Practical File

Java Programming Lab (PCS 408)

B. Tech Fourth Semester
Session : 2024 - 25

Submitted to:
Ms. Kashish Mirza
Lecturer
Computer Science & Engineering
Graphic Era Hill University
Bhimtal Campus

COLLEGE ROLL NO : _____

Submitted by:
Harshit Bhatt
B. Tech (CSE)
 Section:- E
Semester:- IV
University Roll No:- 2361187

EXAMINATION ROLL NO : _____

THIS IS TO CERTIFY THAT **MR./MS.** _____HAS SATISFACTORILY COMPLETED ALL THE EXPERIMENTS IN THE LABORATORY OF THIS COLLEGE. THE COURSE OF THE EXPERIMENTS / TERM WORK IN **JAVA PROGRAMMING LAB(PCS 408)** IN PARTIAL FULFILMENT OF   THE REQUIREMENT IN **FOURTH SEMESTER** OF **BACHELOR OF TECHNOLOGY (C.S.E.)** DEGREE COURSE PRESCRIBED BY THE GRAPHIC ERA HILL UNIVERSITY, BHIMTAL DURING THE YEAR **2024 - 25**.

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NAME OF EXAMINER :

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2		Using the switch statement, write a menu-driven program to calculate the maturity amount of a bank deposit. The user is (i) Term Deposit (ii) Recurring Deposit For option (i) accept Principal (p), rate of interest (r) and time period in years (n). Calculate and output the maturity amount (a) receivable using the formula $a = p[1 + r / 100]n$. For option (ii) accept monthly installment (p), rate of interest (r) and time period in months (n). Calculate and output the maturity amount (a) receivable using the formula $a = p * n + p * n(n + 1) / 2 * r / 100 * 1 / 12$. For an incorrect option, an appropriate error message should be displayed. [Use Scanner Class to take input]		

| 3 | | Program to replace all 0's with 1 in a given integer. Given an integer as an input, all the 0's in the number has to be replaced with 1. For example, consider the following number
Input:　　　102405
Output: 112415

Input: 56004
Output: 56114
Steps to replace all 0's with 1 in a given integer
* Input the integer from the user.
* Traverse the integer digit by digit.
* If a '0' is encountered, replace it by '1'. | | |

		* Print the integer.		
4		Printing an array into Zigzag fashion. Suppose you were given an array of integers, and you are told to sort the integers in a zigzag pattern. In general, in a zigzag pattern, the first integer is less than the second integer, which is greater than the third integer, which is less than the fourth integer, and so on. Hence, the converted array should be in the form of e1 < e2 > e3 < e4 > e5 < e6. Test cases: Input 1: 7 4 3 7 8 6 2 1 Output 1: 3 7 4 8 2 6 1 Input 2: 4 1 4 3 2 Output 2: 1 4 2 3		
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		    .in -> Indian Website		

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		          1
		       2 3
		    4 5 6
		  7 8 9 10
		11 12 13 14 15		

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		       1
		    2 3 4
		  5 6 7 8 9
		10 11 12 13 14 15 16
		  17 18 19 20 21
		    22 23 24
		      25		

19		Given a number , write a java program using while loop to reverse the digits of the number . for example , the number 12345 should be written as 54321.		

Program Objective:

Write a java program to take input as a command line argument. Your name, course, University Roll No. and Semester. Display the information.
Name:
University Roll No:
Course:
Semester:

Program code:

```java
import java.util.Scanner; public class
StudentInfo { public static void
main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter your Name: ");

    String name = scanner.nextLine();
    System.out.print("Enter your University Roll No: ");

    String universityRollNo = scanner.nextLine();

    System.out.print("Enter your Course: ");

    String course = scanner.nextLine();

    System.out.print("Enter your Semester: ");

    String semester = scanner.nextLine();

    System.out.println("\n--- Student Information ---");

    System.out.println("Name: " + name);

    System.out.println("University Roll No: " + universityRollNo);

    System.out.println("Course: " + course);

    System.out.println("Semester: " + semester);

    scanner.close();

  }
```

Output:

Program Objective:

Using the switch statement, write a menu-driven program to calculate the maturity amount of a bank deposit.

The user is

(i) Term Deposit

(ii) Recurring Deposit

For option (i) accept Principal (p), rate of interest (r) and time period in years

(n). Calculate and output the maturity amount (a) receivable using the formula $a = p[1 + r / 100]n$. For option (ii) accept monthly installment (p), rate of interest (r) and time period in months (n). Calculate and output the maturity amount (a) receivable using the formula $a = p * n + p * n(n + 1) / 2 * r / 100 * 1 / 12$.

For an incorrect option, an appropriate error message should be displayed.

[Use Scanner Class to take input]

Program code:

```java
import java.util.Scanner; public class
BankDepositCalculator { public static
void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.println("Choose Deposit Type:");
    System.out.println("1. Term Deposit");
    System.out.println("2. Recurring Deposit");
    System.out.print("Enter your choice (1/2): ");
    int choice = scanner.nextInt();
    scanner.nextLine(); switch (choice) { case 1:
```

```java
        int n = scanner.nextInt();  scanner.nextLine();  // Consume newline character double a = p * Math.pow((1 + r / 100), n);
        System.out.println("Maturity Amount: " + a); break;
        case 2:
            System.out.print("Enter Monthly Installment (P): ");
            double pRD = scanner.nextD
            System.out.print("Enter Time Period in Months (n): ");
            int nRD = scanner.nextInt(); scanner.nextLine();
            double aRD = pRD * nRD + (pRD * nRD * (nRD + 1) / 2 * rRD / 100 * 1 /
        12); System.ln("Maturity Amount: " + aRD); break; default:
            System.out.println("Invalid choice. Please select 1 or 2.");
    }
    scanner.close();
  }
}
```

Output:

```
Choose Deposit Type:
1. Term Deposit
2. Recurring Deposit
Enter your choice (1/2): 1
Enter Principal Amount (P): 20000
Enter Rate of Interest (r): 6
Enter Time Period in Years (n): 12
Maturity Amount: 40243.92943671103
```

Program Objective:

Program to replace all 0's with 1 in a given integer. Given an integer as an input, all the 0's in the number has to be replaced with 1.

For example, consider the following number

Input: 102405

Output: 112415

Input: 56004

Output: 56114

Steps to replace all 0's with 1 in a given integer

* Input the integer from the user.

* Traverse the integer digit by digit.

* If a '0' is encountered, replace it by '1'.

Program code:

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

ReplaceZeroWithOne { public static

void main(String[] args) {

    Scanner scanner = new Scanner(System.in);

    System.out.print("Enter the integer: "); int

    number = scanner.nextInt();

    String numberStr = Integer.toString(number);

    String resultStr = numberStr.replace('0', '1');

    int result = Integer.parseInt(resultStr);

    System.out.println("Output: " + result);

    scanner.close();

  }
}
```

Output:

Enter the integer: 102405

Output: 112415

Program Objective:

Printing an array into Zigzag fashion. Suppose you were given an array of integers, and you are told to sort the integers in a zigzag pattern. In general, in a zigzag pattern, the first integer is less than the second integer, which is greater than the third integer, which is less than the fourth integer, and so on. Hence, the converted array should be in the form of e1 < e2 > e3 < e4 > e5 < e6. Test cases:

Input 1:

7

4 3 7 8 6 2 1

Output 1: 3

7 4 8 2 6 1

Input 2: 4

1 4 3 2

Output

2: 1 4 2 3

Program code:

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

ZigzagArray { public static void

printZigzag(int[] arr) { for (int i = 0; i <

arr.length - 1; i++) { if (i % 2 == 0) { if

(arr[i] > arr[i + 1]) { int temp = arr[i];

arr[i] = arr[i + 1]; arr[i + 1] = temp;

        } } else {

        if (arr[i] < arr[i + 1]) {

            int temp = arr[i];

            arr[i] = arr[i + 1];

            arr[i + 1] = temp;

        }}} for (int i = 0; i <

    arr.length; i++) {
```
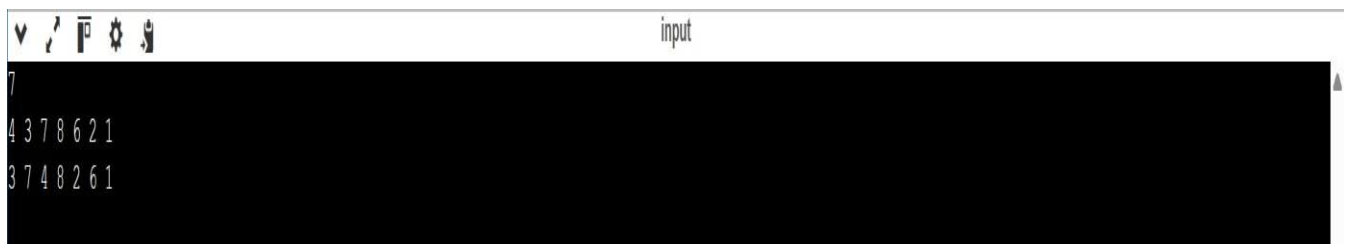
```java
            System.out.print(arr[i] + " ");
        }}
    public static void main(String[] args) {
        Scanner scanner = new
        Scanner(System.in); int n =
        scanner.nextInt(); int[] arr = new int[n]; for
        (int i = 0; i < n; i++) { arr[i] =
        scanner.nextInt();
        }
        printZigzag(arr);
        scanner.close();
    }
}
```

Output:

Program Objective:

Write a java program to add two matrices of size 2*3.

Program code:

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

MatrixAddition { public static void

main(String[] args) { Scanner scanner = new

Scanner(System.in); int rows = 2; int cols = 3;

    int[][] matrix1 = new int[rows][cols];

    int[][] matrix2 = new int[rows][cols];

    int[][] result = new int[rows][cols];

    System.out.println("Enter elements of first matrix

    (2x3):"); for (int i = 0; i < rows; i++) { for (int j = 0; j < cols;

    j++) {

        System.out.print("Enter element at [" + i + "][" + j + "]: ");

        matrix1[i][j] = scanner.nextInt();

      }

    }

    System.out.println("Enter elements of second matrix

    (2x3):"); for (int i = 0; i < rows; i++) { for (int j = 0; j < cols; j++)

    {

        System.out.print("Enter element at [" + i + "][" + j + "]: ");

        matrix2[i][j] = scanner.nextInt();

      }

    }

    for (int i = 0; i < rows; i++) { for (int j = 0; j <

      cols; j++) { result[i][j] = matrix1[i][j] +

      matrix2[i][j];

      }
```

```
        }
        System.out.println("Result of matrix addition
        (2x3):"); for (int i = 0; i < rows; i++) { for (int j = 0; j <
        cols; j++) {
            System.out.print(result[i][j] + " ");
        }
        System.out.println();
    }
    scanner.close();
  }
}
```
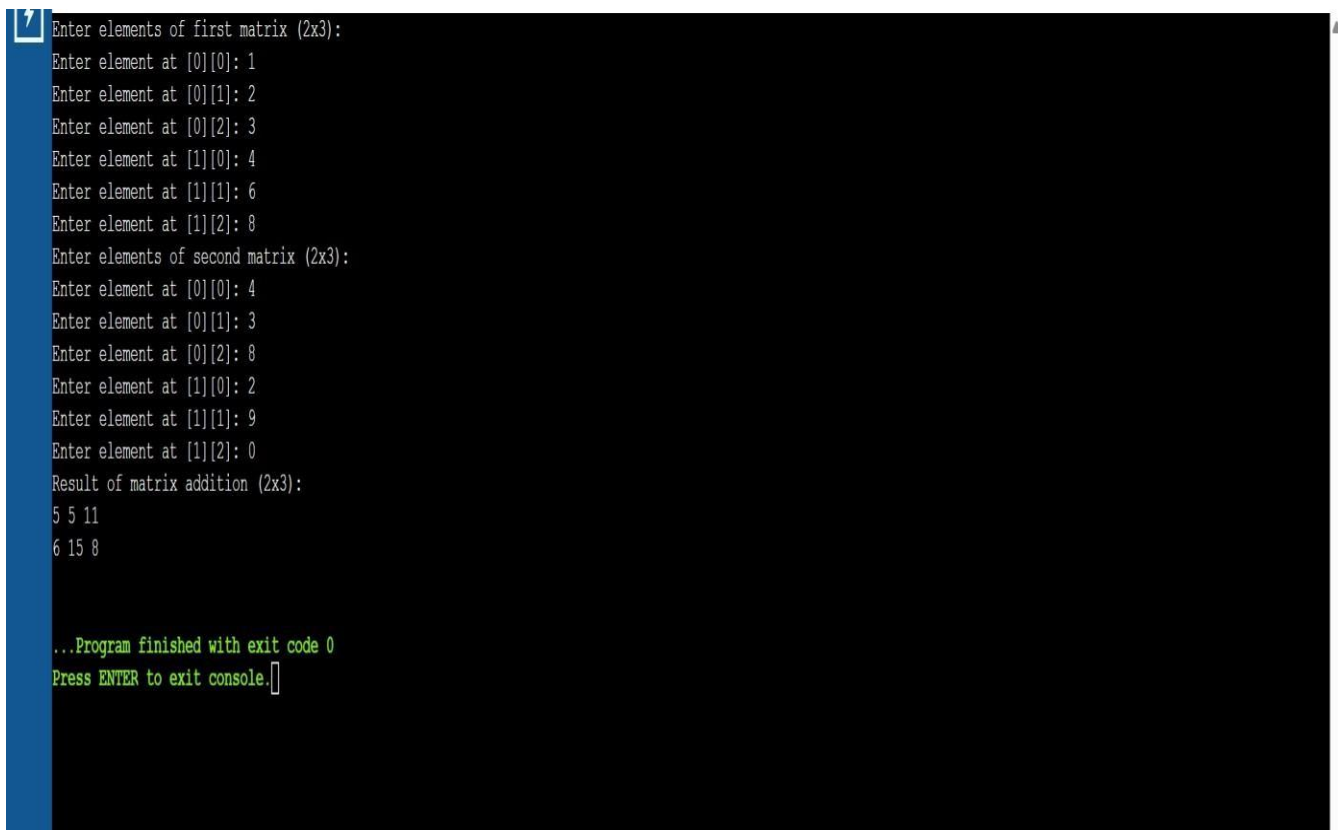
Output:


```
Enter elements of first matrix (2x3):
Enter element at [0][0]: 1
Enter element at [0][1]: 2
Enter element at [0][2]: 3
Enter element at [1][0]: 4
Enter element at [1][1]: 6
Enter element at [1][2]: 8
Enter elements of second matrix (2x3):
Enter element at [0][0]: 4
Enter element at [0][1]: 3
Enter element at [0][2]: 8
Enter element at [1][0]: 2
Enter element at [1][1]: 9
Enter element at [1][2]: 0
Result of matrix addition (2x3):
5 5 11
6 15 8


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

Program Objective:

Java Program to find out the type of website from the Url

.com -> Commercial Website

.org -> Organization Website

.in -> Indian Website

Program code:

```java
import java.util.Scanner; public class
WebsiteTypeChecker { public static void
main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter a website URL: ");
    String    url    =    scanner.nextLine();
    scanner.close(); if (url.endsWith(".com"))
    {
        System.out.println("Commercial Website");
    } else if (url.endsWith(".org")) {
        System.out.println("Organization Website");
    } else if (url.endsWith(".in")) {
        System.out.println("Indian Website");
    } else {
        System.out.println("Unknown Website Type");
    }
  }
}
```

Output:


```
Enter a website URL: google.com
Commercial Website
```

Program Objective:

Write a java program to find the maximum and minimum element in an array.

Program code:

```java
import java.util.Scanner; public class
ArrayMinMax { public static void
main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter the number of elements in the array: ");
    int n = scanner.nextInt(); int[] arr = new int[n];
    System.out.println("Enter the elements of the
    array:"); for (int i = 0; i < n; i++) { arr[i] =
    scanner.nextInt();
    }
    scanner.close(); int max
    = arr[0]; int min =
    arr[0]; for (int i = 1; i < n;
    i++) { if (arr[i] > max) {
    max = arr[i];
        }
        if (arr[i] < min) { min
            = arr[i];
        }
    }
    System.out.println("Maximum element: " + max);
    System.out.println("Minimum element: " + min);
  }
}
```

Output:

Program Objective:

Write a java program to find whether an array is sorted or not.

Program code:

```
import java.util.Scanner; public class
ArraySortedCheck { public static void
main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    System.out.print("Enter array size: "); int n =
    scanner.nextInt(), arr[] = new int[n];
    System.out.println("Enter elements:"); for (int i
    = 0; i < n; i++) arr[i] = scanner.nextInt();
    scanner.close();
    for (int i = 1; i < n; i++) { if
        (arr[i] < arr[i - 1]) {
            System.out.println("Array is not sorted.");
            return;
        }
    }
    System.out.println("Array is sorted.");
  }
  }
```
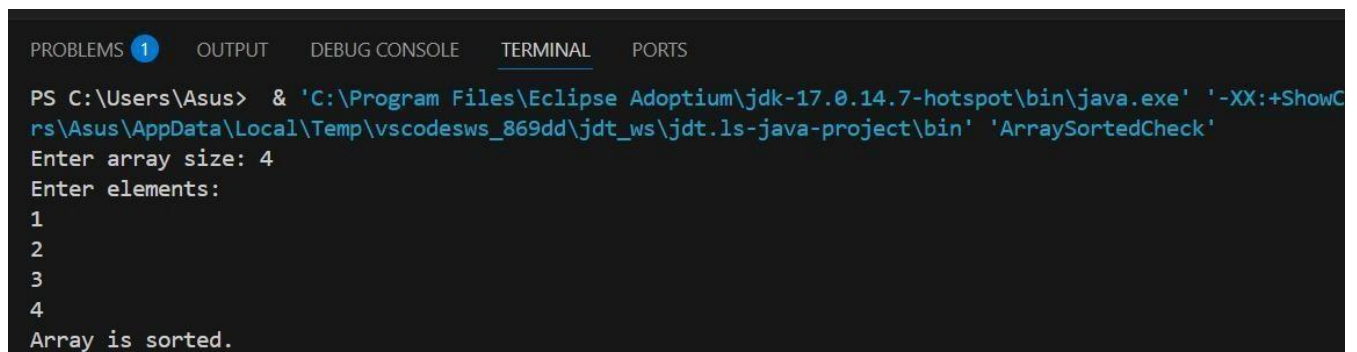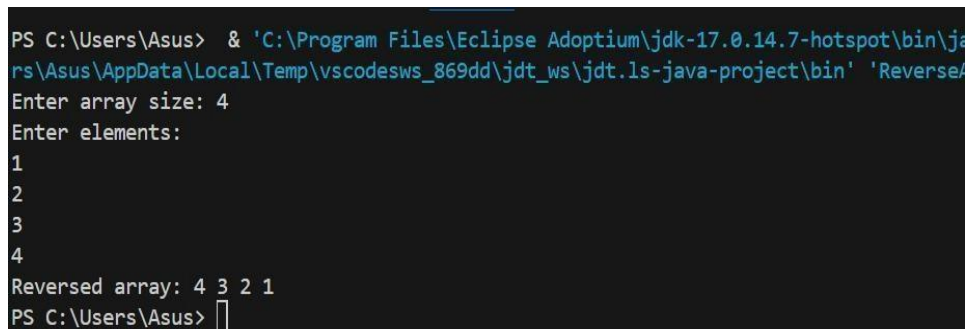
Output:

Program Objective:

Write a java program to reverse an array.

Program code:

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

ReverseArray {  public  static  void

main(String[] args) {

    Scanner scanner = new Scanner(System.in);

    System.out.print("Enter array size: "); int n =

    scanner.nextInt(),   arr[]   =   new   int[n];

    System.out.println("Enter elements:"); for (int i

    = 0; i < n; i++) arr[i] = scanner.nextInt();

    scanner.close();

    System.out.print("Reversed array: "); for (int i = n - 1; i

    >= 0; i--) System.out.print(arr[i] + " ");

  }
}
```

Output:

Program objective:
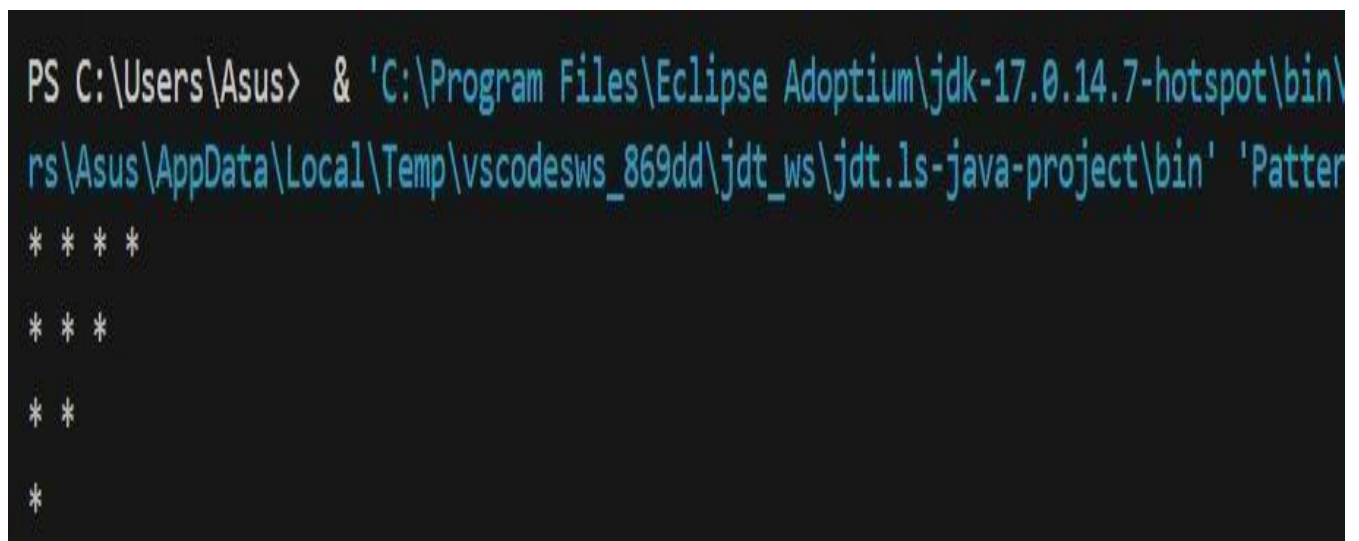
Write a program to print the following pattern

:

* * **

* * *

* * * # Program code:

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

PatternPrinter { public static void

main(String[] args) { for (int i = 4; i >= 1;

i--) { for (int j = 1; j <= i; j++) {

        System.out.print("* ");

    }

    System.out.println();

  }

 }

}
```
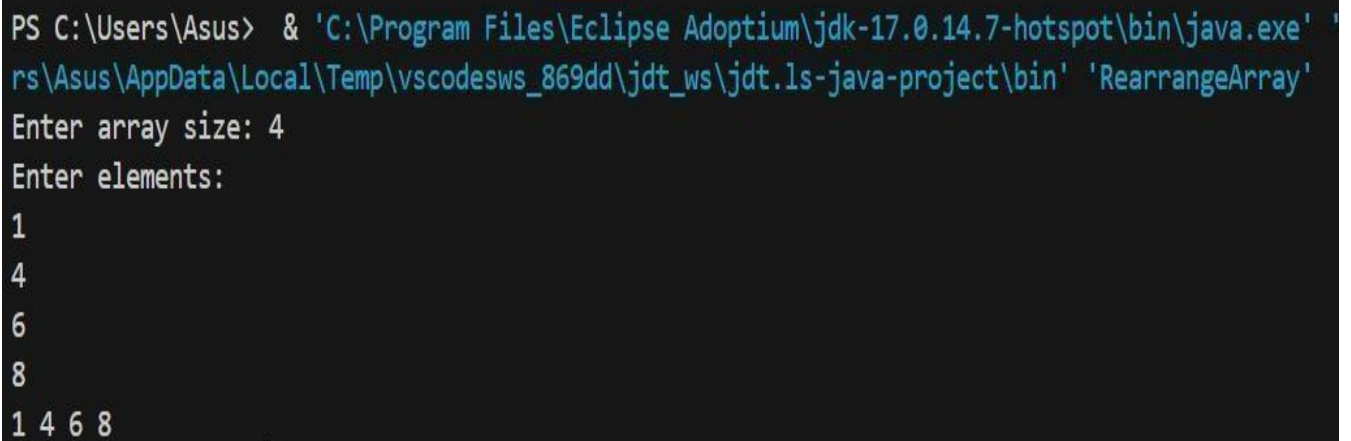
Output:

Program Objective:

Write a java program to rearrange positive and negative numbers in an array .

Program code:

```java
import        java.util.Scanner;      class
RearrangeArray  {  public  static  void
main(String[] args) {
    Scanner sc = new Scanner(System.in);
    System.out.print("Enter array size: ");
    int n = sc.nextInt(), arr[] = new int[n];
    System.out.println("Enter
    elements:");
    for (int i = 0; i < n; i++) arr[i] = sc.nextInt(); sc.close();

    for (int i : arr) if (i < 0) System.out.print(i + " ");
 for (int i : arr) if (i >= 0) System.out.print(i + " "); }
}
```

Output:

```
PS C:\Users\Asus>  & 'C:\Program Files\Eclipse Adoptium\jdk-17.0.14.7-hotspot\bin\java.exe'
rs\Asus\AppData\Local\Temp\vscodesws_869dd\jdt_ws\jdt.ls-java-project\bin' 'RearrangeArray'
Enter array size: 4
Enter elements:
1
4
6
8
1 4 6 8
```

Program objective:

Write java program to find the factorial of a given number using loop.

Program code:

```java
import java.util.Scanner; class

FactorialCalculator { public static void

main(String[] args) {

    Scanner sc = new Scanner(System.in);

    System.out.print("Enter a number: ");

    int n = sc.nextInt(), fact = 1; sc.close();


    for (int i = 1; i <= n; i++) fact *= i;

    System.out.println("Factorial: " + fact);

  }

}
```
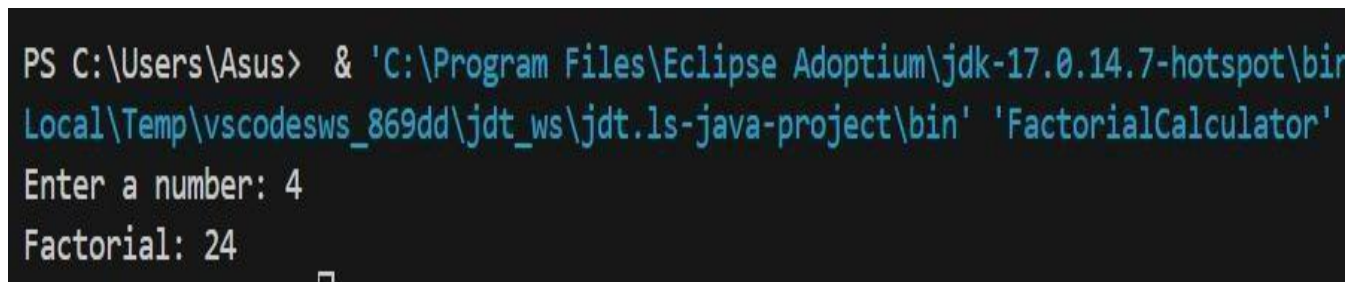
Output:

Program Objective:

Write a function to print nth term of Fibonacci series using recursion.

Program code:

```java
import java.util.Scanner; class FibonacciSeries { static int fibonacci(int n) { return (n

<= 1) ? n : fibonacci(n - 1) + fibonacci(n - 2); } public static void main(String[] args)

{

    Scanner sc = new

    Scanner(System.in);
```
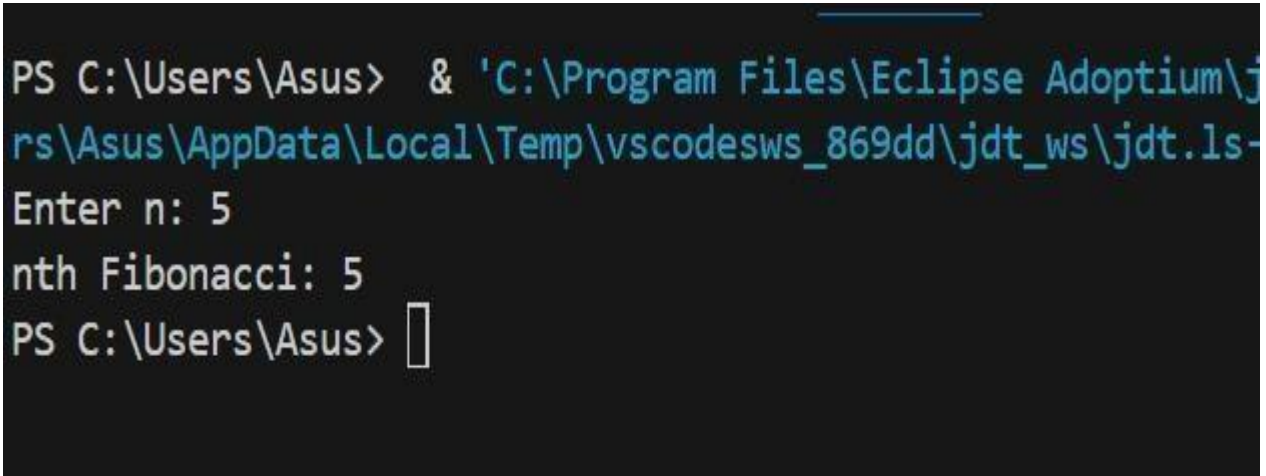
```
System.out.print("Enter n: "); int n =

sc.nextInt(); sc.close();

System.out.println("nth Fibonacci: " + fibonacci(n));

  }

}
```

Output:


```
PS C:\Users\Asus>  & 'C:\Program Files\Eclipse Adoptium\j
rs\Asus\AppData\Local\Temp\vscodesws_869dd\jdt_ws\jdt.ls-
Enter n: 5
nth Fibonacci: 5
PS C:\Users\Asus> []
```

Program objective:

Write a java program to show the concept of operator overloading.

Program code:

```
import          java.util.Scanner;          class

OperatorOverloading { int add(int a, int b) { return

a + b; } double add(double a, double b) { return a

+ b; } public static void main(String[] args) {

    OperatorOverloading obj = new OperatorOverloading();

    System.out.println("Sum (int): " + obj.add(5, 10));

    System.out.println("Sum (double): " + obj.add(5.5, 10.5));
```

```
        }
    }
```

Output:


```
PS C:\Users\Asus> & 'C:\Program Files\Eclipse Adoptium\jdk-17.0.14.7-hotspot\bin\java.exe'
rs\Asus\AppData\Local\Temp\vscodesws_869dd\jdt_ws\jdt.ls-java-project\bin' 'OperatorOverload
Sum (int): 15
Sum (double): 16.0
```

Program Objective:

Write a java program to show the concept of operator overriding.

Program code:

import java.util.Scanner; class Parent { void show() {

System.out.println("Parent class method"); }

} class Child extends Parent

{ void show() {

System.out.println("Child class method"); }

}

public class OperatorOverriding {

   public static void main(String[] args)

   { Parent obj = new Child();

   obj.show();

   }

}**Output:**


```
PS C:\Users\Asus> & 'C:\Program Files\Eclipse Adoptium\jdk-17.0.14.7-hotspot\
rs\Asus\AppData\Local\Temp\vscodesws_869dd\jdt_ws\jdt.ls-java-project\bin' 'Op
Child class method
```
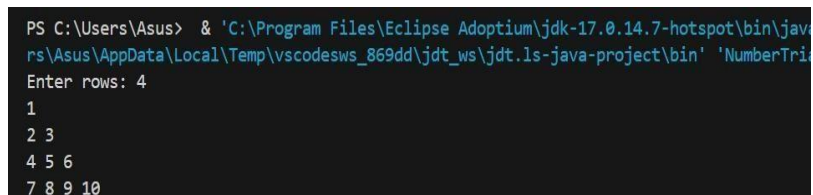
Program Objective:

Write a java program to design the following triangle of numbers:

1
2 3
4 5 6
7 8 9 10
11 12 13 14 15

Program code:

```java
import      java.util.Scanner;      class

NumberTriangle  {  public  static  void

main(String[] args) {

    Scanner sc = new Scanner(System.in);

    System.out.print("Enter rows: "); int rows = sc.nextInt(),

    num = 1; sc.close(); for (int i = 1; num <= rows * (rows +

    1) / 2; i++) { for (int j = 1; j <= i && num <= rows * (rows +

    1) / 2; j++)

        System.out.print(num++ + " ");

      System.out.println();

    }

  }

}
```

Output:


```
PS C:\Users\Asus>  & 'C:\Program Files\Eclipse Adoptium\jdk-17.0.14.7-hotspot\bin\java
rs\Asus\AppData\Local\Temp\vscodesws_869dd\jdt_ws\jdt.ls-java-project\bin' 'NumberTri
Enter rows: 4
1
2 3
4 5 6
7 8 9 10
```

Program Objective:

Write a java program to design the following rhombus:

```
                    1
                  2 3 4
                5 6 7 8 9
          10 11 12 13 14 15 16
              17 18 19 20 21
                22 23 24
                   25
```

Program code:

```java
import        java.util.Scanner;

class RhombusPattern {

    public static void main(String[] args) {

        int num = 1; int rows = 5;

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

            for (int j = i; j < rows; j++) System.out.print(" "); for (int j = 1; j

            <= (2 * i - 1); j++) System.out.print(num++ + " ");

            System.out.println();

        }

        num -= (2 * rows - 1);

        for (int i = rows - 1; i >= 1; i--) {

            for (int j = rows; j > i; j--) System.out.print(" ");

            for (int j = 1; j <= (2 * i - 1); j++) System.out.print(num++ + "

            "); System.out.println(); num -= (2 * i - 1) * 2;

        }}}
```

Output:

```
PS C:\Users\Asus>  & 'C:\Program Files\Eclipse Adoptium\jdk-17.0.14.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetail
rs\Asus\AppData\Local\Temp\vscodesws_869dd\jdt_ws\jdt.ls-java-project\bin' 'RhombusPattern'
        1
      2 3 4
    5 6 7 8 9
  10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25
  17 18 19 20 21 22 23
    10 11 12 13 14
      5 6 7
        2
```

Program objective:Given a number , write a java program using while loop to reverse the digits of the number . for example , the number 12345 should be written as 54321.

Program code:

```java
import java.util.Scanner; class

ReverseNumber { public static void

main(String[] args) {

    Scanner sc = new Scanner(System.in);

    System.out.print("Enter a number: ");

    int num = sc.nextInt(), reversed = 0;

    sc.close(); while (num != 0) {

        reversed = reversed * 10 + num % 10; num

        /= 10;

    }

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

  }

}
```

Output: