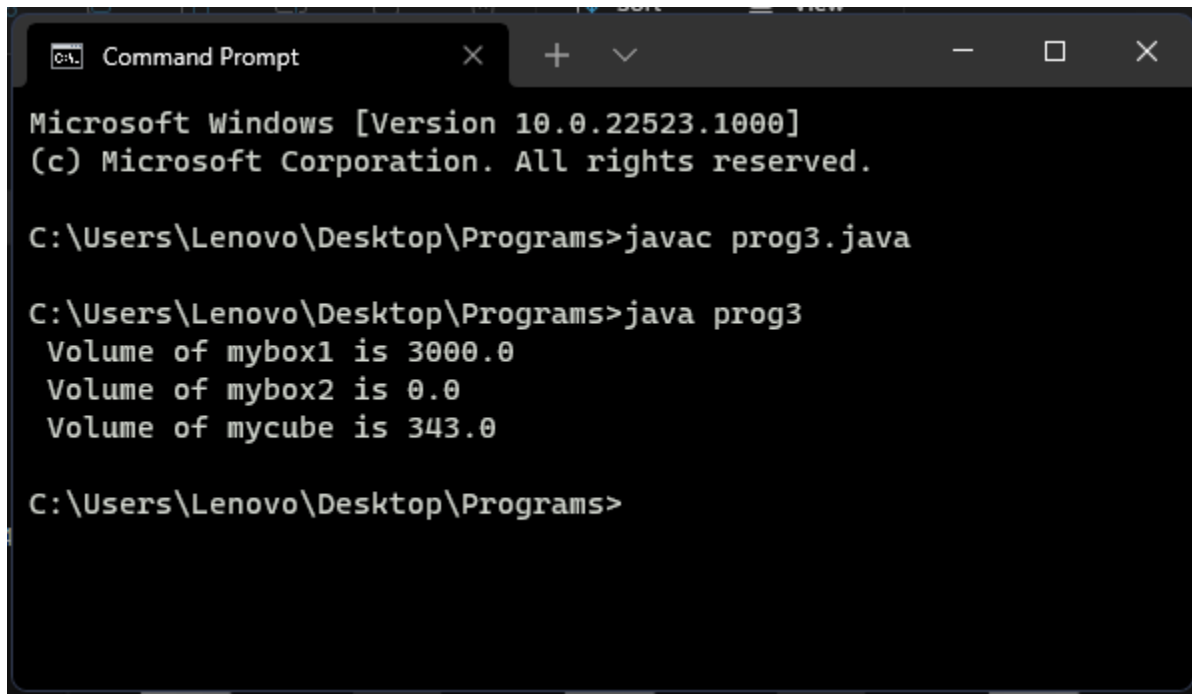
Coding:

```
class OverloadDemo {  
    void test() {  
        System.out.println("Case 1:");  
        System.out.println("No Parameters");  
    }  
  
    void test(int a) {  
        System.out.println("Case 2:");  
        System.out.println("a = " + a);  
    }  
  
    void test(int a, int b) {  
        System.out.println("Case 3:");  
        System.out.println("a = " + a);  
        System.out.println("b = " + b);  
    }  
  
    double test(double a) {  
        System.out.println("Case 4:");  
        System.out.println("Double a = " + a);  
        return a * a;  
    }  
}
```



```
class prog2 {  
  
    public static void main(String args[]) {  
        OverloadDemo od = new OverloadDemo();  
        od.test();  
        od.test(15);  
        od.test(25, 35);  
        double result = od.test(2.1);  
        System.out.println("Result is : " + result);  
    }  
}
```

Output 03



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog3.java

C:\Users\Lenovo\Desktop\Programs>java prog3
Volume of mybox1 is 3000.0
Volume of mybox2 is 0.0
Volume of mycube is 343.0

C:\Users\Lenovo\Desktop\Programs>
```

Program 03

Q. Write a program to demonstrate concept of constructor overloading of Polymorphism.

Coding:

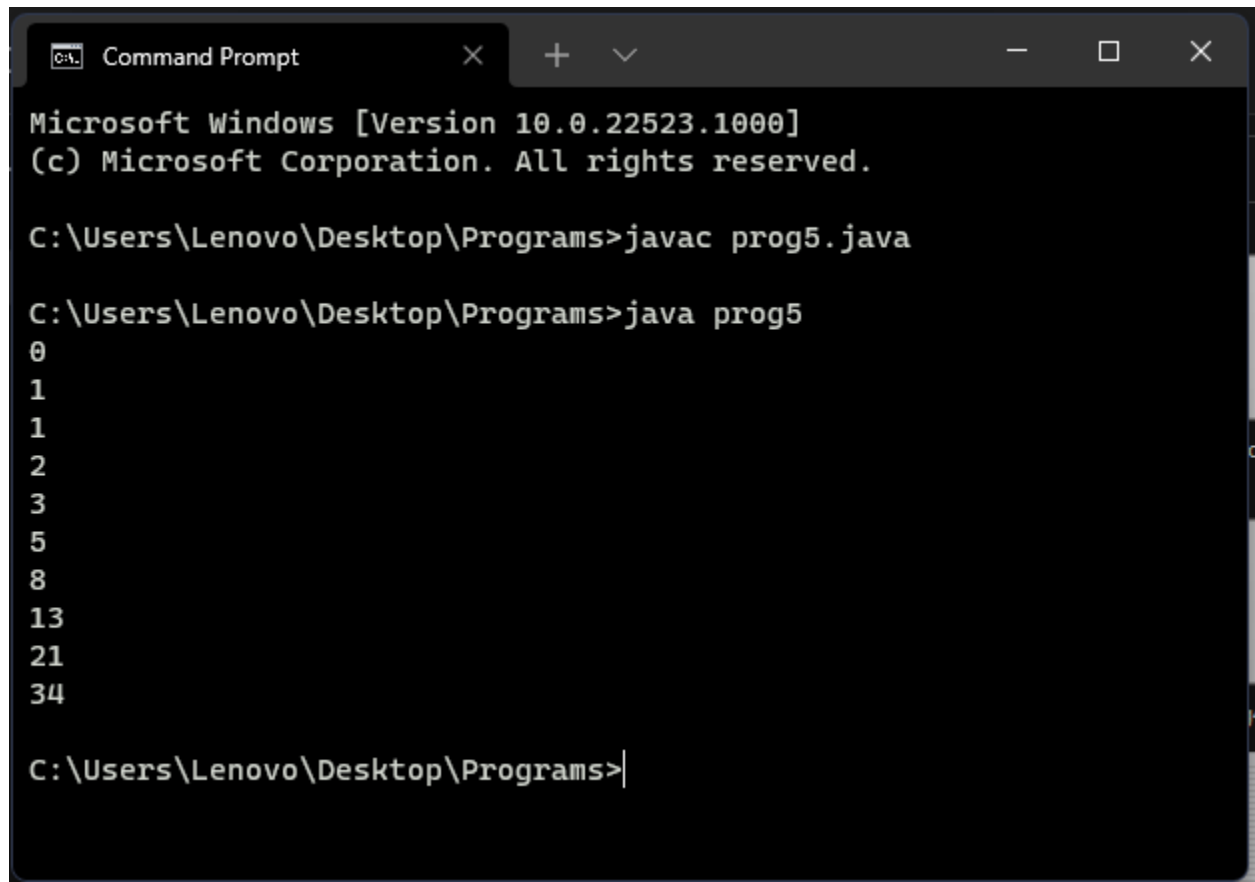
```
class Box
{
    double width, height, depth;
    Box(double w, double h, double d)
    {
        width = w;
        height = h;
        depth = d;
    }
    Box()
    {
        width = height = depth = 0;
    }
    Box(double len)
    {
        width = height = depth = len;
    }
    double volume()
    {
        return width * height * depth;
    }
}

public class prog3
```



```
{  
    public static void main(String args[])  
    {  
        Box mybox1 = new Box(10, 20, 15);  
        Box mybox2 = new Box();  
        Box mycube = new Box(7);  
        double vol;  
        vol = mybox1.volume();  
        System.out.println(" Volume of mybox1 is " + vol);  
        vol = mybox2.volume();  
        System.out.println(" Volume of mybox2 is " + vol);  
        vol = mycube.volume();  
        System.out.println(" Volume of mycube is " + vol);  
    }  
}
```

Output 04



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog5.java

C:\Users\Lenovo\Desktop\Programs>java prog5
0
1
1
2
3
5
8
13
21
34

C:\Users\Lenovo\Desktop\Programs>
```

Program 04

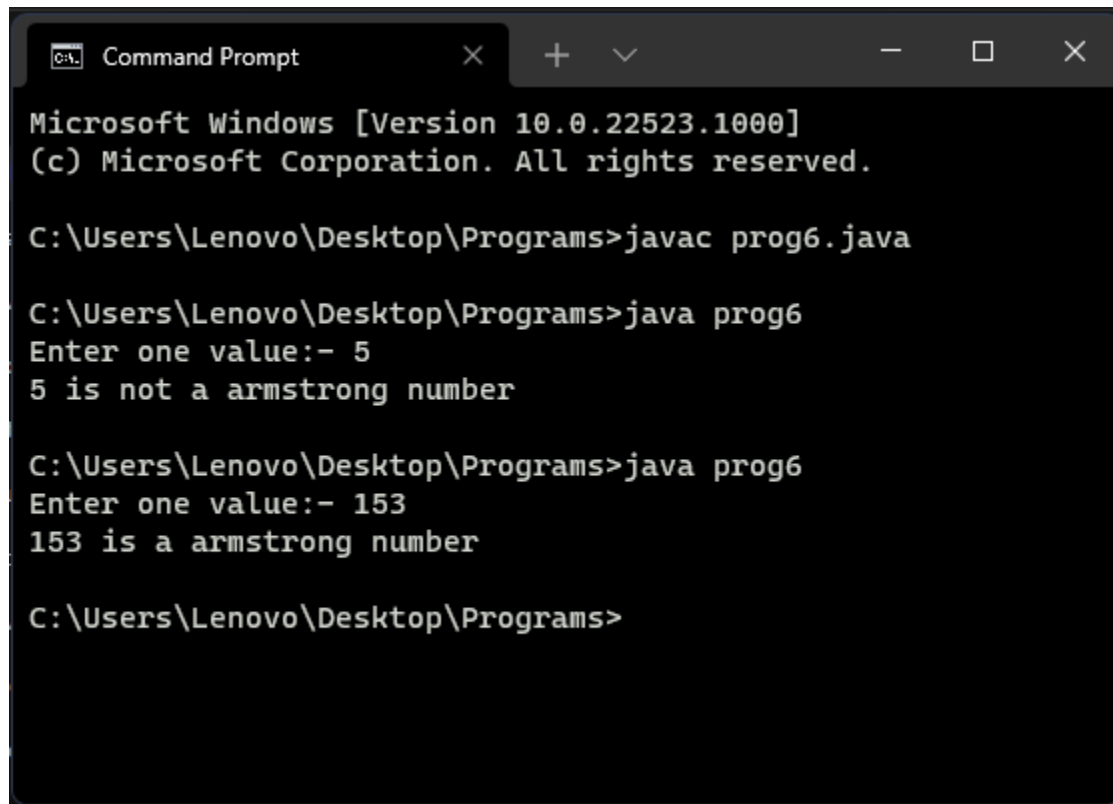
Q. Write a program to print first 10 number of the following series using Do-While loop 0, 1, 1, 2, 3, 5, 8, 11....

Coding:

```
class Demo
{
    int a = -1, b = 1, c;
    void series() {
        int i = 1;
        do
        {
            c = a + b;
            System.out.println(c);
            a = b;
            b = c;
            i++;
        } while (i <= 10);
    }
}

class prog5 {
    public static void main(String args[]) {
        Demo d = new Demo();
        d.series();
    }
}
```

Output 05



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog6.java

C:\Users\Lenovo\Desktop\Programs>java prog6
Enter one value:- 5
5 is not a armstrong number

C:\Users\Lenovo\Desktop\Programs>java prog6
Enter one value:- 153
153 is a armstrong number

C:\Users\Lenovo\Desktop\Programs>
```

Program 05

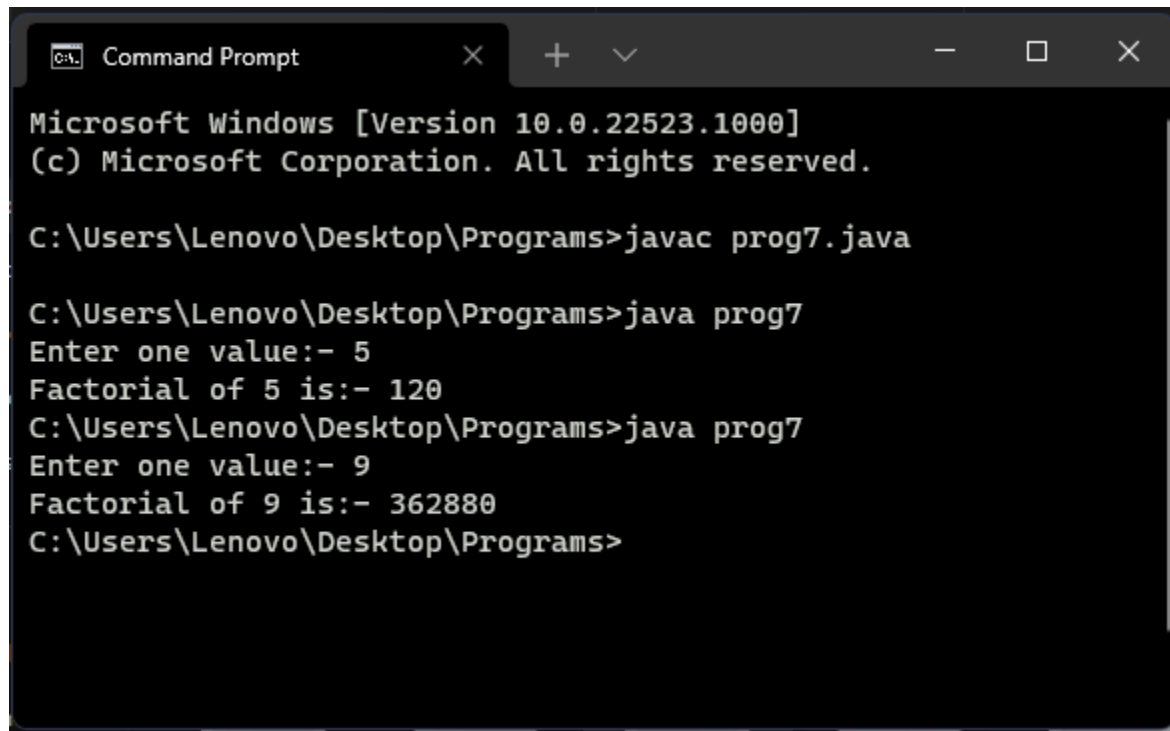
Q. Write a program to check the given number is Armstrong or not.

Coding:

```
import java.util.*;

class prog6
{
    public static void main(String args[])
    {
        Scanner in=new Scanner(System.in);
        System.out.print("Enter one value:- ");
        int n=in.nextInt();
        int temp=n;
        int r;
        double sum=0;
        while(n!=0){
            r=n%10;
            sum=sum+Math.pow(r,3);
            n=n/10;
        }
        if(temp==sum)
            System.out.println(temp+" is a armstrong number");
        else
            System.out.println(temp+" is not a armstrong number");
    }
}
```

Output 06



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog7.java

C:\Users\Lenovo\Desktop\Programs>java prog7
Enter one value:- 5
Factorial of 5 is:- 120
C:\Users\Lenovo\Desktop\Programs>java prog7
Enter one value:- 9
Factorial of 9 is:- 362880
C:\Users\Lenovo\Desktop\Programs>
```

Program 06

Q. Write a program to find factorial of any given numbers.

Coding:

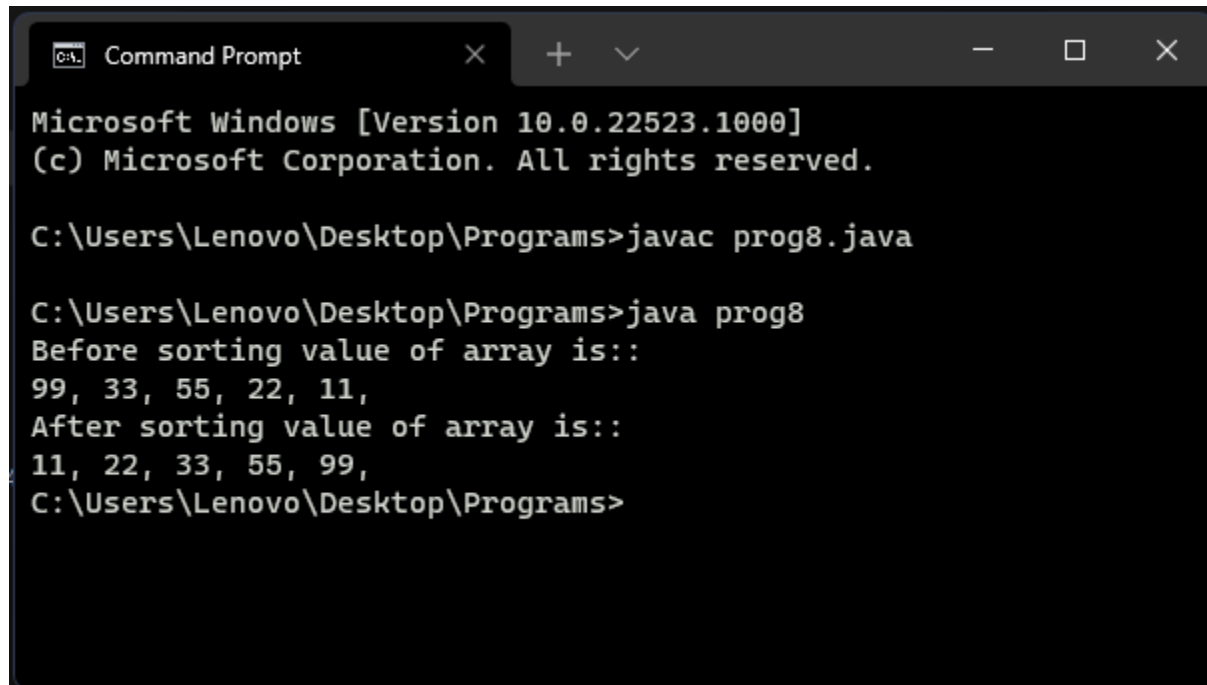
```
import java.util.*;

public class prog6a {

    public static void main(String[] args) {
        int num;
        Scanner in = new Scanner(System.in);
        System.out.print("Enter one value:- ");
        num = in.nextInt();
        long factorial = multiplyNumbers(num);
        System.out.println("Factorial of " + num + " = " + factorial);
    }

    public static long multiplyNumbers(int num)
    {
        if (num >= 1)
            return num * multiplyNumbers(num - 1);
        else
            return 1;
    }
}
```

Output 07



```
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog8.java

C:\Users\Lenovo\Desktop\Programs>java prog8
Before sorting value of array is::
99, 33, 55, 22, 11,
After sorting value of array is::
11, 22, 33, 55, 99,
C:\Users\Lenovo\Desktop\Programs>
```


Program 07

Q. Write a program to sort the element of one-dimensional array in ascending order.

Coding:

```
class prog8 {  
    public static void main(String args[]) {  
        int[] a = { 99, 33, 55, 22, 11 };  
        int i, j;  
        System.out.println("Before sorting value of array is:: ");  
        for (i = 0; i < 5; i++) {  
            System.out.print(a[i] + ", ");  
        }  
        // sorting process  
        for (i = 0; i < 5; i++) {  
            for (j = i + 1; j < 5; j++) {  
                if (a[i] > a[j]) {  
                    int temp = a[i];  
                    a[i] = a[j];  
                    a[j] = temp;  
                }  
            }  
        }  
        System.out.println("\nAfter sorting value of array is:: ");  
        for (i = 0; i < 5; i++) {  
            System.out.print(a[i] + ", ");  
        }  
    } }  
}
```

Output 08

```
C:\javaprogram\project>javac Matrix.java
```

```
C:\javaprogram\project>java Matrix
```

```
Enter the values of First Matrix :
```

```
1  
2  
3  
4  
5  
6  
7  
8  
9
```

```
First Matrix is :
```

```
1    2    3  
4    5    6  
7    8    9
```

```
Enter the values of Second Matrix :
```

```
9  
8  
7  
6  
5  
4  
4  
3  
2
```

```
Second Matrix is :
```

```
9    8    7  
6    5    4  
4    3    2
```

```
Multiplication of Matrix is :
```

```
33    27    21  
90    75    60  
147    123    99
```

```
C:\javaprogram\project>_
```

Program 08

Q. Write a program for matrix multiplication using input/output stream.

Coding:

```
import java.io.*;

class prog9 {

    public static void main(String args[]) throws IOException {

        BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));

        int a[][] = new int[3][3];
        int b[][] = new int[3][3];
        int c[][] = new int[3][3];
        int i, j, k;

        System.out.println("Enter the values of First Matrix : ");
        for (i = 0; i < 3; i++) {
            for (j = 0; j < 3; j++) {
                a[i][j] = Integer.parseInt(br.readLine());
            }
        }

        System.out.println("First Matrix is : ");
        for (i = 0; i < 3; i++) {
            for (j = 0; j < 3; j++) {
                System.out.print("\t" + a[i][j]);
            }
            System.out.println("\n");
        }

        System.out.println("Enter the values of Second Matrix : ");
        for (i = 0; i < 3; i++) {
```



```

    for (j = 0; j < 3; j++) {
        b[i][j] = Integer.parseInt(br.readLine());
    }
}
System.out.println("Second Matrix is : ");
for (i = 0; i < 3; i++) {
    for (j = 0; j < 3; j++) {
        System.out.print("\t" + b[i][j]);
    }
    System.out.println("\n");
}
for (i = 0; i < 3; i++) {
    for (j = 0; j < 3; j++) {
        c[i][j] = 0;
        for (k = 0; k < 3; k++) {
            c[i][j] = c[i][j] + a[i][k] * b[k][j];
        }
    }
}
System.out.println("Multiplication of Matrix is : ");
for (i = 0; i < 3; i++) {
    for (j = 0; j < 3; j++) {
        System.out.print("\t" + c[i][j]);
    }
    System.out.println("\n");
}
}
}

```

Output 09

```
Command Prompt
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog11.java

C:\Users\Lenovo\Desktop\Programs>java prog11
Enter total rows and columns:
3
2
Enter matrix:
2
2
3
2
3
2
The above matrix before Transpose is
2 2
3 2
3 2
The above matrix after Transpose is
2 3 3
2 2 2

C:\Users\Lenovo\Desktop\Programs>
```

Program 09

Q. Write a program for matrix transpose using I/O stream class.

Coding:

```
import java.util.Scanner;

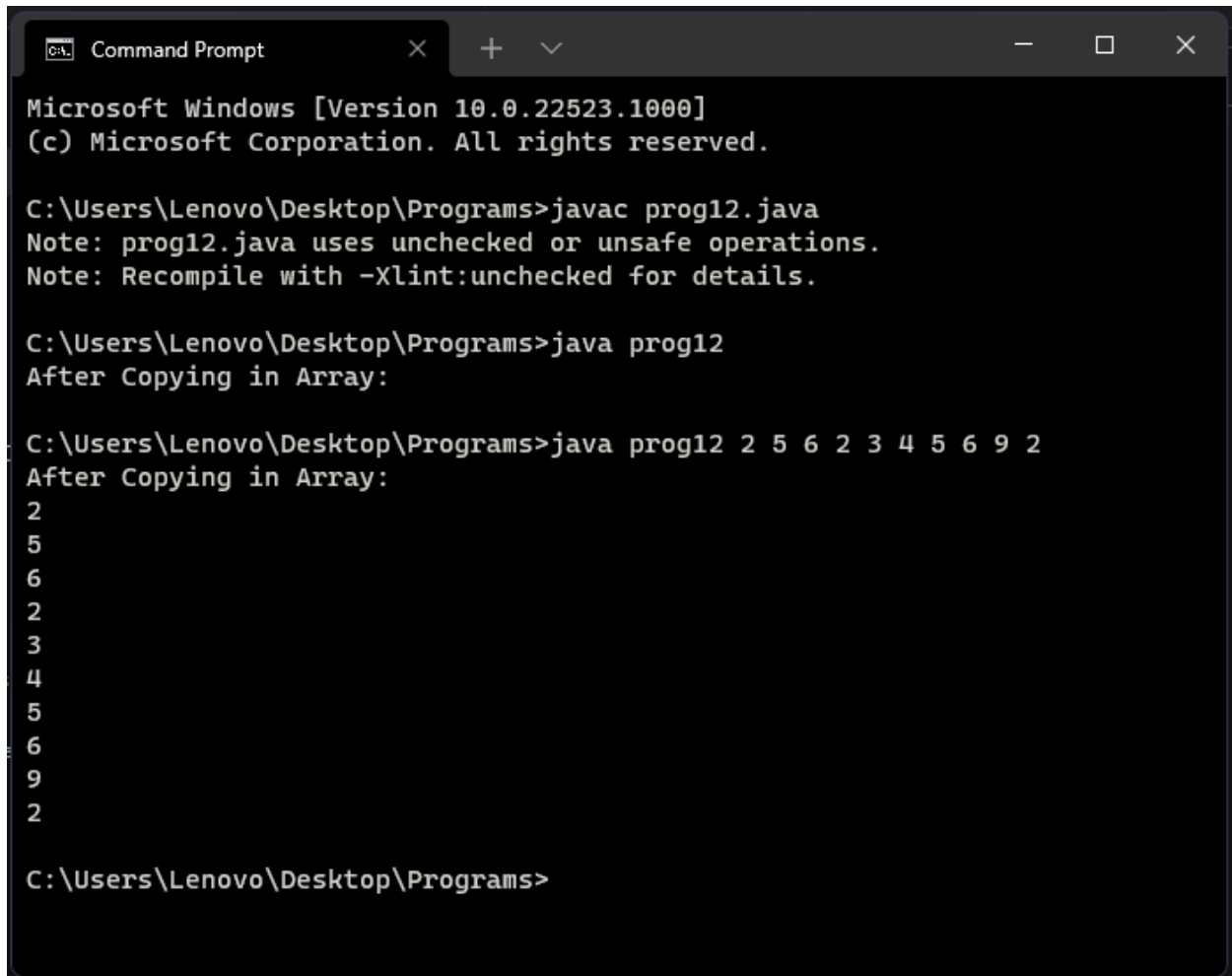
class prog11 {
    public static void main(String args[]) {
        int i, j;
        System.out.println("Enter total rows and columns: ");
        Scanner s = new Scanner(System.in);
        int row = s.nextInt();
        int column = s.nextInt();
        int array[][] = new int[row][column];
        System.out.println("Enter matrix:");
        for (i = 0; i < row; i++) {
            for (j = 0; j < column; j++) {
                array[i][j] = s.nextInt();
                System.out.print(" ");
            }
        }
        System.out.println("The above matrix before Transpose is ");
        for (i = 0; i < row; i++) {
            for (j = 0; j < column; j++) {
                System.out.print(array[i][j] + " ");
            }
        }

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



```
    }  
  
    System.out.println("The above matrix after Transpose is ");  
    for (i = 0; i < column; i++) {  
        for (j = 0; j < row; j++) {  
            System.out.print(array[j][i] + " ");  
        }  
        System.out.println(" ");  
    }  
  
    }  
  
}
```

Output 10



```
Command Prompt
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog12.java
Note: prog12.java uses unchecked or unsafe operations.
Note: Recompile with -Xlint:unchecked for details.

C:\Users\Lenovo\Desktop\Programs>java prog12
After Copying in Array:

C:\Users\Lenovo\Desktop\Programs>java prog12 2 5 6 2 3 4 5 6 9 2
After Copying in Array:
2
5
6
2
3
4
5
6
9
2

C:\Users\Lenovo\Desktop\Programs>
```

Program 10

Q. Write a program to add the elements of vector as arguments of main method (Run Time) and rearrange them and copy it into an array.

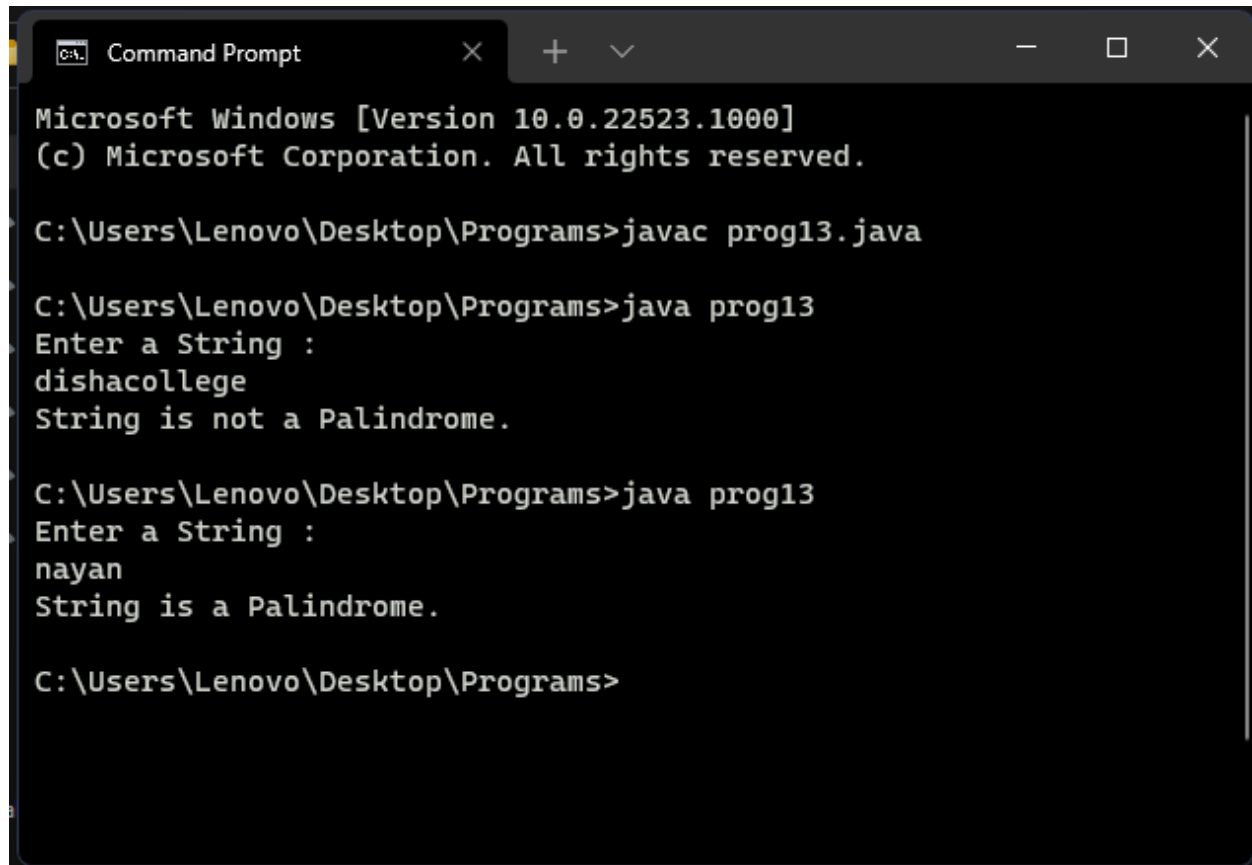
Coding:

```
import java.util.*;

class prog12 {
    public static void main(String args[])
    {
        Vector v=new Vector();
        int i;
        for(i=0;i<args.length;i++)
        {
            v.addElement(args[i]);
        }

        int l=v.size();
        String ar[]=new String[l];
        v.copyInto(ar);
        System.out.println("After Copying in Array: ");
        for(i=0;i<l;i++)
        {
            System.out.println(ar[i]);
        }
    }
}
```

Output 11



```
Command Prompt
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog13.java

C:\Users\Lenovo\Desktop\Programs>java prog13
Enter a String :
dishacollege
String is not a Palindrome.

C:\Users\Lenovo\Desktop\Programs>java prog13
Enter a String :
nayan
String is a Palindrome.

C:\Users\Lenovo\Desktop\Programs>
```

Program 11

Q. Write a program to check that the given string is palindrome or not.

Coding:

```
import java.io.*;

class prog13 {
    public static void main(String args[]) throws Exception {
        BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));
        String s;
        System.out.println("Enter a String : ");
        s = br.readLine();
        int l = s.length();
        char ch[] = s.toCharArray();
        for (int i = 0; i < l; i++) {
            for (int j = l - 1; j >= 0; j--) {
                char t;
                t = ch[j];
                ch[j] = ch[i];
                ch[i] = t;
            }
        }
        String sr = String.copyValueOf(ch);
        if (s.compareTo(sr) > 0) {
            System.out.println("String is a Palindrome.");
        }
    }
}
```



```
else {  
    System.out.println("String is not a Palindrome.");  
}  
}  
}
```

Output 12

```
Command Prompt
Microsoft Windows [Version 10.0.22523.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog15.java

C:\Users\Lenovo\Desktop\Programs>java prog15
Original String : Java Programming

Length of the String is : 16
Character at the Position : 1 is J
Character at the Position : 2 is a
Character at the Position : 3 is v
Character at the Position : 4 is a
Character at the Position : 5 is 
Character at the Position : 6 is P
Character at the Position : 7 is r
Character at the Position : 8 is o
Character at the Position : 9 is g
Character at the Position : 10 is r
Character at the Position : 11 is a
Character at the Position : 12 is m
Character at the Position : 13 is m
Character at the Position : 14 is i
Character at the Position : 15 is n
Character at the Position : 16 is g

Modified String : Java  Object Oriented Programming
Modified Character : Java -Object Oriented Programming

Appended String : Java -Object Oriented Programming Language.

C:\Users\Lenovo\Desktop\Programs>
```


Program 12

Q. Write a program for stringbuffer class which perform all methods of that class.

Coding:

```
class prog15 {  
    public static void main(String args[]) {  
        StringBuffer s = new StringBuffer("Java Programming");  
        System.out.println("Original String : " + s + "\n");  
  
        // Obtaining String Length  
        System.out.println("Length of the String is : " + s.length());  
  
        // Accessing Characters in the String  
        int l=s.length();  
        for (int i = 0; i < l; i++) {  
            int p = i + 1;  
            System.out.println("Character at the Position : " + p + "  
is " + s.charAt(i));  
        }  
        System.out.println("\n");  
  
        // Inserting a String in the Middle  
        String st = new String(s.toString());  
        int pos = st.indexOf("Programming");  
        s.insert(pos," Object Oriented ");  
        System.out.println("Modified String : " + s + "\n");  
  
        // Modifying Character
```

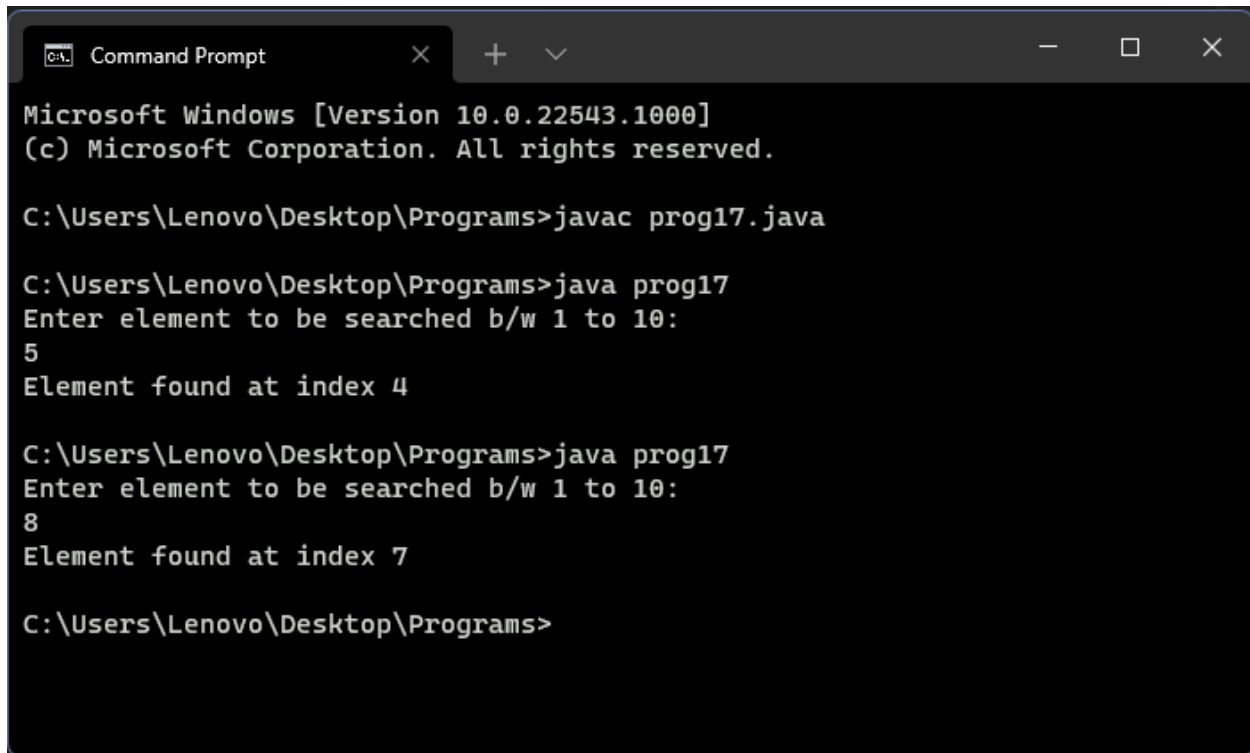


```
int pt = st.indexOf("Programming");

s.setCharAt(pt, '-');
System.out.println("Modified Character : " + s + "\n");

// Appending a String at the end
s.append(" Language.");
System.out.println("Appended String : " + s + "\n");
}
}
```

Output 13



```
Command Prompt
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog17.java

C:\Users\Lenovo\Desktop\Programs>java prog17
Enter element to be searched b/w 1 to 10:
5
Element found at index 4

C:\Users\Lenovo\Desktop\Programs>java prog17
Enter element to be searched b/w 1 to 10:
8
Element found at index 7

C:\Users\Lenovo\Desktop\Programs>
```

Program 13

Q. Write a program to find the entered number is present or not in the array list (Binary Search).

Coding:

```
import java.util.Scanner;

class prog17 {
    int binarySearch(int array[], int element, int low, int high) {
        while (low <= high) {
            int mid = low + (high - low) / 2;
            if (array[mid] == element)
                return mid;
            if (array[mid] < element)
                low = mid + 1;
            else
                high = mid - 1;
        }

        return -1;
    }

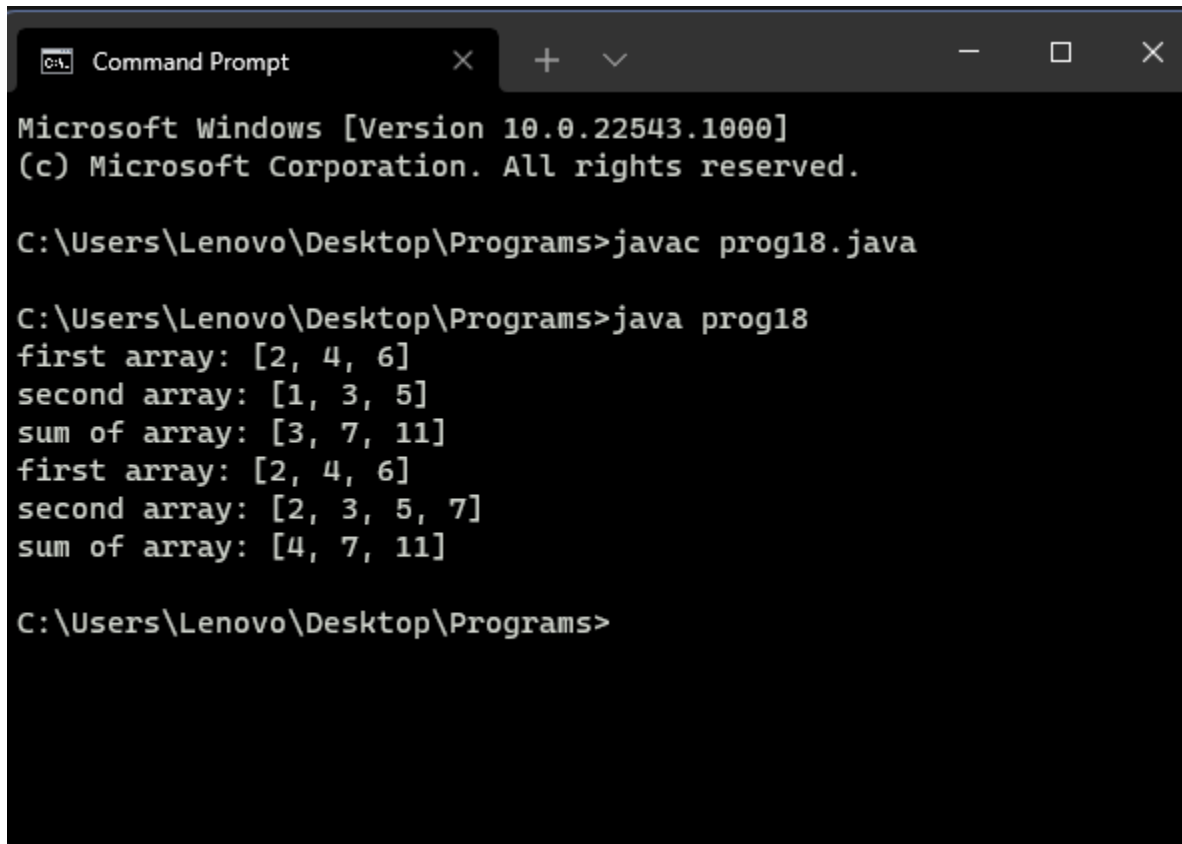
    public static void main(String args[]) {
        prog17 obj = new prog17();
        int[] array = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
        int n = array.length;
        Scanner input = new Scanner(System.in);

        System.out.println("Enter element to be searched b/w 1 to
10:");
```



```
int element = input.nextInt();
    input.close();
    int result = obj.binarySearch(array, element, 0, n - 1);
    if (result == -1)
        System.out.println("Not found");
    else
        System.out.println("Element found at index " + result);
}
}
```

Output 14



```
Command Prompt
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog18.java

C:\Users\Lenovo\Desktop\Programs>java prog18
first array: [2, 4, 6]
second array: [1, 3, 5]
sum of array: [3, 7, 11]
first array: [2, 4, 6]
second array: [2, 3, 5, 7]
sum of array: [4, 7, 11]

C:\Users\Lenovo\Desktop\Programs>
```


Program 14

Q. Write a program to add elements of two 1D array and store it in another array.

Coding:

```
import java.util.Arrays;

public class prog18 {

    public static void main(String args[]) {

        int[] even = { 2, 4, 6 };

        int[] odd = { 1, 3, 5 };

        int[] result = add(even, odd);

        System.out.println("first array: " + Arrays.toString(even));
        System.out.println("second array: " + Arrays.toString(odd));
        System.out.println("sum of array: " +
Arrays.toString(result));

        int[] prime = { 2, 3, 5, 7 };
        result = add(even, prime);
        System.out.println("first array: " + Arrays.toString(even));
        System.out.println("second array: " + Arrays.toString(prime));
        System.out.println("sum of array: " +
Arrays.toString(result));
    }

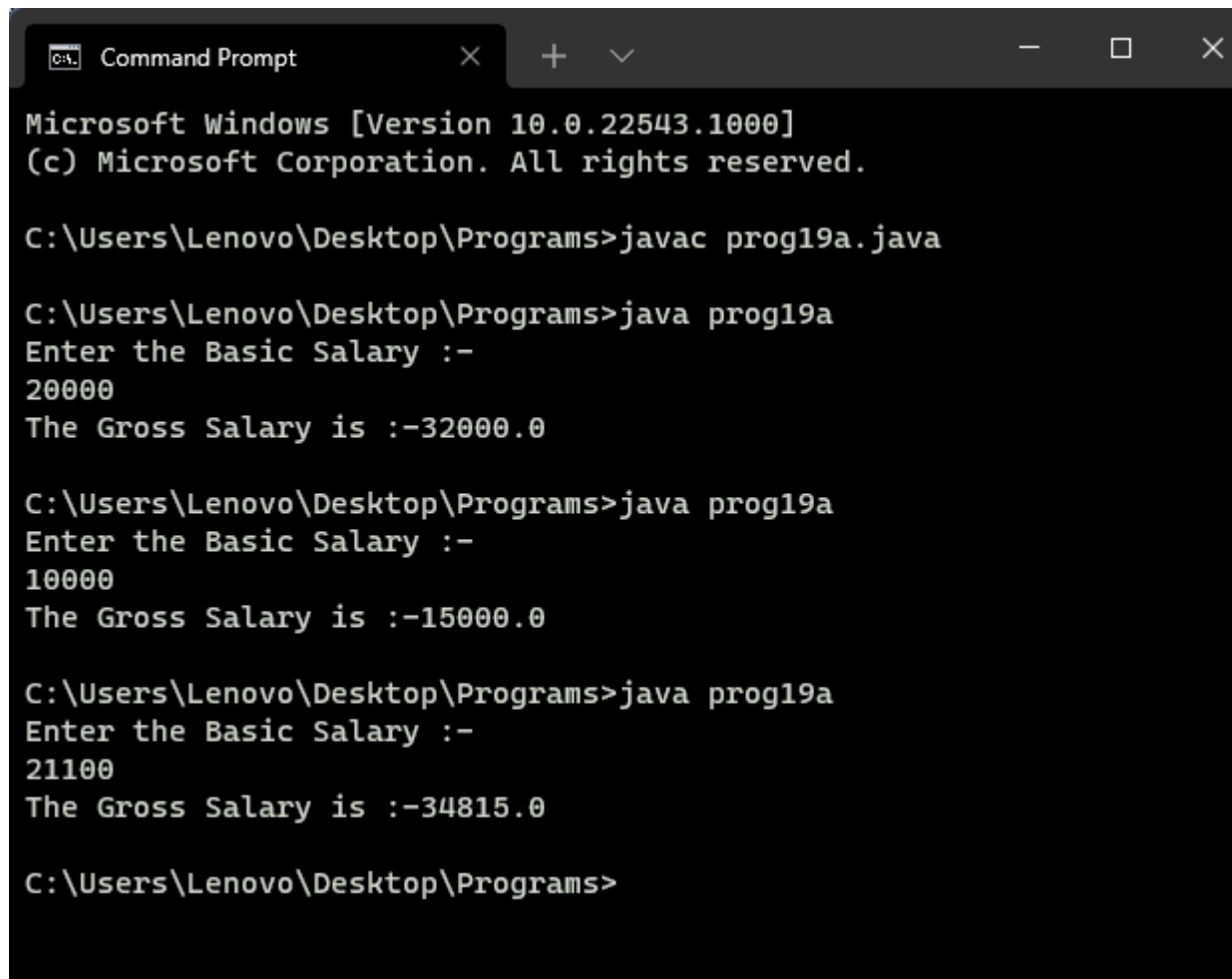
    public static int[] add(int[] first, int[] second) {
        int length = first.length < second.length ? first.length
            : second.length;

        int[] result = new int[length];
        for (int i = 0; i < length; i++) {
```



```
        result[i] = first[i] + second[i];
    }
    return result;
}
```

Output 15



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog19a.java

C:\Users\Lenovo\Desktop\Programs>java prog19a
Enter the Basic Salary :-
20000
The Gross Salary is :-32000.0

C:\Users\Lenovo\Desktop\Programs>java prog19a
Enter the Basic Salary :-
10000
The Gross Salary is :-15000.0

C:\Users\Lenovo\Desktop\Programs>java prog19a
Enter the Basic Salary :-
21100
The Gross Salary is :-34815.0

C:\Users\Lenovo\Desktop\Programs>
```

Program 15

Q. Write a program to input basic salary of an employee and calculate its Gross salary according to the following:

Basic salary \leq 10000 : HRA:20% : DRA: 30%

Basic salary \leq 20000 : HRA:25% : DRA: 35%

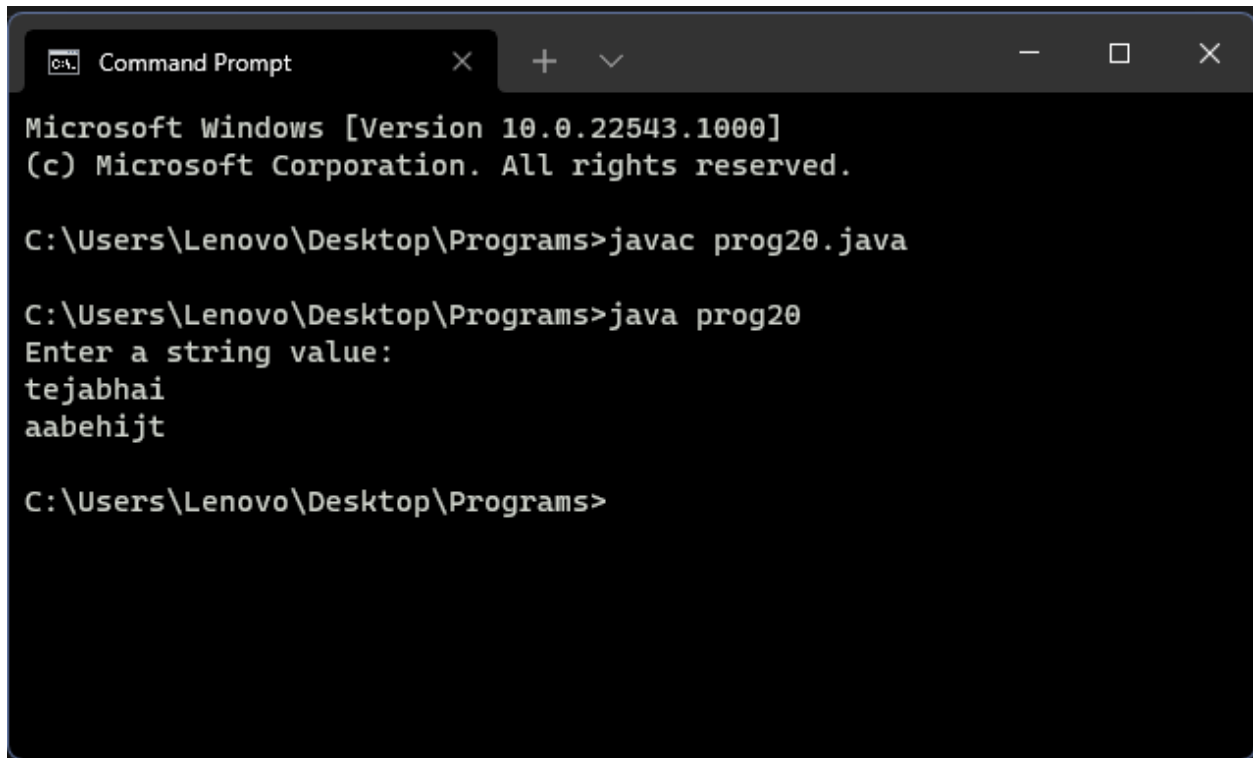
Basic salary $>$ 20000 : HRA:30% : DRA: 35%

Coding:

```
import java.util.Scanner;

class prog19a {
    public static void main(String args[]) {
        double basic, gross, da, hra;
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the Basic Salary :- ");
        basic = in.nextDouble();
        if (basic <= 10000) {
            da = basic * 0.3;
            hra = basic * 0.2;
        } else if (basic <= 20000) {
            da = basic * 0.35;
            hra = basic * 0.25;
        } else {
            da = basic * 0.35;
            hra = basic * 0.3;
        }
        gross = basic + da + hra;
        System.out.println("The Gross Salary is :-" + gross);
    }
}
```

Output 16



```
Command Prompt
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog20.java

C:\Users\Lenovo\Desktop\Programs>java prog20
Enter a string value:
tejabhai
aabeijit

C:\Users\Lenovo\Desktop\Programs>
```

Program 16

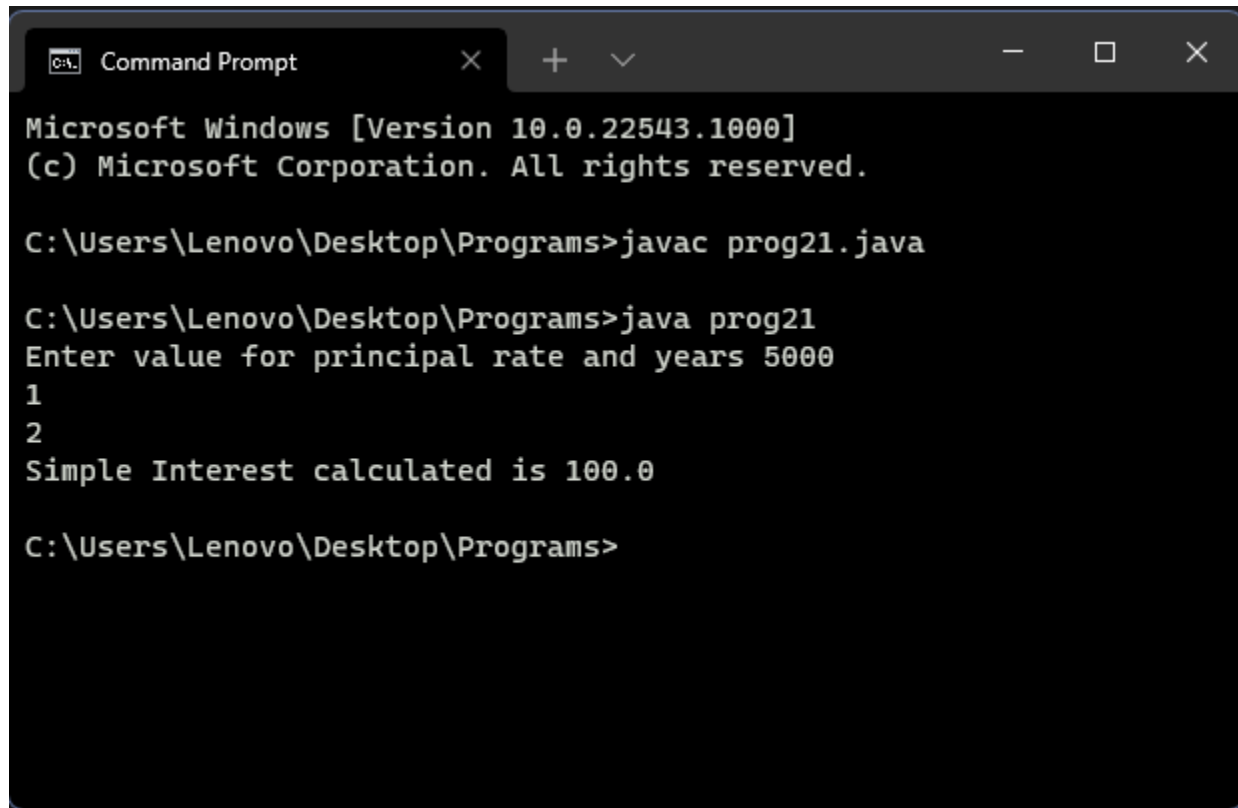
Q. Write a program to arrange the string in alphabetical order.

Coding:

```
import java.util.Arrays;
import java.util.Scanner;

public class prog20 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a string value: ");
        String str = sc.nextLine();
        char[] charArray = str.toCharArray();
        Arrays.sort(charArray);
        System.out.println(new String(charArray));
    }
}
```

Output 17



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog21.java

C:\Users\Lenovo\Desktop\Programs>java prog21
Enter value for principal rate and years 5000
1
2
Simple Interest calculated is 100.0

C:\Users\Lenovo\Desktop\Programs>
```


Program 17

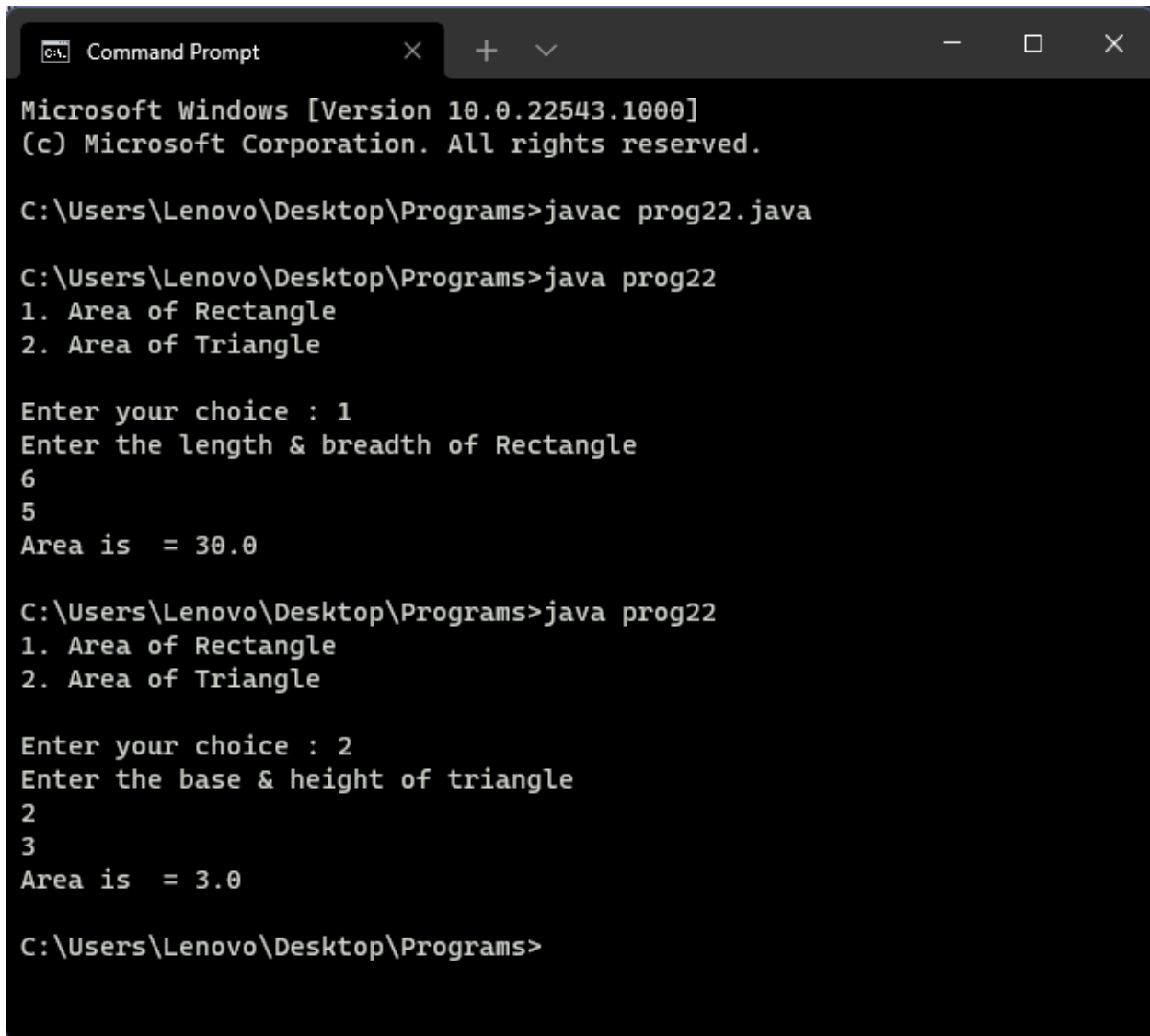
Q. Write a program to arrange the string in alphabetical order.

Coding:

```
import java.util.Scanner;

public class prog21 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter value for principal rate and years ");
        Integer principal = sc.nextInt(), years = sc.nextInt();
        Float rate = sc.nextFloat(), simpleInterest = (principal *
rate * years) / 100;
        System.out.println("Simple Interest calculated is " +
simpleInterest);
    }
}
```

Output 18



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog22.java

C:\Users\Lenovo\Desktop\Programs>java prog22
1. Area of Rectangle
2. Area of Triangle

Enter your choice : 1
Enter the length & breadth of Rectangle
6
5
Area is  = 30.0

C:\Users\Lenovo\Desktop\Programs>java prog22
1. Area of Rectangle
2. Area of Triangle

Enter your choice : 2
Enter the base & height of triangle
2
3
Area is  = 3.0

C:\Users\Lenovo\Desktop\Programs>
```

Program 18

Q. Write a program to calculate areas of various geometrical figures using the abstract class.

Coding:

```
import java.io.BufferedReader;
import java.io.InputStreamReader;

abstract class Area {
    final static float pi = 3.14F;

    abstract float compute(float x, float y);
}

class Rectangle extends Area {
    float compute(float x, float y) {
        return (x * y);
    }
}

class Triangle extends Area {
    float compute(float x, float y) {
        return (x * y / 2);
    }
}

public class prog22 {
    public static void main(String[] args) throws Exception {
        float r, s;
```

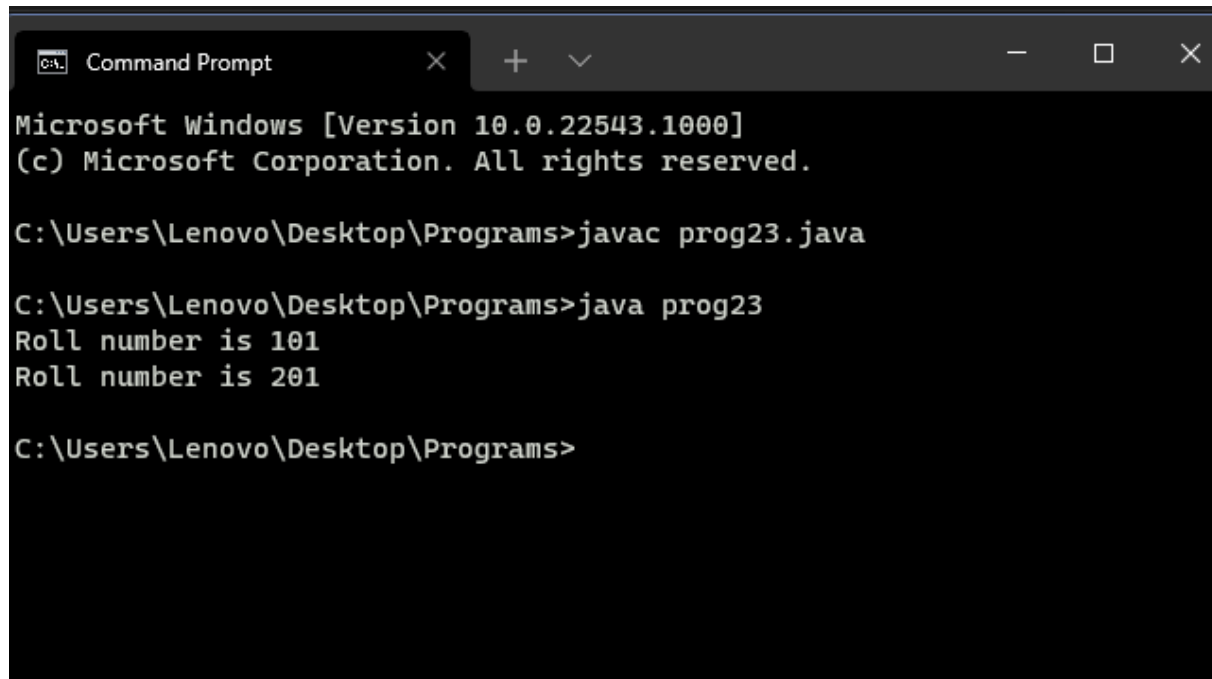


```

        Rectangle rectangle = new Rectangle();
        Triangle triangle = new Triangle();
        BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));
        System.out.println("1. Area of Rectangle  ");
        System.out.println("2. Area of Triangle\n  ");
        System.out.print("Enter your choice : ");
        int ch = Integer.parseInt(br.readLine());
        switch (ch) {
            case 1: {
                System.out.println("Enter the length & breadth of
Rectangle");
                r = Float.parseFloat(br.readLine());
                s = Float.parseFloat(br.readLine());
                System.out.println("Area is  = " +
rectangle.compute(r, s));
                break;
            }
            case 2: {
                System.out.println("Enter the base & height of
triangle");
                r = Float.parseFloat(br.readLine());
                s = Float.parseFloat(br.readLine());
                System.out.println("Area is  = " + triangle.compute(r,
s));
                break;
            }
        }
    }
}

```

Output 19



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog23.java

C:\Users\Lenovo\Desktop\Programs>java prog23
Roll number is 101
Roll number is 201

C:\Users\Lenovo\Desktop\Programs>
```

Program 19

Q. Write a program where single class implements more than one interfaces and with the help of interface reference variable user call the method.

Coding:

```
import java.util.Scanner;

interface Interface01 {
    void get(int roll_no);

    void display();
}

interface Interface02 {
    void get(int roll_no);

    void display();
}

class Details implements Interface01, Interface02 {
    int roll_no;
    Scanner sc = new Scanner(System.in);

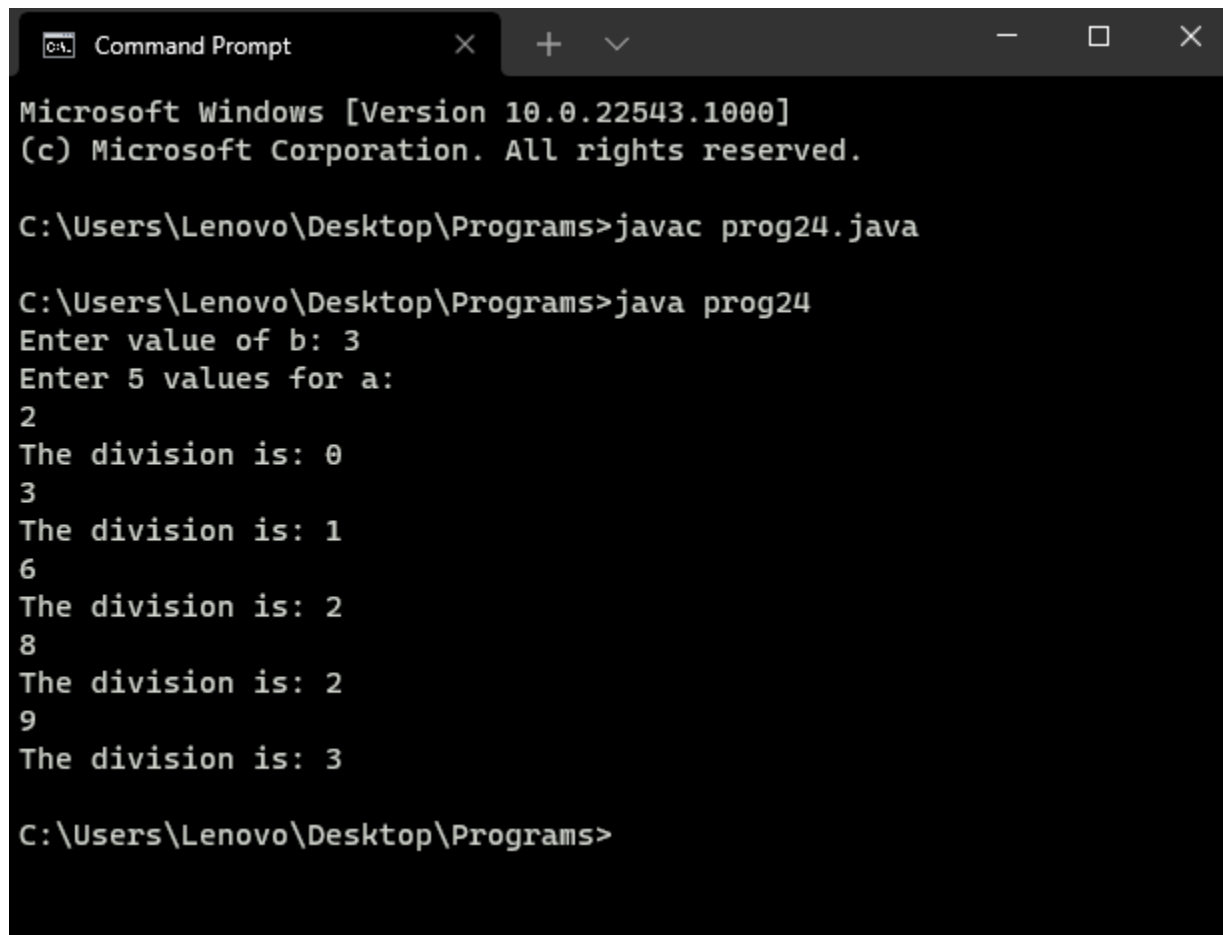
    public void get(int roll_no) {
        this.roll_no = roll_no;
    }

    public void display() {
        System.out.println("Roll number is " + roll_no);
    }
}
```



```
    }  
}  
  
public class prog23 {  
    public static void main(String[] args) {  
        Interface01 details01 = new Details();  
        details01.get(101);  
        details01.display();  
        Interface02 details02 = new Details();  
        details02.get(201);  
        details02.display();  
    }  
}
```

Output 20



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog24.java

C:\Users\Lenovo\Desktop\Programs>java prog24
Enter value of b: 3
Enter 5 values for a:
2
The division is: 0
3
The division is: 1
6
The division is: 2
8
The division is: 2
9
The division is: 3

C:\Users\Lenovo\Desktop\Programs>
```

Program 20

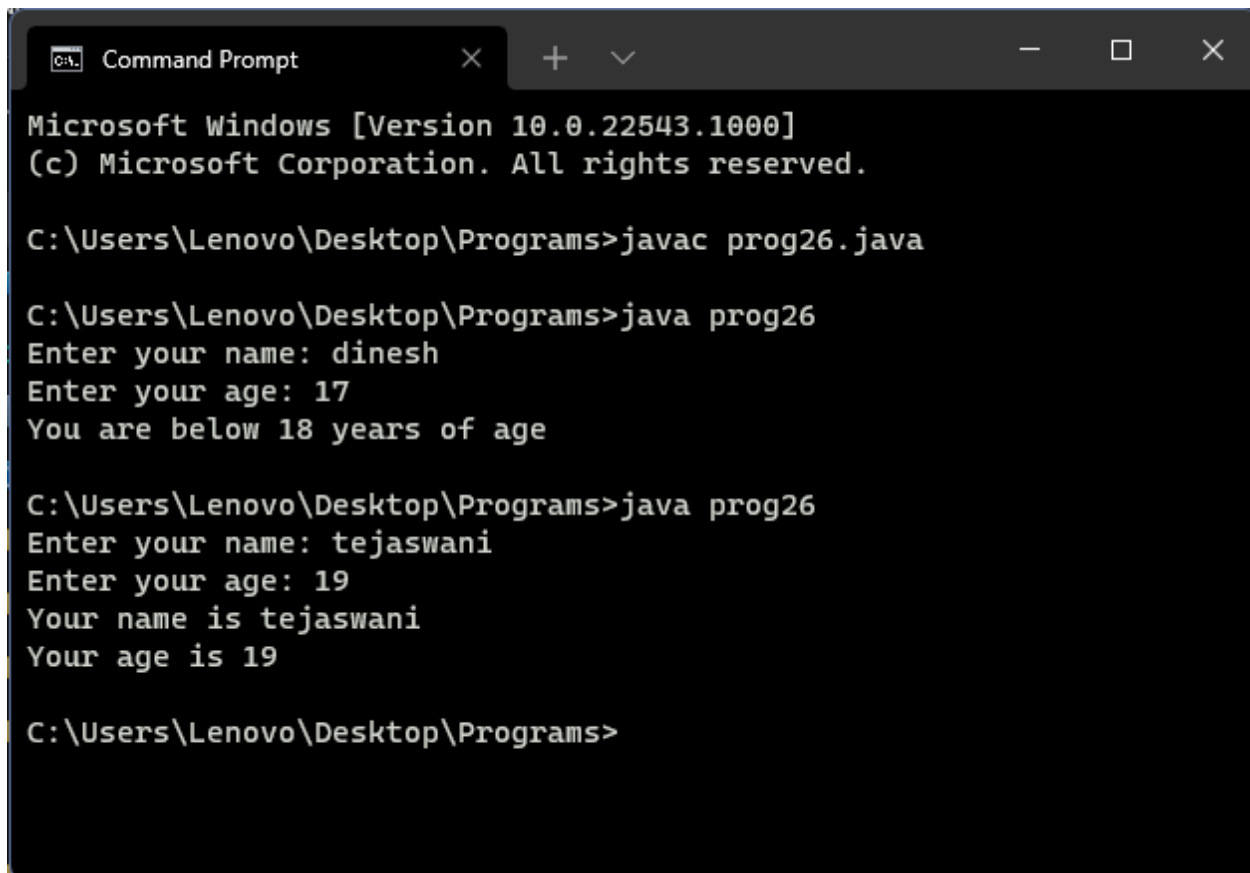
Q. Write a program that use the multiple catch statements within the try catch mechanism.

Coding:

```
import java.util.Scanner;

public class prog24 {
    public static void main(String[] args) {
        int[] a = new int[5];
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter value of b: ");
        int b = sc.nextInt();
        try {
            System.out.println("Enter 5 values for a: ");
            for (int i = 0; i < a.length; i++) {
                a[i] = sc.nextInt();
                System.out.println("The division is: " + a[i] / b);
            }
        } catch (IndexOutOfBoundsException | ArithmeticException e) {
            System.err.println(e.getMessage());
        }
    }
}
```

Output 21



```
Command Prompt
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog26.java

C:\Users\Lenovo\Desktop\Programs>java prog26
Enter your name: dinesh
Enter your age: 17
You are below 18 years of age

C:\Users\Lenovo\Desktop\Programs>java prog26
Enter your name: tejaswani
Enter your age: 19
Your name is tejaswani
Your age is 19

C:\Users\Lenovo\Desktop\Programs>
```

Program 21

Q. Write a program where user will create a self-Exception using "throw" keyword.

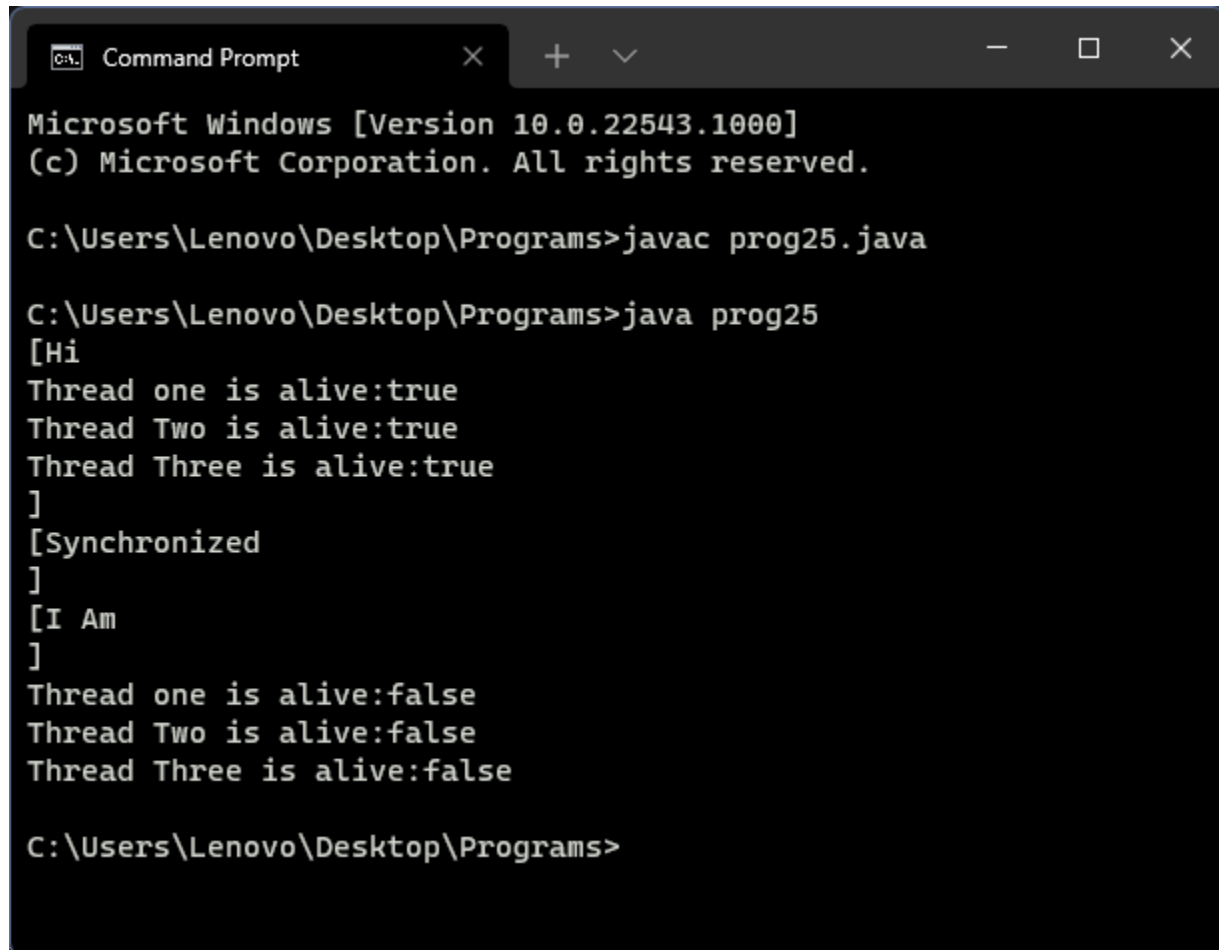
Coding:

```
import java.util.Scanner;

public class prog26 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter your name: ");
        String name = sc.next();
        System.out.print("Enter your age: ");
        int age = sc.nextInt();
        try {
            if (age < 18)
                throw new InvalidAgeException();
            else {
                System.out.println("Your name is " + name);
                System.out.println("Your age is " + age);
            }
        } catch (InvalidAgeException e) {
            System.err.println(e.getMessage());
        }
    }
}

class InvalidAgeException extends Exception {
    InvalidAgeException() {
        super("You are below 18 years of age");
    }
}
```

Output 22



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog25.java

C:\Users\Lenovo\Desktop\Programs>java prog25
[Hi
Thread one is alive:true
Thread Two is alive:true
Thread Three is alive:true
]
[Synchronized
]
[I Am
]
Thread one is alive:false
Thread Two is alive:false
Thread Three is alive:false

C:\Users\Lenovo\Desktop\Programs>
```

Program 22

Q. Write a program for multithreading using the `isAlive()`, `join()` and `synchronized()` methods of Thread class.

Coding:

```
class CallMe {  
    synchronized void call(String msg) {  
        System.out.println "[" + msg);  
        try {  
            Thread.sleep(100);  
        } catch (InterruptedException e) {  
            System.out.println("Interrupted");  
        }  
        System.out.println("]");  
    }  
}
```

```
class Caller implements Runnable {  
    String msg;  
    CallMe target;  
    Thread t;  
  
    public Caller(CallMe target, String s) {  
        this.target = target;  
        msg = s;  
        t = new Thread(this);  
        t.start();  
    }  
}
```



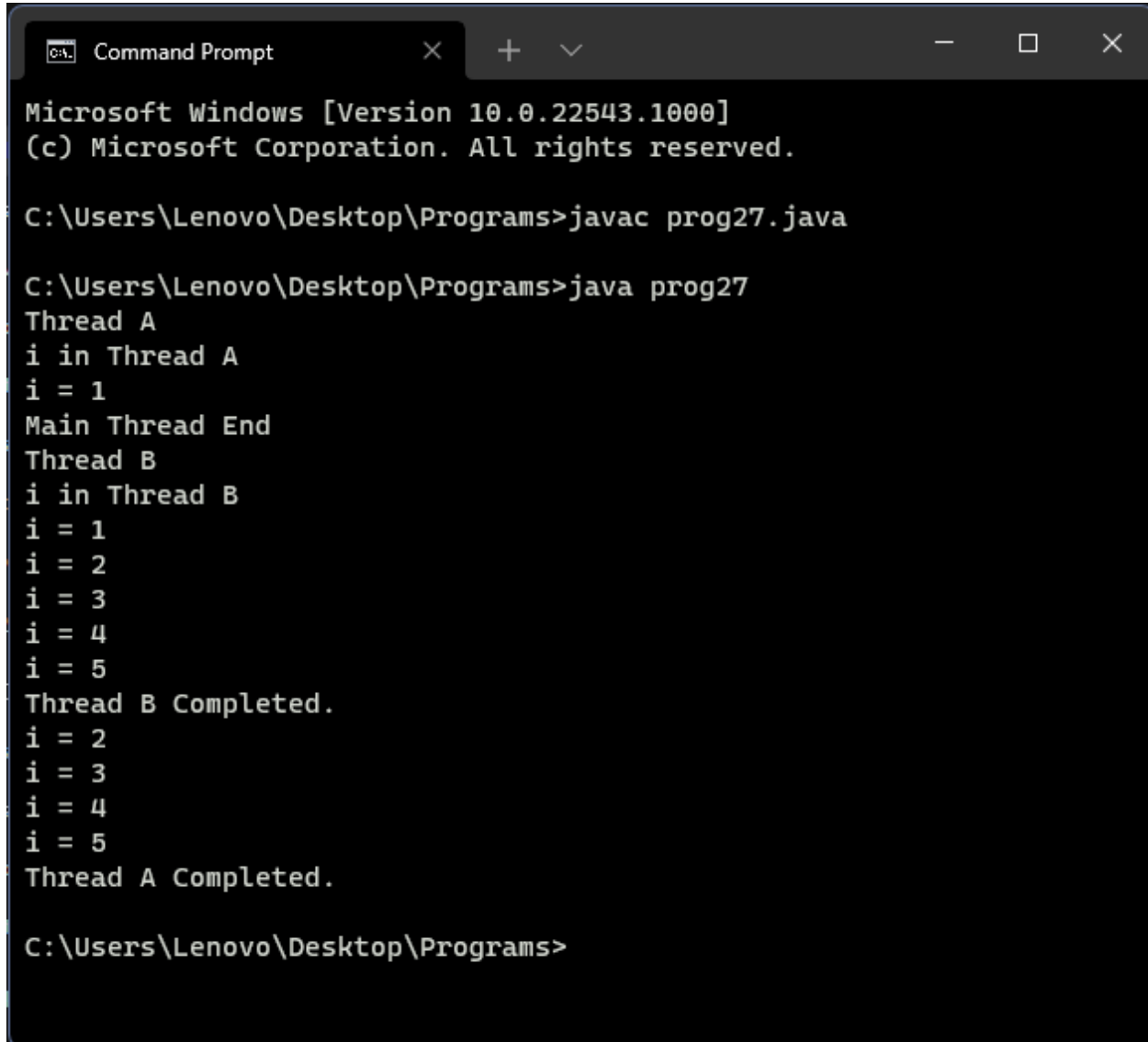
```

        public void run() {
            target.call(msg);
        }
    }

    public class prog25 {
        public static void main(String[] args) {
            CallMe target = new CallMe();
            Caller ob1 = new Caller(target, "Hi");
            Caller ob2 = new Caller(target, "I Am");
            Caller ob3 = new Caller(target, "Synchronized");
            System.out.println("Thread one is alive:" + ob1.t.isAlive());
            System.out.println("Thread Two is alive:" + ob2.t.isAlive());
            System.out.println("Thread Three is alive:" +
ob3.t.isAlive());
            try {
                ob1.t.join();
                ob2.t.join();
                ob3.t.join();
            } catch (InterruptedException ie) {
                System.out.println("Interrupted");
            }
            System.out.println("Thread one is alive:" + ob1.t.isAlive());
            System.out.println("Thread Two is alive:" + ob2.t.isAlive());
            System.out.println("Thread Three is alive:" +
ob3.t.isAlive());
        }
    }
}

```

Output 23



```
Microsoft Windows [Version 10.0.22543.1000]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Lenovo\Desktop\Programs>javac prog27.java

C:\Users\Lenovo\Desktop\Programs>java prog27
Thread A
i in Thread A
i = 1
Main Thread End
Thread B
i in Thread B
i = 1
i = 2
i = 3
i = 4
i = 5
Thread B Completed.
i = 2
i = 3
i = 4
i = 5
Thread A Completed.

C:\Users\Lenovo\Desktop\Programs>
```

Program 23

Q. Write a program to show the life cycle of a thread.

Coding:

```
class A1 extends Thread {
    public void run() {
        System.out.println("Thread A");
        System.out.println("i in Thread A ");
        for (int i = 1; i <= 5; i++) {
            System.out.println("i = " + i);
            try {
                Thread.sleep(1000);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }
        System.out.println("Thread A Completed.");
    }
}

class B extends Thread {
    public void run() {
        System.out.println("Thread B");
        System.out.println("i in Thread B ");
        for (int i = 1; i <= 5; i++) {
            System.out.println("i = " + i);
        }
        System.out.println("Thread B Completed.");
    }
}
```



```

    }
}

public class prog27 {
    public static void main(String[] args) {

        A1 threadA = new A1();
        B threadB = new B();

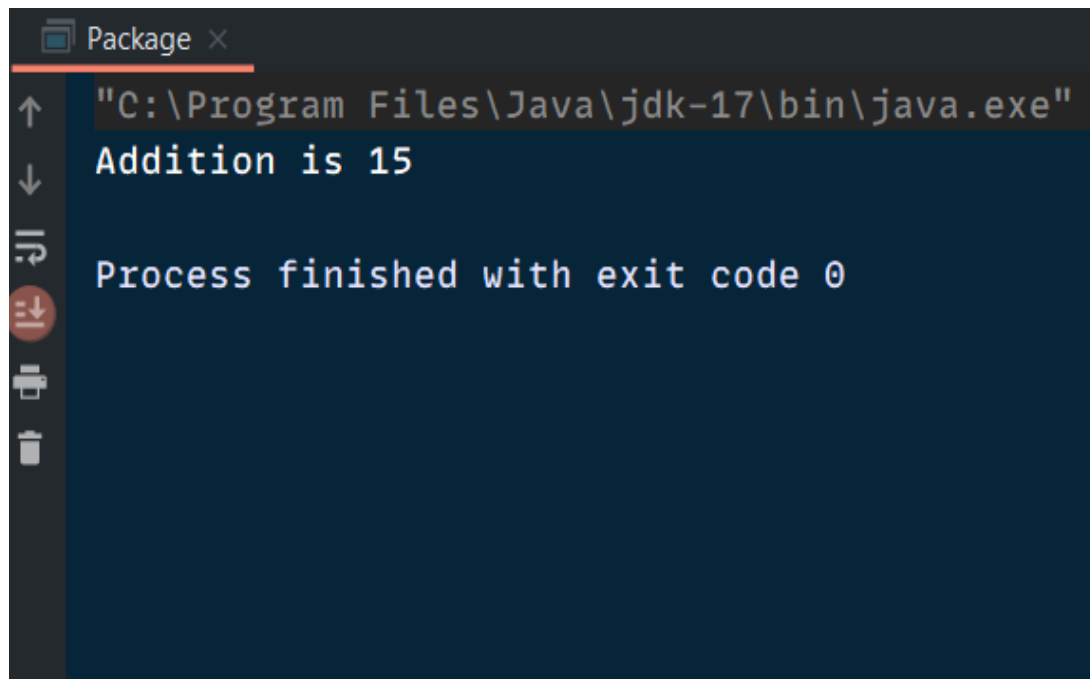
        threadA.start();

        threadA.yield();

        try {
            threadA.sleep(1000);
        } catch (InterruptedException e) {
            e.printStackTrace();
        }
        threadB.start();
        System.out.println("Main Thread End");
    }
}

```

Output 24



A screenshot of a terminal window with a dark background. The title bar at the top shows a folder icon and the text "Package x". The terminal content is as follows:

```
"C:\Program Files\Java\jdk-17\bin\java.exe"  
Addition is 15  
  
Process finished with exit code 0
```

On the left side of the terminal, there is a vertical toolbar containing several icons: an upward arrow, a downward arrow, a magnifying glass, a red circle with a white downward arrow, a printer icon, and a trash can icon.

Program 24

Q. Write a program to create a package using command and one package will import another class.

Coding:

```
package MyPack1;

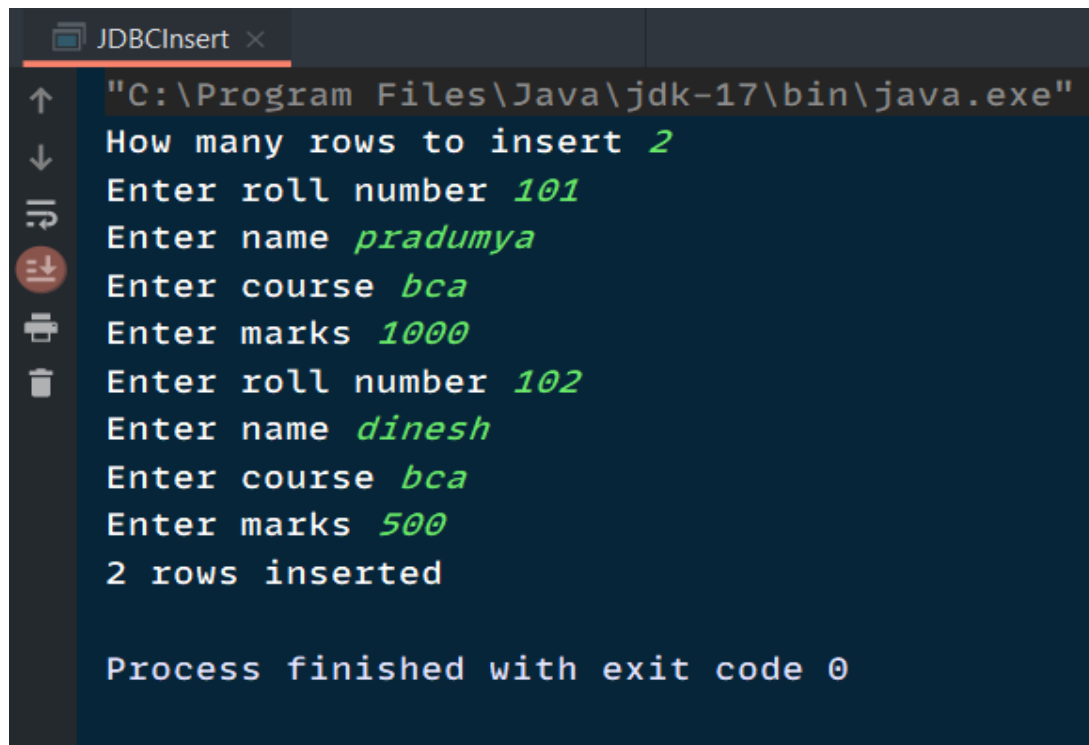
public class Addition {
    public void add(int a, int b){
        System.out.println("Addition is "+(a+b));
    }
}
```

Code: Package.java

```
import MyPack1.*;

public class Package {
    public static void main(String[] args) {
        new Addition().add(5,10);
    }
}
```

Output 25



```
JDBCInsert x
"C:\Program Files\Java\jdk-17\bin\java.exe"
How many rows to insert 2
Enter roll number 101
Enter name pradumya
Enter course bca
Enter marks 1000
Enter roll number 102
Enter name dinesh
Enter course bca
Enter marks 500
2 rows inserted

Process finished with exit code 0
```


Program 25

Q. Write a program for JDBC to insert the values into the existing table by using preparedStatement.

Coding:

```
package com.bca3.practical;

import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.util.Scanner;

public class JDBCInsert {

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

        int roll, marks;

        String name, course;

        Connection connection = null; PreparedStatement
        preparedStatement = null;

        try {

            Class.forName("com.mysql.cj.jdbc.Driver");

            connection =
DriverManager.getConnection("jdbc:mysql://localhost:3306/class","root"
, "1234");

            preparedStatement = connection.prepareStatement("INSERT
INTO details VALUES(?,?,?,?)");

            Scanner sc = new Scanner(System.in);

            System.out.print("How many rows to insert ");

            int rows = sc.nextInt();

            for (int i = 1; i <= rows; i++) {

                System.out.print("Enter roll number ");

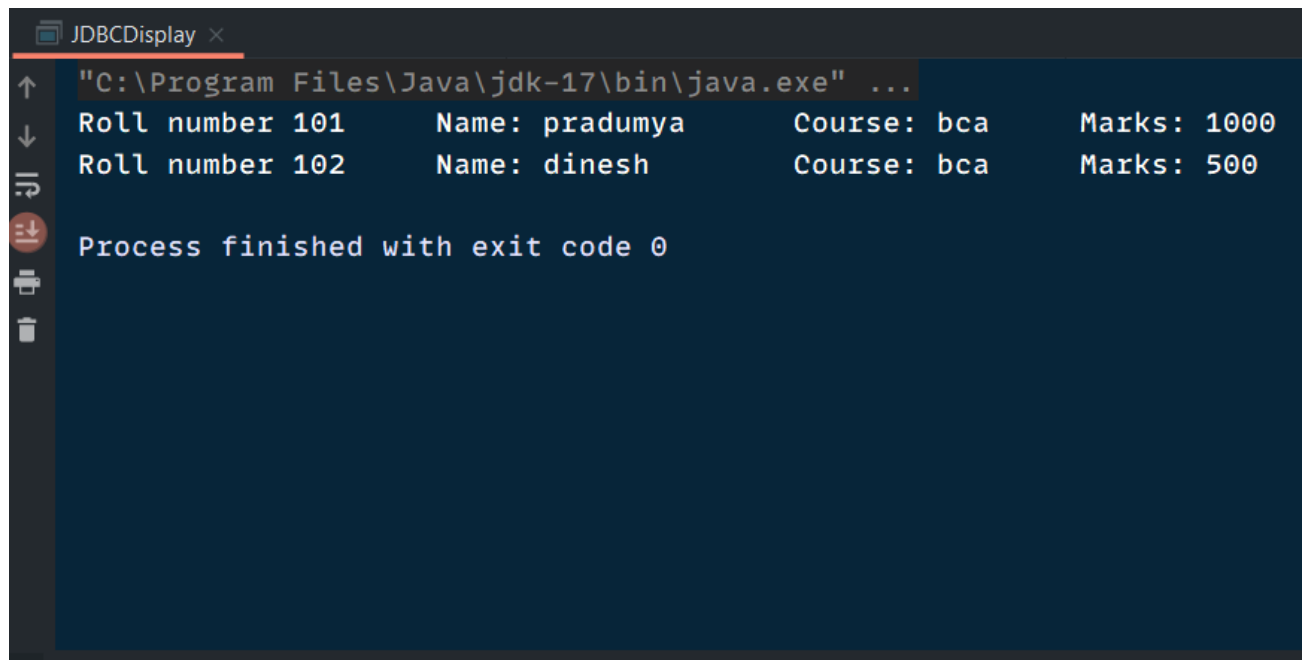
                roll = sc.nextInt();

                System.out.print("Enter name ");
```



```
        name = sc.next();
        System.out.print("Enter course ");
        course = sc.next();
        System.out.print("Enter marks ");
        marks = sc.nextInt();
        preparedStatement.setInt(1, roll);
        preparedStatement.setString(2, name);
        preparedStatement.setString(3, course);
        preparedStatement.setInt(4, marks);
        preparedStatement.execute();
    }
    System.out.println(rows + " rows inserted");
} catch (Exception e) {
    System.out.println(e.getMessage());
}
}
}
```

Output 26



```
JDBCDisplay x
"C:\Program Files\Java\jdk-17\bin\java.exe" ...
Roll number 101      Name: pradumya      Course: bca      Marks: 1000
Roll number 102      Name: dinesh        Course: bca      Marks: 500

Process finished with exit code 0
```

Program 26

Q. Write a program for JDBC to display the records from the existing table.

Coding:

```
import java.sql.*;

public class JDBCDisplay {

    public static void main(String[] args) throws SQLException {

        Connection connection = null;
        PreparedStatement statement = null;
        ResultSet resultSet = null;

        try {

            connection =
DriverManager.getConnection("jdbc:mysql://localhost:3306/class",
"root", "1234");

            statement = connection.prepareStatement("SELECT * FROM
details");

            resultSet = statement.executeQuery();

            while (resultSet.next()) {

                System.out.println("Roll number " +
resultSet.getInt(1) +

                    "\t\tName: " + resultSet.getString(2) +
                    "\t\tCourse: " + resultSet.getString(3) +
                    "\t\tMarks: " + resultSet.getInt(4));

            }

        } catch (Exception e) {

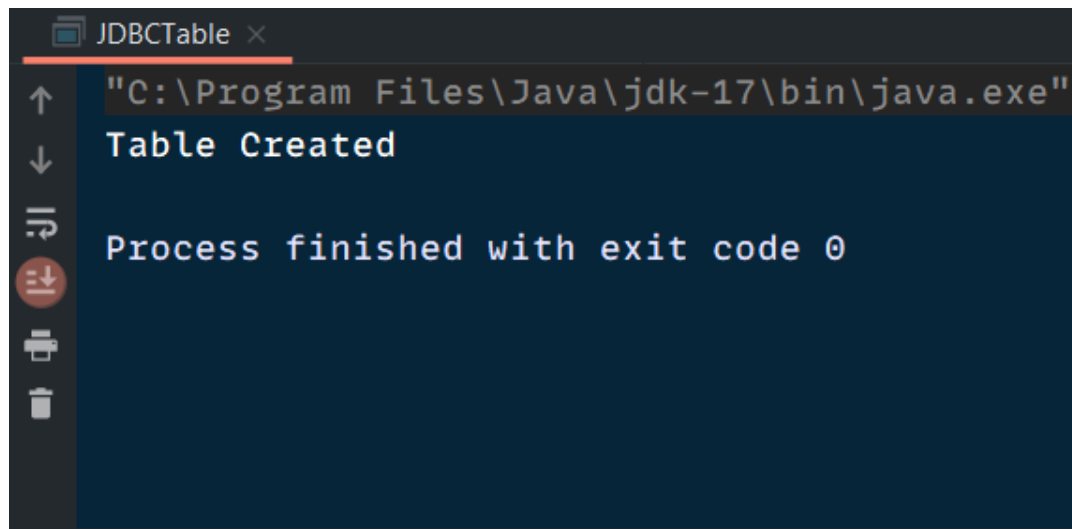
            System.out.println(e.getMessage());

        }

    }

}
```

Output 27



```
JDBCTable ×  
"C:\Program Files\Java\jdk-17\bin\java.exe"  
Table Created  
Process finished with exit code 0
```

The image shows a terminal window with a dark background. The title bar at the top reads "JDBCTable" followed by a close button icon. The terminal content shows a command prompt where the path "C:\Program Files\Java\jdk-17\bin\java.exe" has been entered and highlighted. Below this, the output "Table Created" is displayed. At the bottom, it says "Process finished with exit code 0". On the left side of the terminal, there is a vertical toolbar with icons for navigation (up, down), search, and other standard terminal functions.

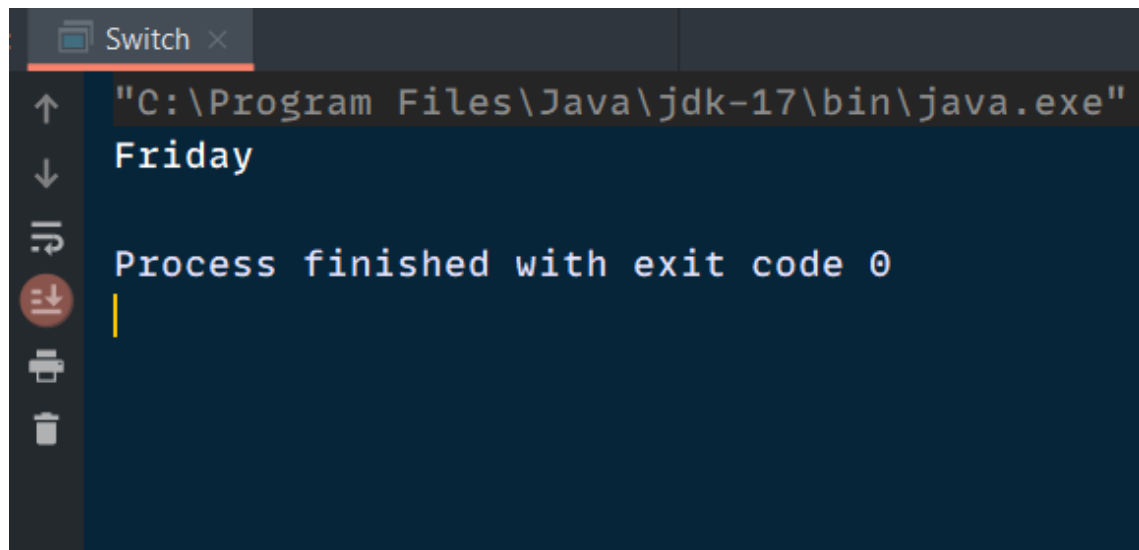
Program 27

Q. Write a program for JDBC to create a table.

Coding:

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
public class JDBCTable {
    public static void main(String[] args) throws Exception {
        Connection connection = null;
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            connection =
DriverManager.getConnection("jdbc:mysql://localhost:3306/class",
"root", "1234");
            connection.prepareStatement("CREATE TABLE details(roll
int, name varchar(20), course varchar(20), marks int)").execute();
            System.out.println("Table Created");
        } catch (Exception e) {
            System.out.println(e.getMessage());
        }
    }
}
```

Output 28



A screenshot of a terminal window with a dark background. The window has a tab labeled "Switch" with a close button. The terminal displays the following text: the first line is the full path to the Java executable, `"C:\Program Files\Java\jdk-17\bin\java.exe"`; the second line is the word `Friday`; and the third line is `Process finished with exit code 0`. A yellow cursor is positioned at the end of the third line. On the left side of the terminal, there is a vertical toolbar with icons for navigation (up, down), search, and other standard terminal functions.

```
"C:\Program Files\Java\jdk-17\bin\java.exe"  
Friday  
Process finished with exit code 0
```


Program 28

Q. Write a program for demonstration of switch and break statement.

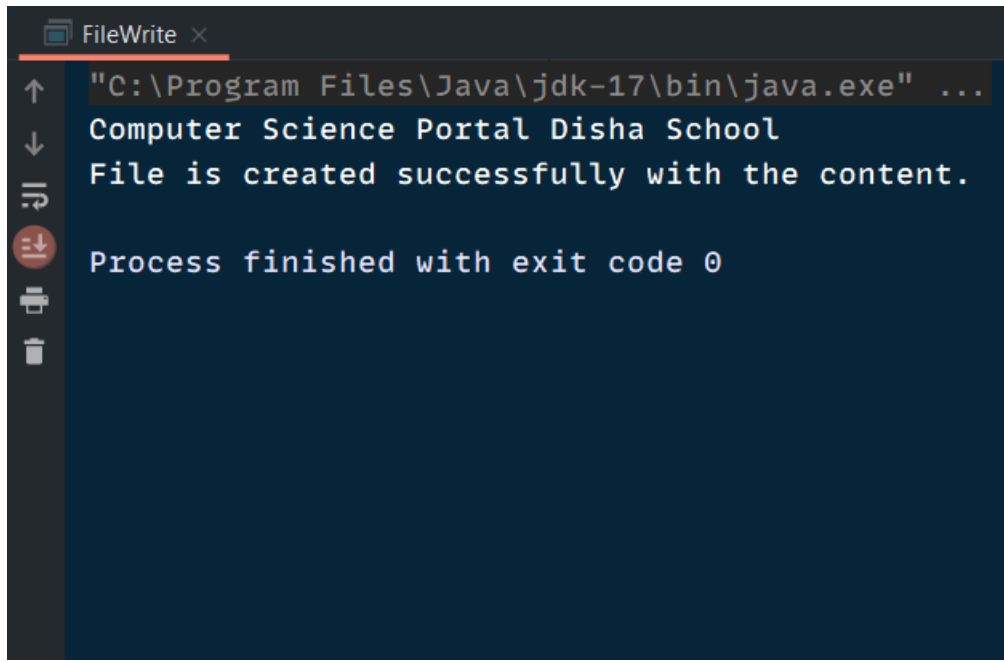
Coding:

```
public class Switch {  
    public static void main(String[] args) {  
        int day = 5;  
        switch (day) {  
            case 1:  
                String dayString = "Monday";  
                break;  
            case 2:  
                String dayString = "Tuesday";  
                break;  
            case 3:  
                String dayString = "Wednesday";  
                break;  
            case 4:  
                String dayString = "Thursday";  
                break;  
            case 5:  
                String dayString = "Friday";  
                break;  
            case 6:  
                String dayString = "Saturday";  
                break;  
            case 7:  
                String dayString = "Sunday";
```



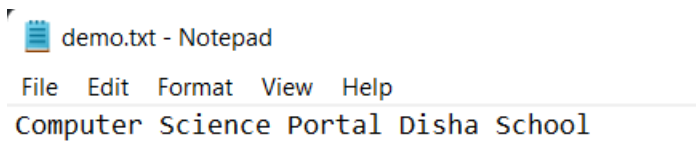
```
        break;
    default:
        String dayString = "Invalid day";
    }
    System.out.println(dayString);
}
}
```

Output 29



The screenshot shows a window titled "FileWrite" with a dark background. On the left is a vertical toolbar with icons for back, forward, home, search, print, and delete. The main area displays the following text:

```
"C:\Program Files\Java\jdk-17\bin\java.exe" ...  
Computer Science Portal Disha School  
File is created successfully with the content.  
  
Process finished with exit code 0
```



The screenshot shows a Notepad window titled "demo.txt - Notepad". The menu bar includes "File", "Edit", "Format", "View", and "Help". The text content of the file is:

```
Computer Science Portal Disha School
```

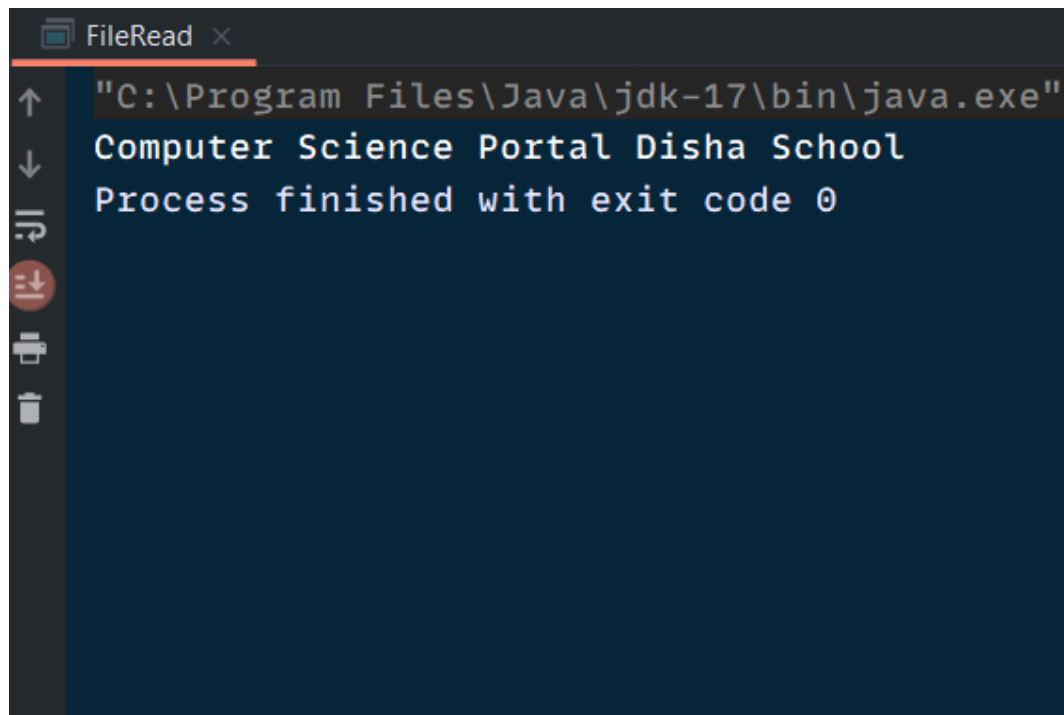
Program 29

Q. Write a program to perform write operation in the file using input/output stream.

Coding:

```
import java.io.FileOutputStream;
import java.io.IOException;
public class FileWrite {
    public static void main(String[] args) {
        String fileContent = "Computer Science Portal Disha School";
        FileOutputStream outputStream = null;
        try {
            outputStream = new FileOutputStream("demo.txt");
            byte[] strToBytes = fileContent.getBytes();
            outputStream.write(strToBytes);
            System.out.print("File is created successfully with the
content.");
        }
        catch (IOException e) {
            System.out.print(e.getMessage());
        }
    }
}
```

Output 30



```
FileRead ×  
↑ "C:\Program Files\Java\jdk-17\bin\java.exe"  
↓ Computer Science Portal Disha School  
↺ Process finished with exit code 0  
⏏  
🖨  
🗑
```

The screenshot shows a Java IDE's output window. The title bar is 'FileRead' with a close button. The output text is as follows:

```
"C:\Program Files\Java\jdk-17\bin\java.exe"  
Computer Science Portal Disha School  
Process finished with exit code 0
```

On the left side of the output window, there is a vertical toolbar with icons for navigating the output (up, down, first, last, search), printing, and deleting.

Program 30

Q. Write a program to read from file using input/output stream.

Coding:

```
import java.io.FileReader;

public class FileRead {
    public static void main(String[] args) throws Exception {
        FileReader fr = new FileReader("demo.txt");
        int i;
        while ((i = fr.read()) != -1)
            System.out.print((char)i);
    }
}
```