C-DAC Mumbai

Lab Assignment: 4

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Question 1: Print Numbers from 1 to N
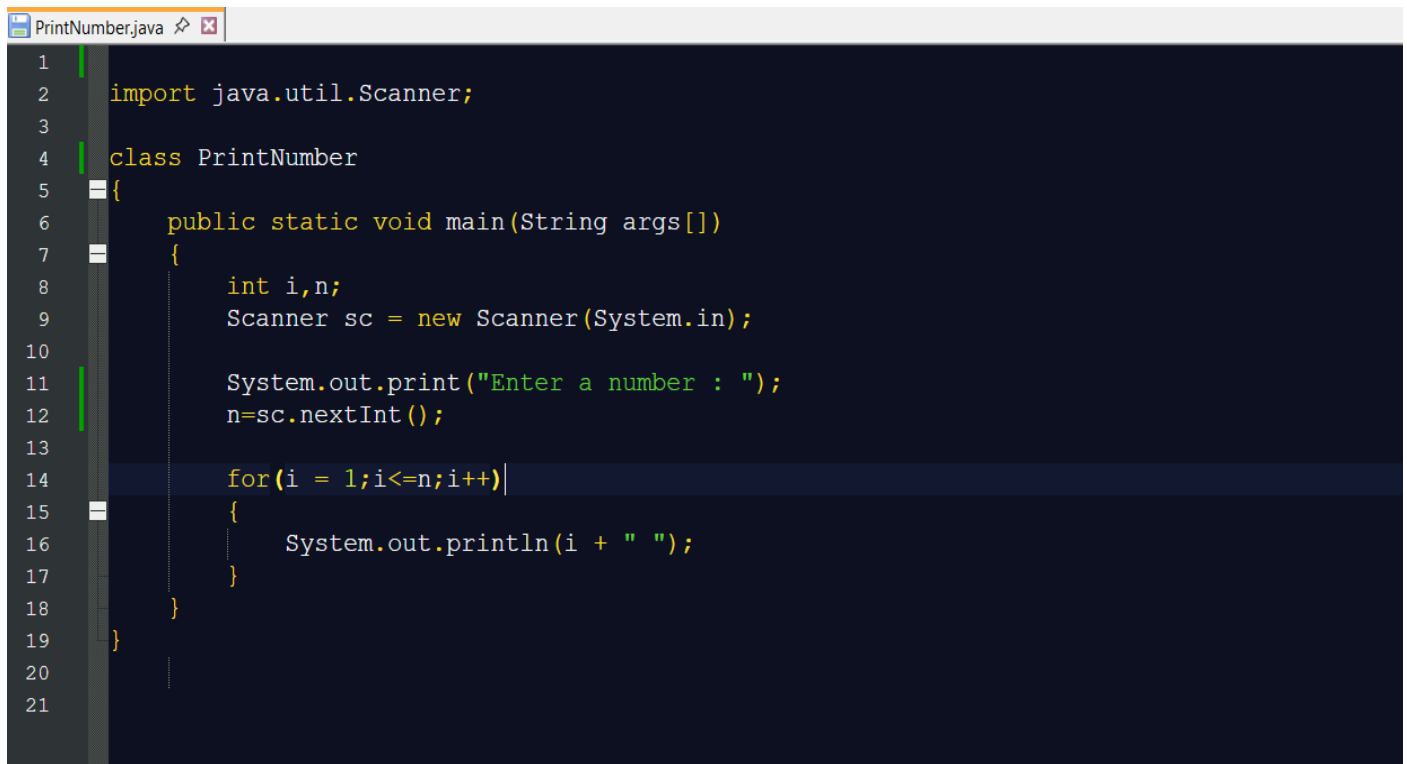
Problem Statement:

Write a Java program that asks the user for a number N and then prints the numbers from 1 to N using a for loop.
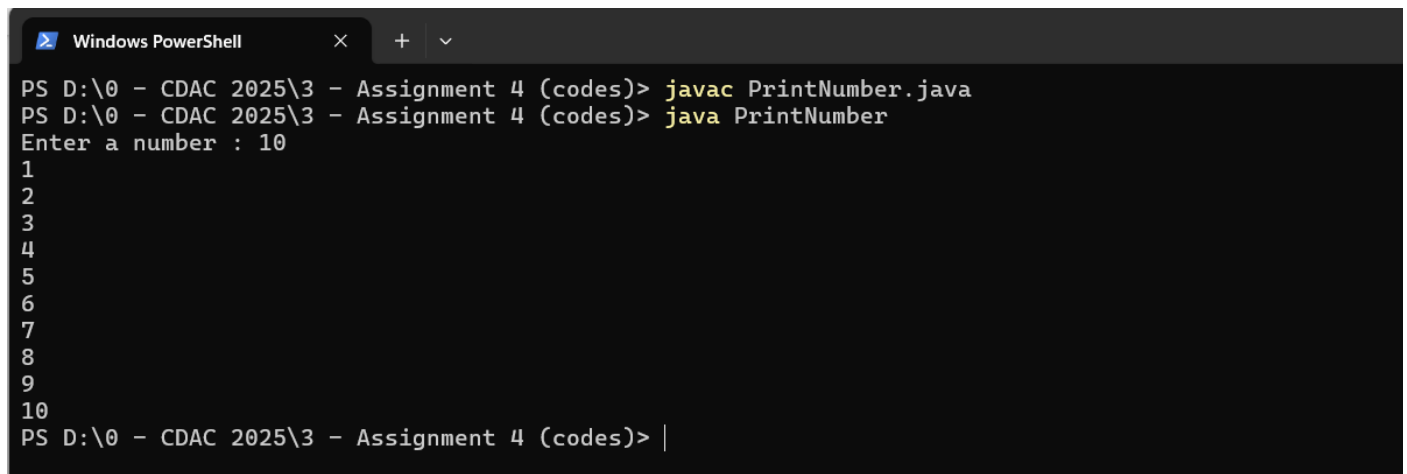
Sample Input:

Enter a number: 10

Expected Output:

1 2 3 4 5 6 7 8 9 10

```java
import java.util.Scanner;

class PrintNumber
{
    public static void main(String args[])
    {
        int i,n;
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a number : ");
        n=sc.nextInt();

        for(i = 1;i<=n;i++)
        {
            System.out.println(i + " ");
        }
    }
}
```

Output:

```
Windows PowerShell        ×    +   ∨

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac PrintNumber.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java PrintNumber
Enter a number : 10
1
2
3
4
5
6
7
8
9
10
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 2: Print Multiples of 3 between 1 and N

Problem Statement:

Write a Java program that asks the user for a number N and prints all the multiples of 3 between 1 and N using a for loop.

Sample Input:

Enter a number: 20

Expected Output:

3 6 9 12 15 18

```java
import java.util.Scanner;

class Multiples {
    public static void main(String args[])
    {
        int n,i;

        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        n = sc.nextInt();

        for(i=3; i<= n; i +=3)
        {
            System.out.println(i + " ");
        }
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac Multiples.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java Multiples
Enter a number: 20
3
6
9
12
15
18
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

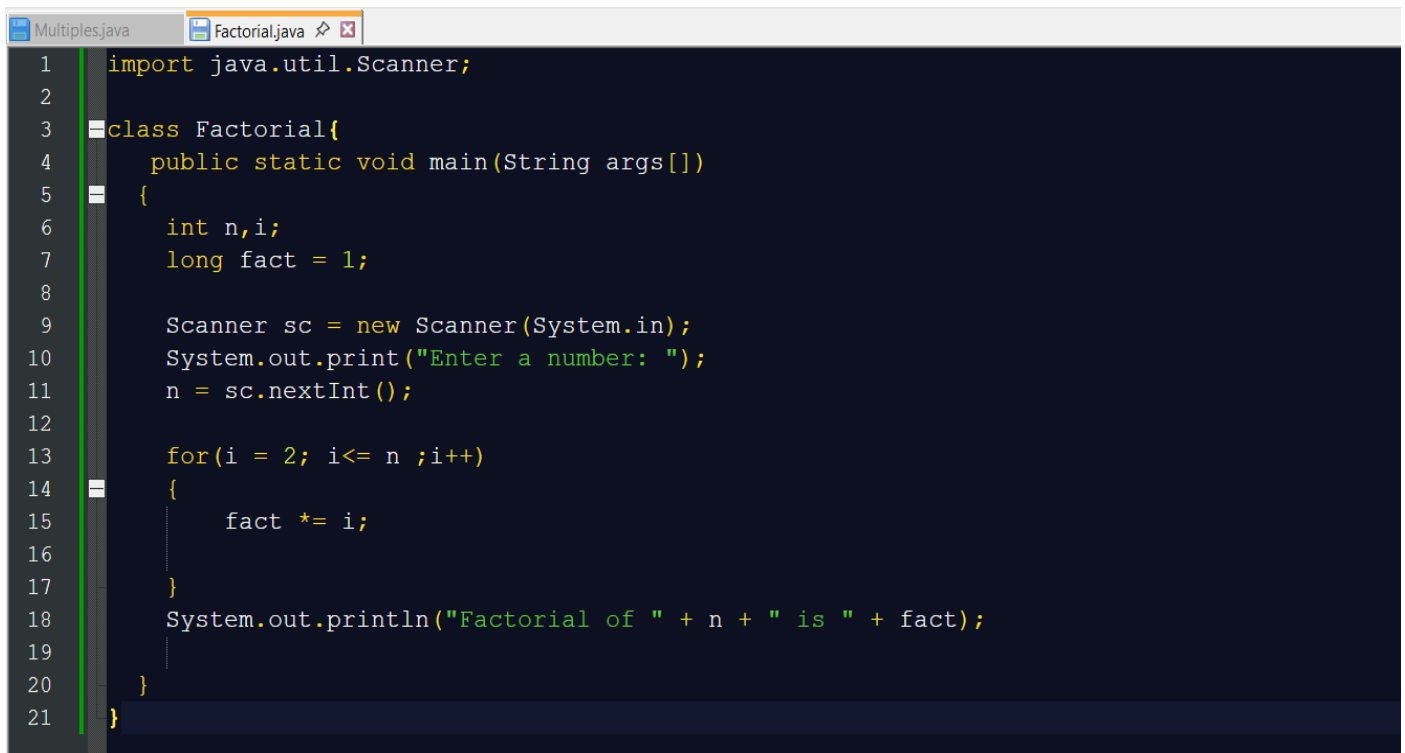## Question 3: Calculate the Factorial of a Number

Problem Statement:

Write a Java program that asks the user for a number N and calculates the factorial of N using a for loop.
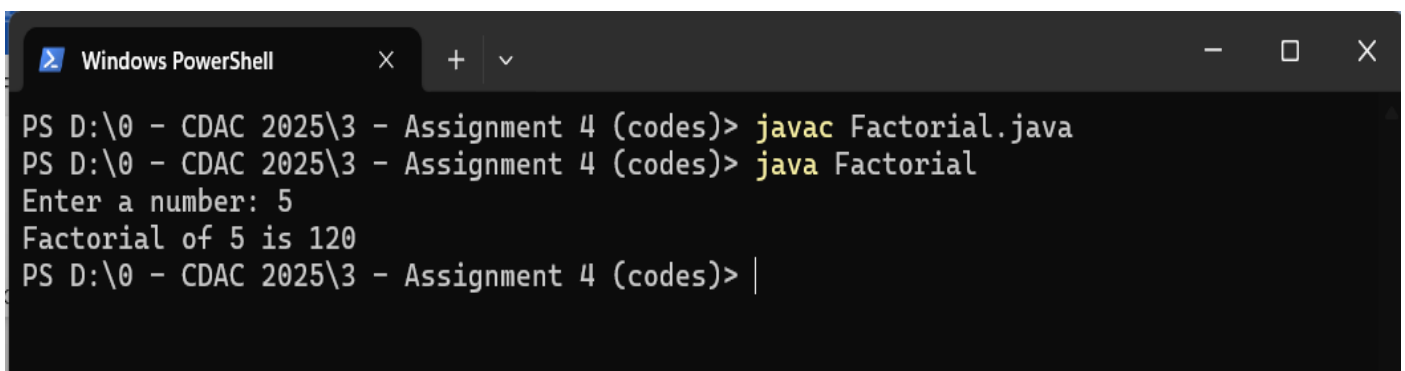
Sample Input:

Enter a number: 5

Expected Output:

Factorial of 5 is 120

```java
import java.util.Scanner;

class Factorial{
    public static void main(String args[])
    {
        int n,i;
        long fact = 1;

        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        n = sc.nextInt();

        for(i = 2; i<= n ;i++)
        {
            fact *= i;

        }
        System.out.println("Factorial of " + n + " is " + fact);

    }
}
```

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac Factorial.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java Factorial
Enter a number: 5
Factorial of 5 is 120
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

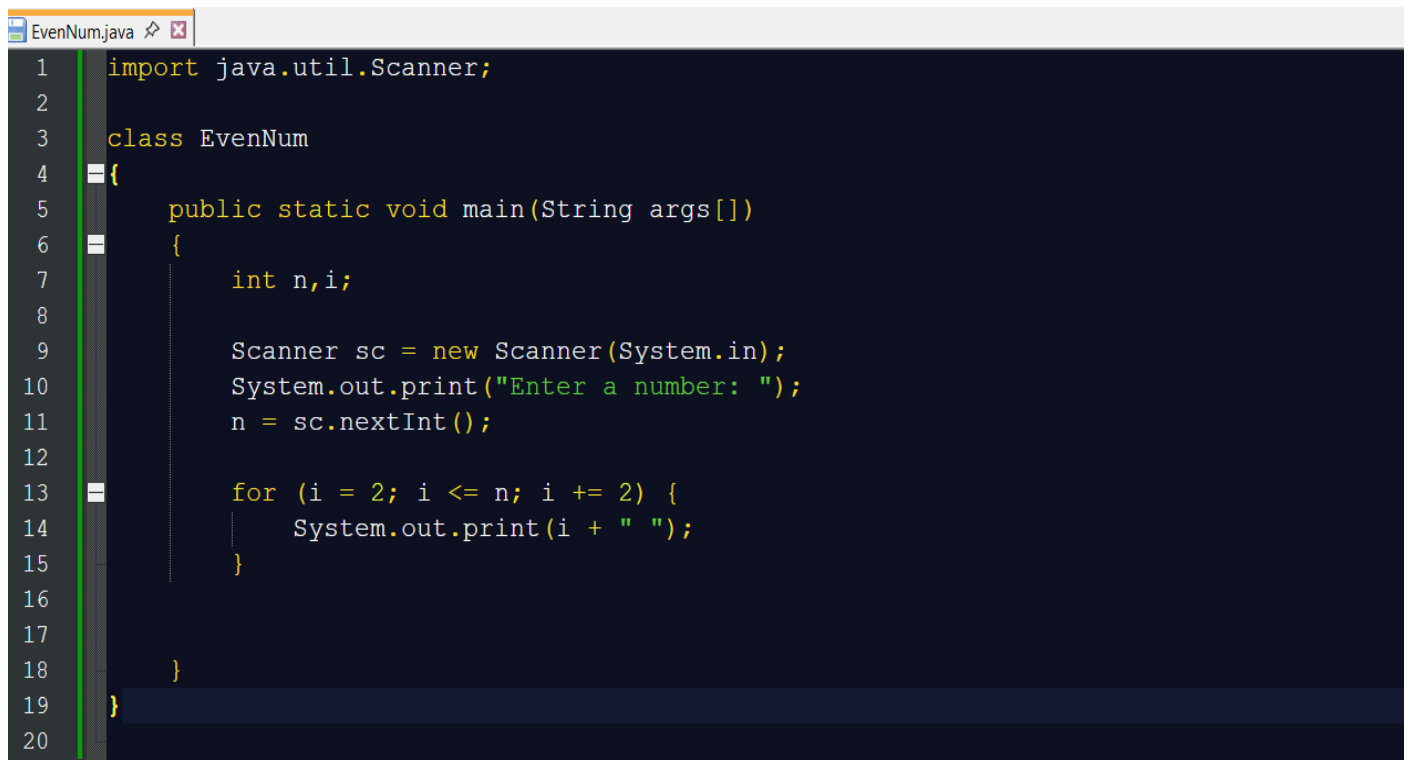## Question 4: Print Even Numbers from 1 to N
Problem Statement:
Write a Java program that asks the user for a number N and prints all the even numbers from 1 to N using a for loop.
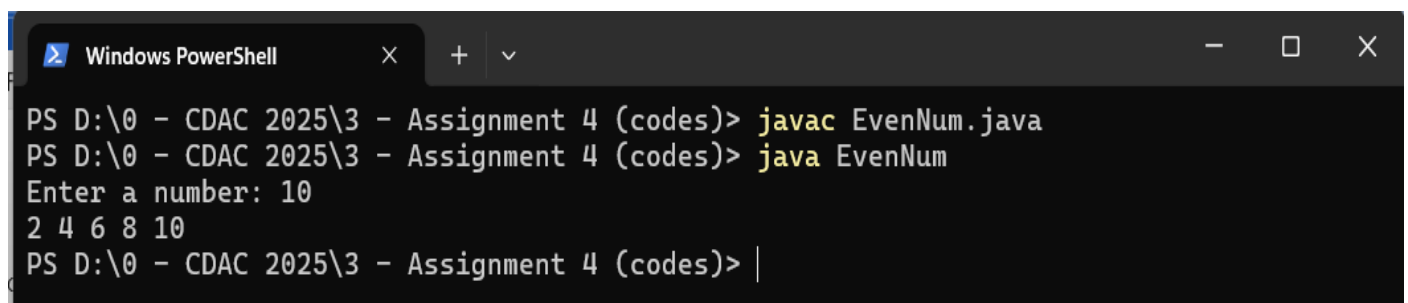**Sample Input:**
Enter a number: 10

Expected Output:
2 4 6 8 10

```java
EvenNum.java
1   import java.util.Scanner;
2
3   class EvenNum
4   {
5       public static void main(String args[])
6       {
7           int n,i;
8
9           Scanner sc = new Scanner(System.in);
10          System.out.print("Enter a number: ");
11          n = sc.nextInt();
12
13          for (i = 2; i <= n; i += 2) {
14              System.out.print(i + " ");
15          }
16
17
18      }
19  }
20
```

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac EvenNum.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java EvenNum
Enter a number: 10
2 4 6 8 10
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

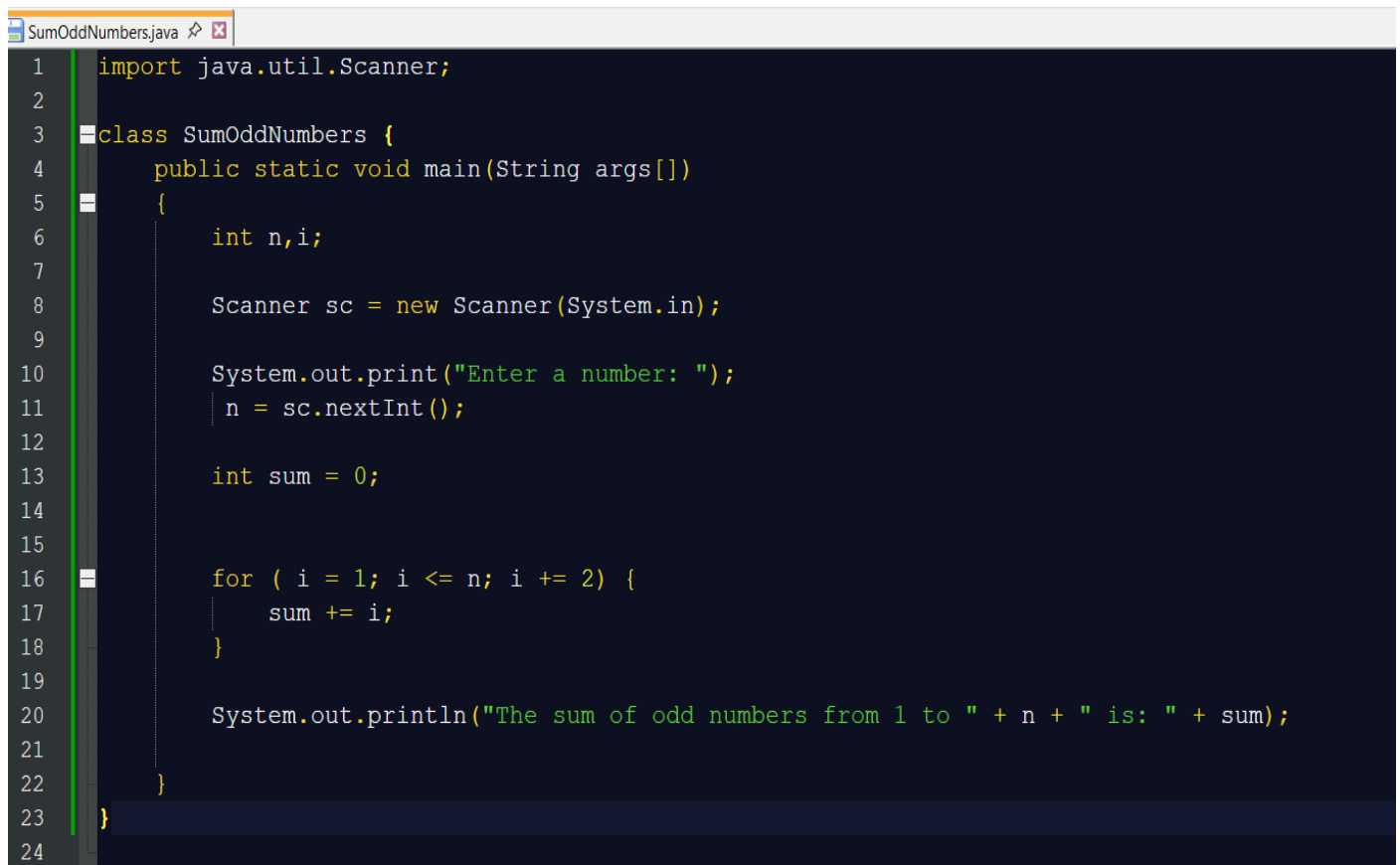## Question 5: Sum of Odd Numbers between 1 and N

Problem Statement:

Write a Java program that asks the user for a number N and calculates the sum of all odd numbers between 1 and N using a for loop.
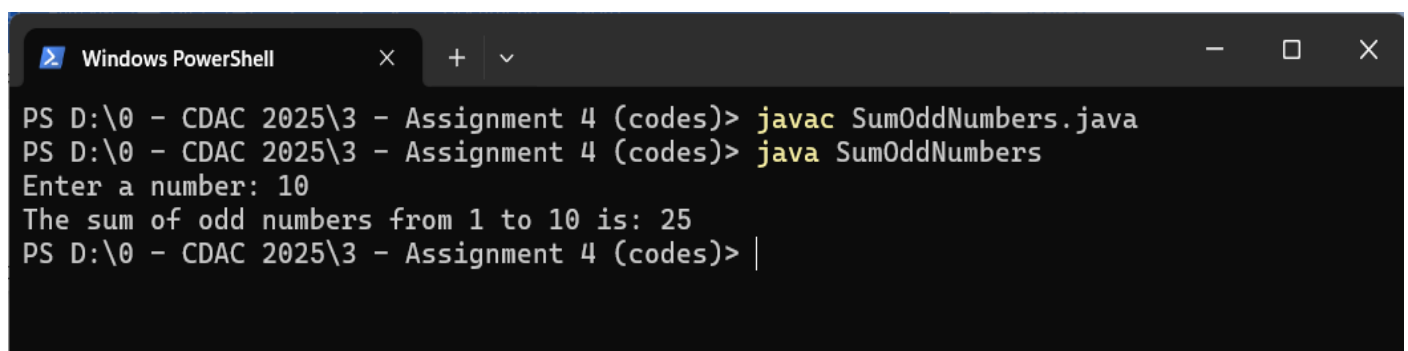
Sample Input:

Enter a number: 10

Expected Output:

The sum of odd numbers from 1 to 10 is: 25

```java
import java.util.Scanner;

class SumOddNumbers {
    public static void main(String args[])
    {
        int n,i;

        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a number: ");
        n = sc.nextInt();

        int sum = 0;


        for ( i = 1; i <= n; i += 2) {
            sum += i;
        }

        System.out.println("The sum of odd numbers from 1 to " + n + " is: " + sum);

    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac SumOddNumbers.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java SumOddNumbers
Enter a number: 10
The sum of odd numbers from 1 to 10 is: 25
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 6: Find the Average of Elements in the Array.

Problem Statement:

Write a Java program that uses a **for-each** loop to print all elements of an integer array. The program should ask the user to input 5 integers, store them in an array, and then print all the elements using a **for-each** loop.

Sample Input:

Enter 5 integers: 3 7 12 5 8

Expected Output:

3 7 12 5 8

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

        int i;
        int num[] = new int[5];

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter 5 integers: ");

        for(i =0; i<5; i++)
        {
            num[i] = sc.nextInt();

        }

        System.out.println(" Array elements are :");

        for(int num1 : num)
        {
            System.out.print(num1 + " ");
        }
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac ForEachArray.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java ForEachArray
Enter 5 integers:
3
7
12
5
8
 Array elements are :
3 7 12 5 8
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 7: Find the Sum of All Elements in an Array
Problem Statement:
Write a Java program that uses a **for-each** loop to calculate the sum of all elements in a given integer array. The program should ask the user to input 5 integers, store them in an array, and then compute the sum of these numbers using the **for-each** loop.
Sample Input:
Enter 5 integers: 4 6 8 2 10

Expected Output:
The sum of all numbers is: 30

```java
import java.util.Scanner;
class ArraySum
{
    public static void main(String args[])
    {
        int[] number = new int[5];
        int i,sum=0;

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter 5 integers: ");

        for(i=0; i< number.length;i++)
        {
            number[i]=sc.nextInt();
        }
        for(int num : number)
        {
            sum += num;
        }
        System.out.println("The sum of all numbers is : "+ sum);
    }
}
```

Output:

```
Windows PowerShell                    ×    +   ∨

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac  ArraySum.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java   ArraySum
Enter 5 integers:
4
6
8
2
10
The sum of all numbers is : 30
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 8: Print All Names in a String Array

Problem Statement:

Write a Java program that uses a **for-each** loop to print all the names stored in a String array. The program should ask the user to input 4 names, store them in an array, and then print each name using the **for-each** loop.

Sample Input:
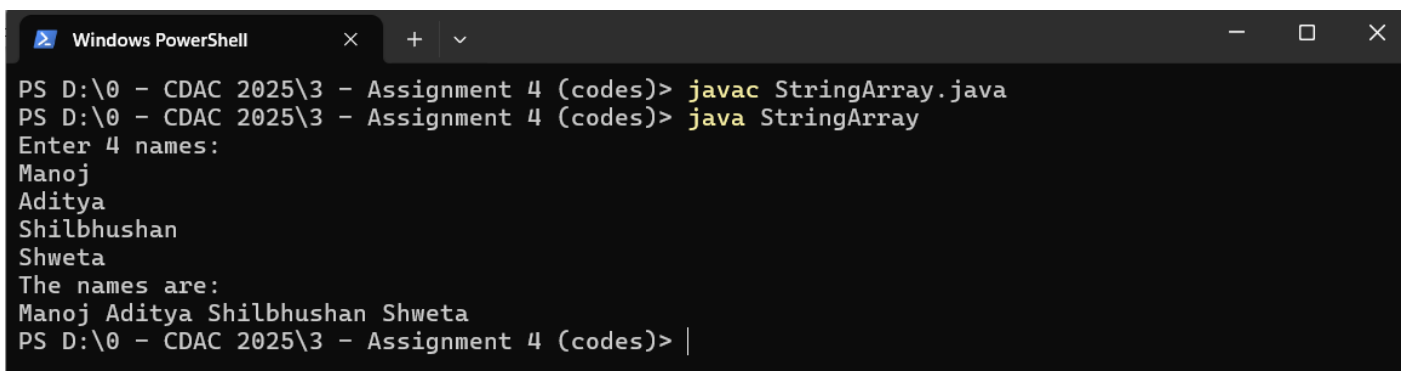
Enter 4 names: Manoj Aditya Shilbhushan Shweta

Expected Output:

Manoj Aditya Shilbhushan Shweta

```java
import java.util.Scanner;

class StringArray
{
  public static void main(String args[])
    {
      String[] name = new String[4];
      int i;

      Scanner sc = new Scanner(System.in);

      System.out.println("Enter 4 names: ");

      for(i=0; i< name.length; i++)
      {
          name[i]=sc.next();
      }

      System.out.println("The names are: ");

      for(String names : name)
      {
          System.out.print(names + " ");
      }
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac StringArray.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java StringArray
Enter 4 names:
Manoj
Aditya
Shilbhushan
Shweta
The names are:
Manoj Aditya Shilbhushan Shweta
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 9: Find the Largest Element in an Array
Problem Statement:
Write a Java program that asks the user to input 5 integers, stores them in an array, and then finds and prints the largest element in the array. (Explore in-built method to solve this)
Sample Input:
Enter 5 integers: 12 45 67 23 89

Expected Output:
The largest element is: 89

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

class LargestElement{
   public static void main(String args[])
   {
       int[] num = new int[5];
       int i,largest;

       Scanner sc = new Scanner(System.in);

       System.out.println("Enter 5 integers: ");

       for(i = 0; i< num.length; i++)
       {
           num[i]=sc.nextInt();
       }

       largest =  Arrays.stream(num).max().getAsInt();
       System.out.println("The largest element is: "+ largest);

   }
}
```

Output:

```
Windows PowerShell                    ×    +  ∨                                    —   □   ×

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac LargestElement.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java LargestElement
Enter 5 integers:
12
45
67
23
89
The largest element is: 89
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> |
```

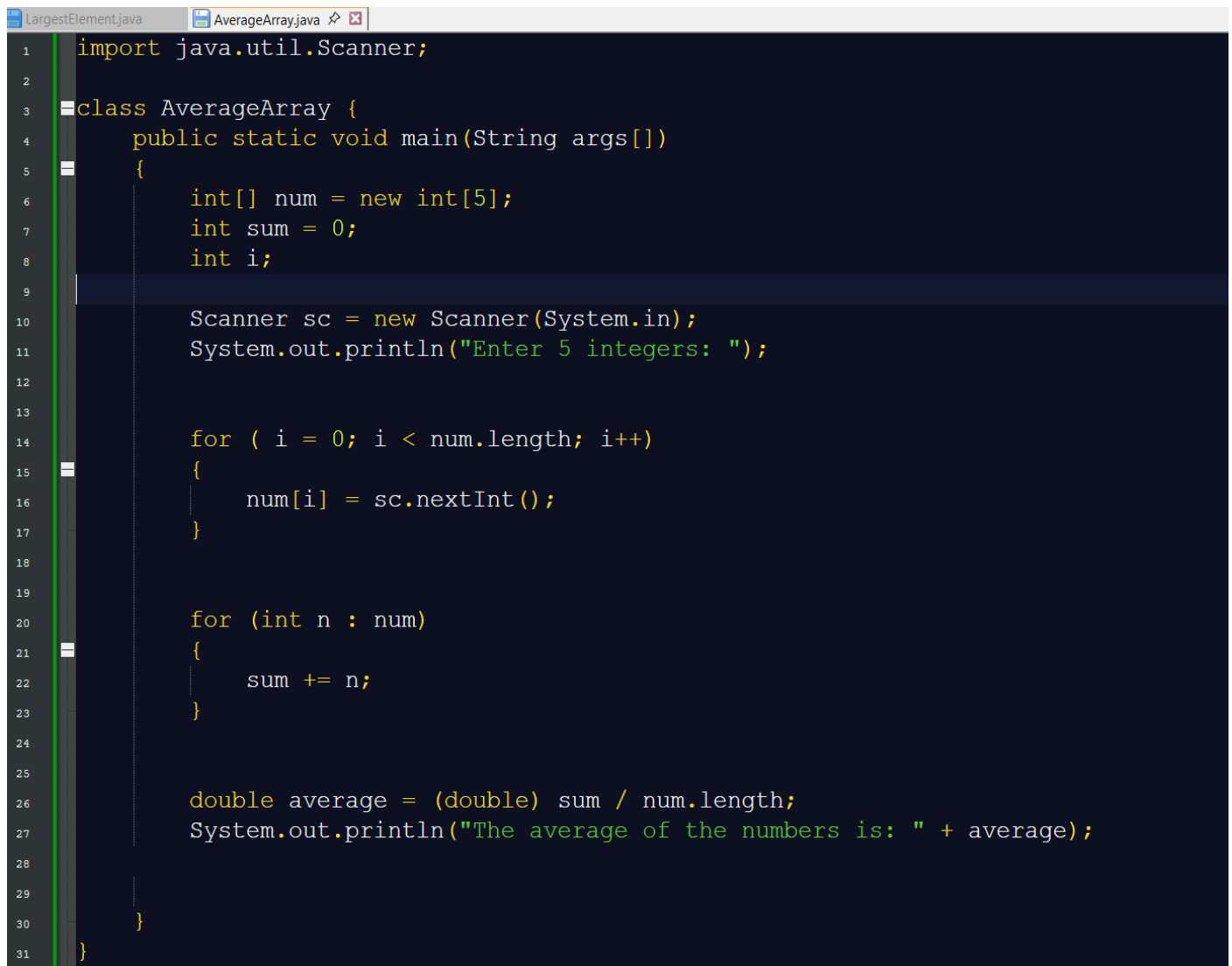# Question 10: Find the Average of Elements in the Array.

Problem Statement:
Write a Java program that asks the user to input 5 integers, stores them in an array, and then calculates and prints the average of the elements in the array.
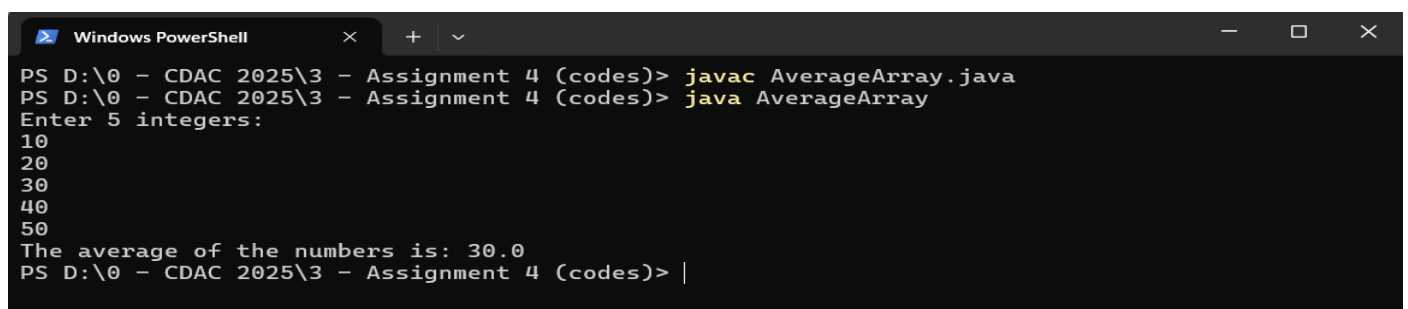
Sample Input:
Enter 5 integers: 10 20 30 40 50

Expected Output:
The average of the numbers is: 30.0

```java
import java.util.Scanner;

class AverageArray {
    public static void main(String args[])
    {
        int[] num = new int[5];
        int sum = 0;
        int i;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter 5 integers: ");


        for ( i = 0; i < num.length; i++)
        {
            num[i] = sc.nextInt();
        }


        for (int n : num)
        {
            sum += n;
        }


        double average = (double) sum / num.length;
        System.out.println("The average of the numbers is: " + average);


    }
}
```

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac AverageArray.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java AverageArray
Enter 5 integers:
10
20
30
40
50
The average of the numbers is: 30.0
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 11: Count Positive and Negative Numbers in an Array

Problem Statement:

Write a Java program that asks the user to input 6 integers, stores them in an array, and then counts how many positive and negative numbers are present in the array.

Sample Input:

Enter 6 integers: -5 3 7 -2 0 8

Expected Output:

Positive numbers: 3

Negative numbers: 2

```java
import java.util.Scanner;

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

        int[] numbers = new int[6];
        int positive = 0, negative = 0;
        int i;

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter 6 integers: ");

        for ( i = 0; i < numbers.length; i++)
        {
            numbers[i] = sc.nextInt();
        }

        for (int n : numbers)
        {
            if (n > 0) {
                positive++;
            } else if (n < 0) {
                negative++;
            }
        }
        System.out.println("Positive numbers: " + positive);
        System.out.println("Negative numbers: " + negative);

        sc.close();
    }
}
```

<u>Output:</u>

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac CountNum.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java CountNum
Enter 6 integers:
-5
3
7
-2
0
8
Positive numbers: 3
Negative numbers: 2
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

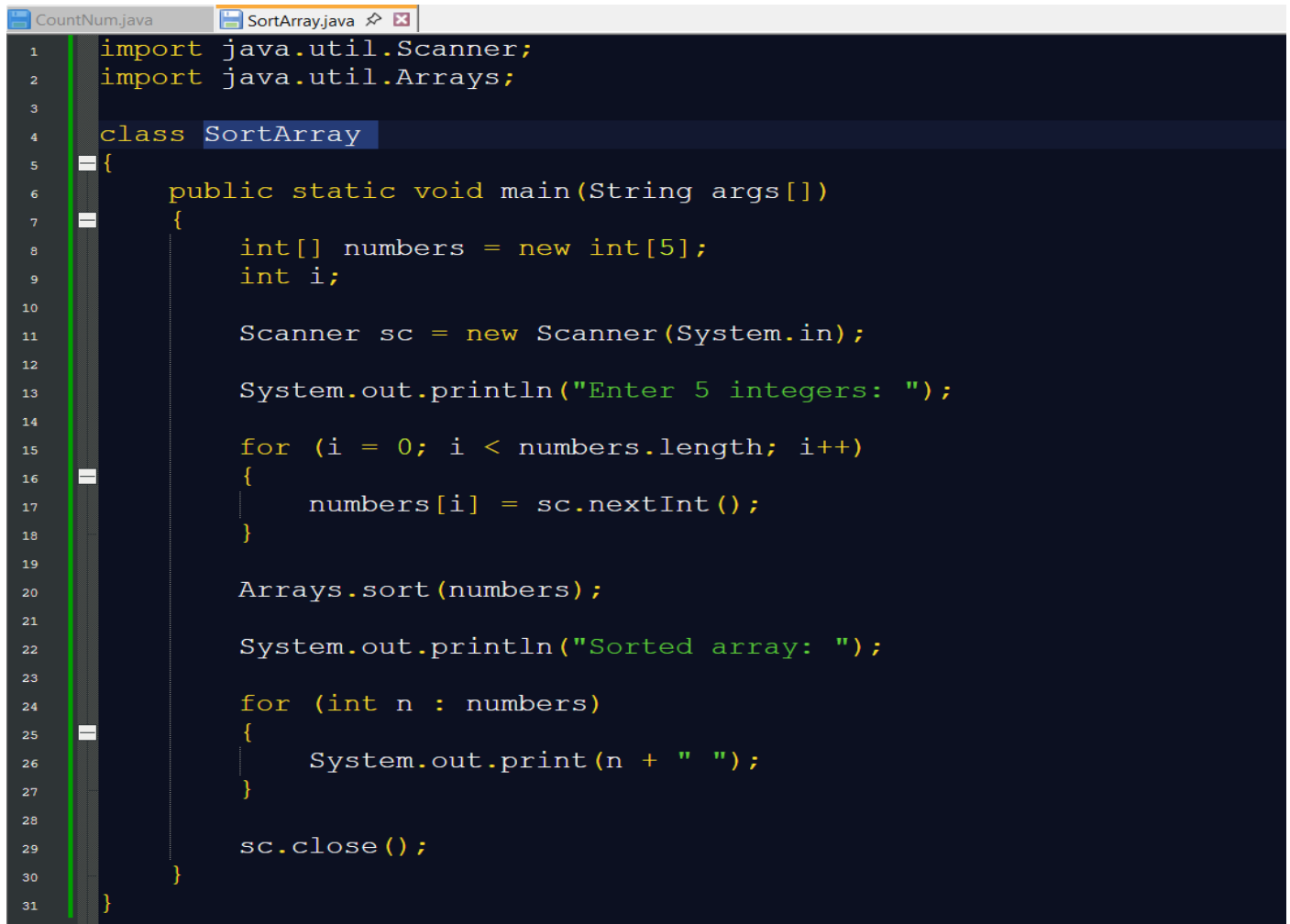**Question 12: Sort an Array in Ascending Order**
Problem Statement:
Write a Java program that asks the user to input 5 integers, stores them in an array, and then sorts the array in ascending order using the Arrays.sort() method. After sorting, print the sorted array.
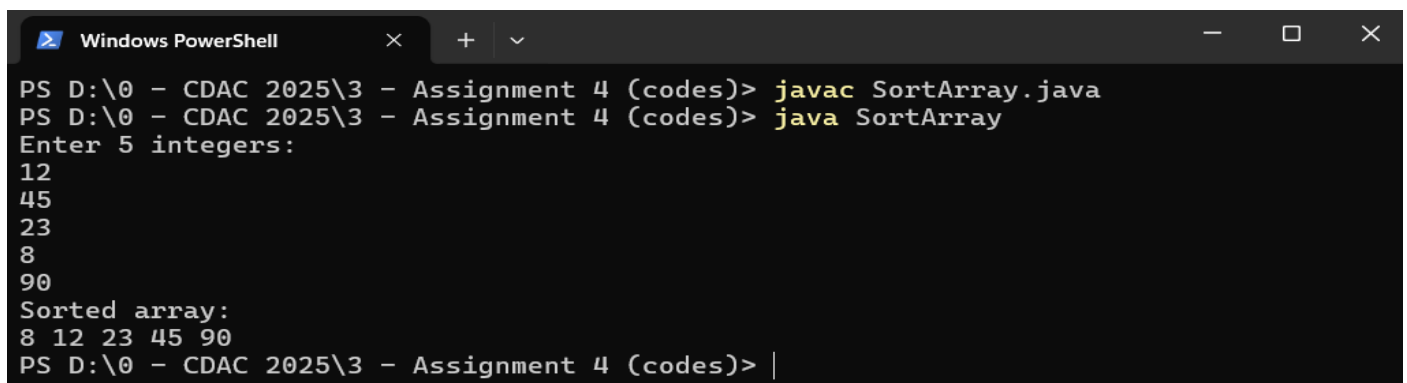**Sample Input:**
Enter 5 integers: 12 45 23 8 90

Expected Output:
Sorted array: 8 12 23 45 90

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

class SortArray
{
    public static void main(String args[])
    {
        int[] numbers = new int[5];
        int i;

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter 5 integers: ");

        for (i = 0; i < numbers.length; i++)
        {
            numbers[i] = sc.nextInt();
        }

        Arrays.sort(numbers);

        System.out.println("Sorted array: ");

        for (int n : numbers)
        {
            System.out.print(n + " ");
        }

        sc.close();
    }
}
```

Output:

```
Windows PowerShell                  ×     +   ∨

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac SortArray.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java SortArray
Enter 5 integers:
12
45
23
8
90
Sorted array:
8 12 23 45 90
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 13: Check if an Array Contains a Specific Element
Problem Statement:
Write a Java program that asks the user to input 5 integers, stores them in an array, and then checks whether a specific number (input by the user) is present in the array using the Arrays.asList() method. If the number is found, print "Found", otherwise print "Not Found".
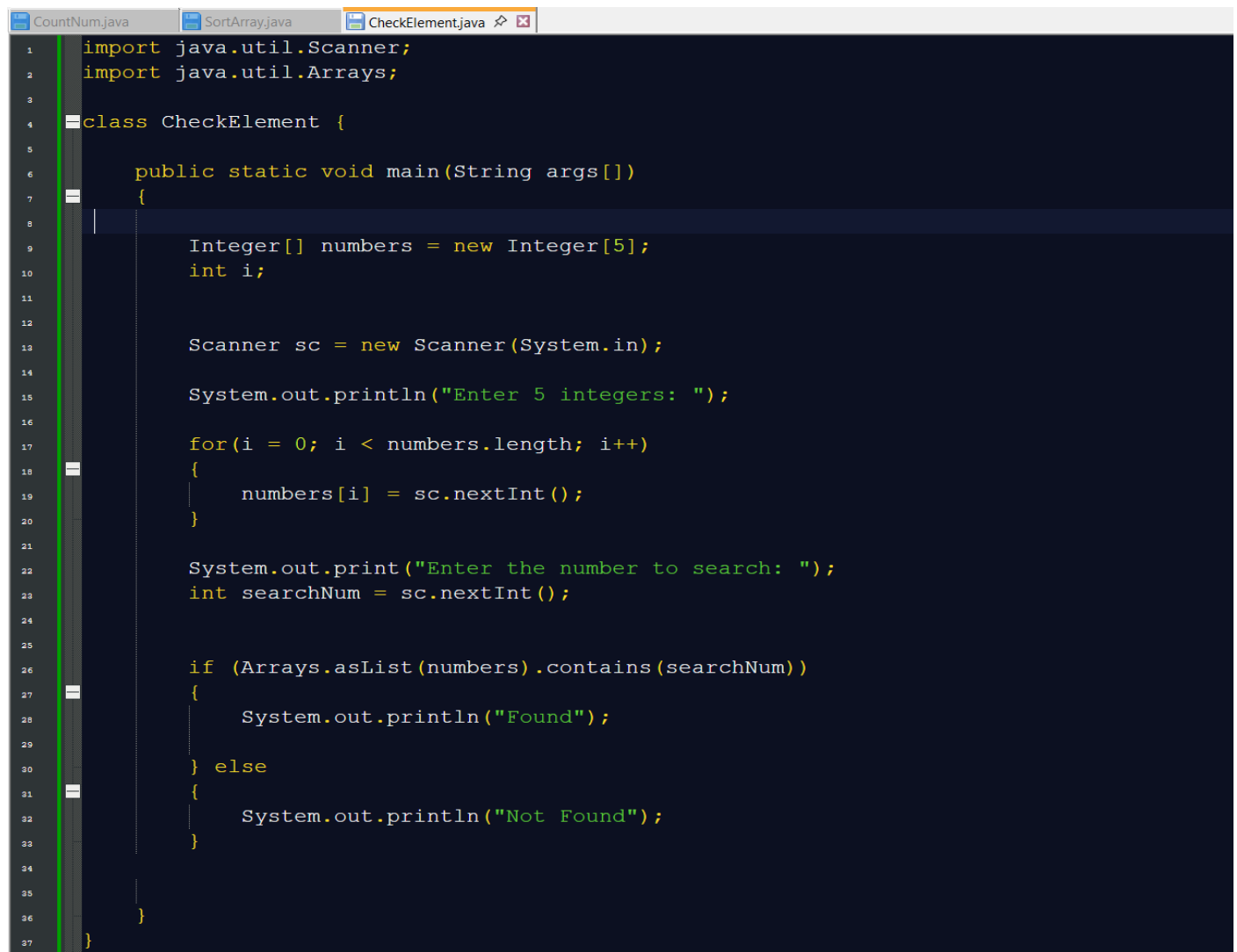**Sample Input:**
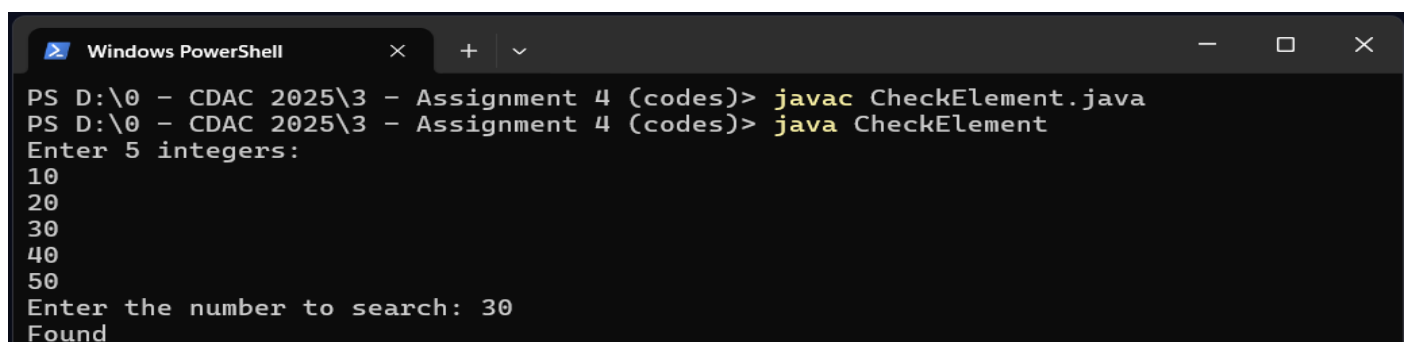Enter 5 integers: 10 20 30 40 50
Enter the number to search: 30

Expected Output:
Found

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

class CheckElement {

    public static void main(String args[])
    {

        Integer[] numbers = new Integer[5];
        int i;


        Scanner sc = new Scanner(System.in);

        System.out.println("Enter 5 integers: ");

        for(i = 0; i < numbers.length; i++)
        {
            numbers[i] = sc.nextInt();
        }

        System.out.print("Enter the number to search: ");
        int searchNum = sc.nextInt();


        if (Arrays.asList(numbers).contains(searchNum))
        {
            System.out.println("Found");

        } else
        {
            System.out.println("Not Found");
        }



    }
}
```

Output:

```
Windows PowerShell              ×      +  ∨                          —  □  ×

PS D:\0 — CDAC 2025\3 — Assignment 4 (codes)> javac CheckElement.java
PS D:\0 — CDAC 2025\3 — Assignment 4 (codes)> java CheckElement
Enter 5 integers:
10
20
30
40
50
Enter the number to search: 30
Found
```

Question 14: Find the index of an Element in an Array

Problem Statement:
Write a Java program that asks the user to input 5 integers, stores them in an array, and then finds the index of a specific number (input by the user) using the Arrays.binarySearch() method. If the number is found, print the index, otherwise, print "Not Found".

Sample Input:
Enter 5 integers: 5 10 15 20 25 Enter the number to search: 15

Expected Output:
The number 15 is found at index 2

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

class FindIndex {

    public static void main(String args[])
    {
        int searchNum;
        int i;
        int[] numbers = new int[5];


        Scanner sc = new Scanner(System.in);

        System.out.println("Enter 5 integers: ");

        for (i = 0; i < numbers.length; i++) {
            numbers[i] = sc.nextInt();
        }

        System.out.print("Enter the number to search: ");
        searchNum = sc.nextInt();

        Arrays.sort(numbers);

        int index = Arrays.binarySearch(numbers, searchNum);

        if (index >= 0)
        {
            System.out.println("The number " + searchNum + " is found at index " + index);
        } else
        {
            System.out.println("Not Found");
        }

    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac FindIndex.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java FindIndex
Enter 5 integers:
5
10
15
20
25
Enter the number to search: 15
The number 15 is found at index 2
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 15: Write a program to print the following pattern:

```
1
2*2
3*3*3
4*4*4*4
5*5*5*5*5
5*5*5*5*5
4*4*4*4
3*3*3
2*2
```
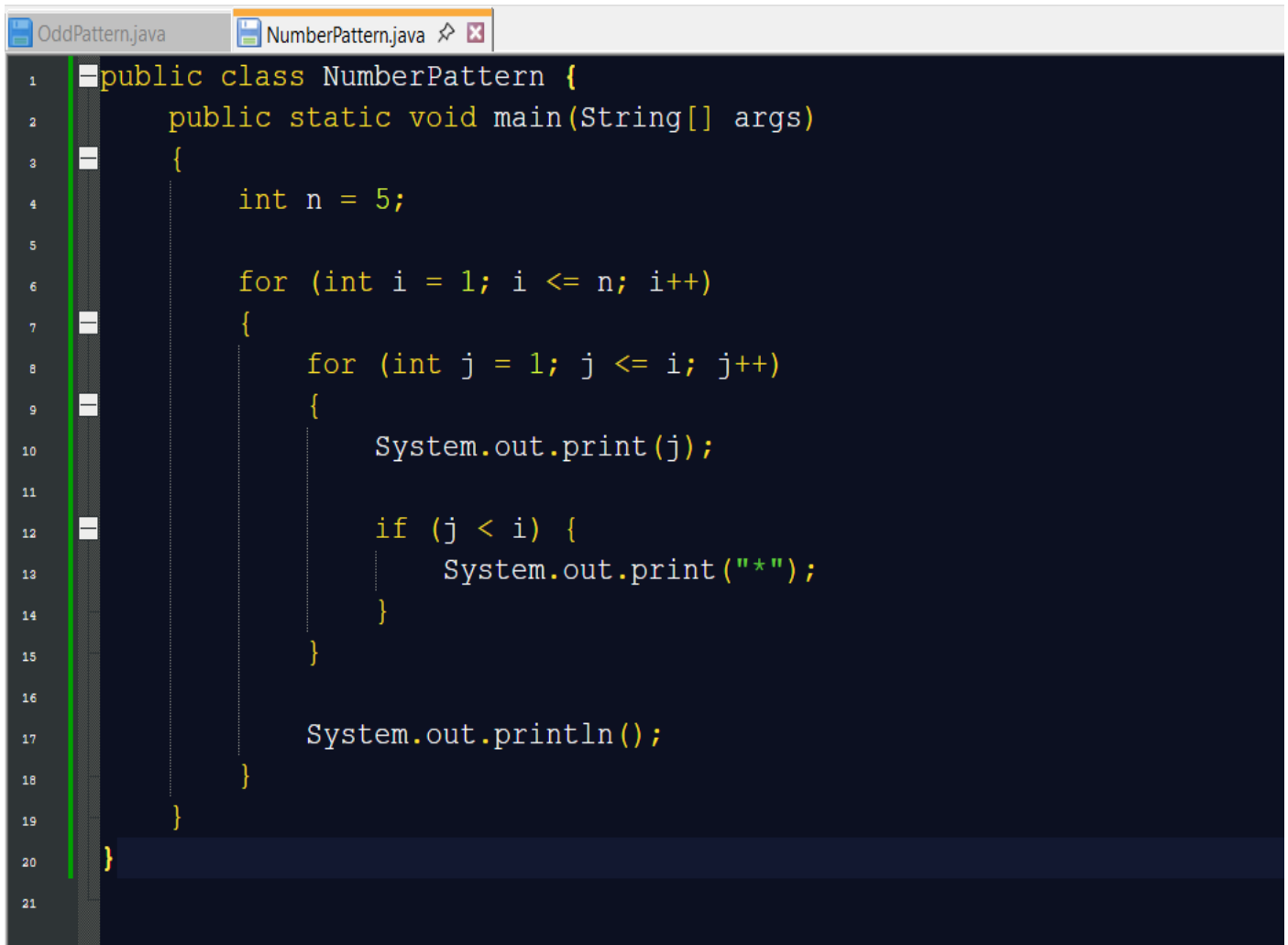
PatternProgram.java

```java
public class PatternProgram
{
    public static void main(String[] args) {
        int n = 5;


        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= i; j++)
            {
                System.out.print(i);

                if (j < i) {
                    System.out.print("*");
                }
            }

            System.out.println();
        }

        for (int i = n; i >= 2; i--)
        {
            for (int j = 1; j <= i; j++)
            {
                System.out.print(i);

                if (j < i)
                {
                    System.out.print("*");
                }
            }

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

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac PatternProgram.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java PatternProgram
1
2*2
3*3*3
4*4*4*4
5*5*5*5*5
5*5*5*5*5
4*4*4*4
3*3*3
2*2
```
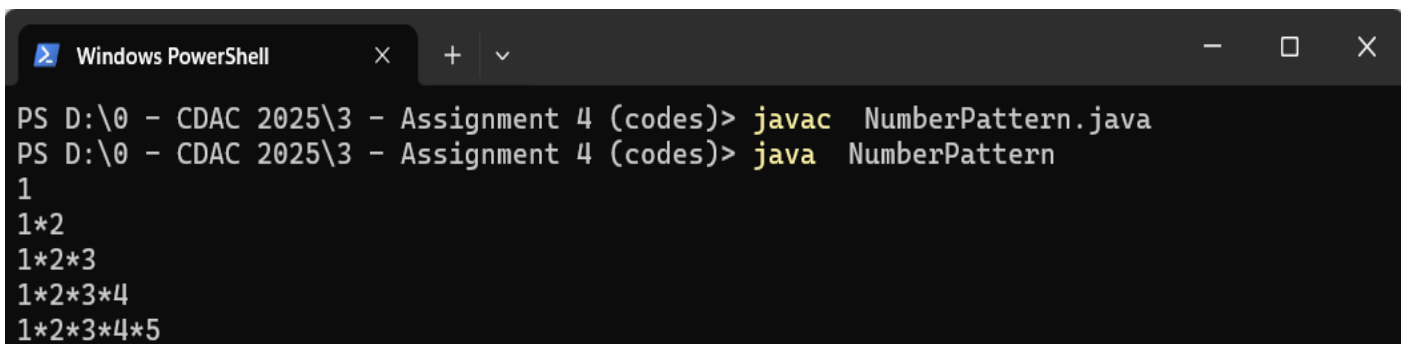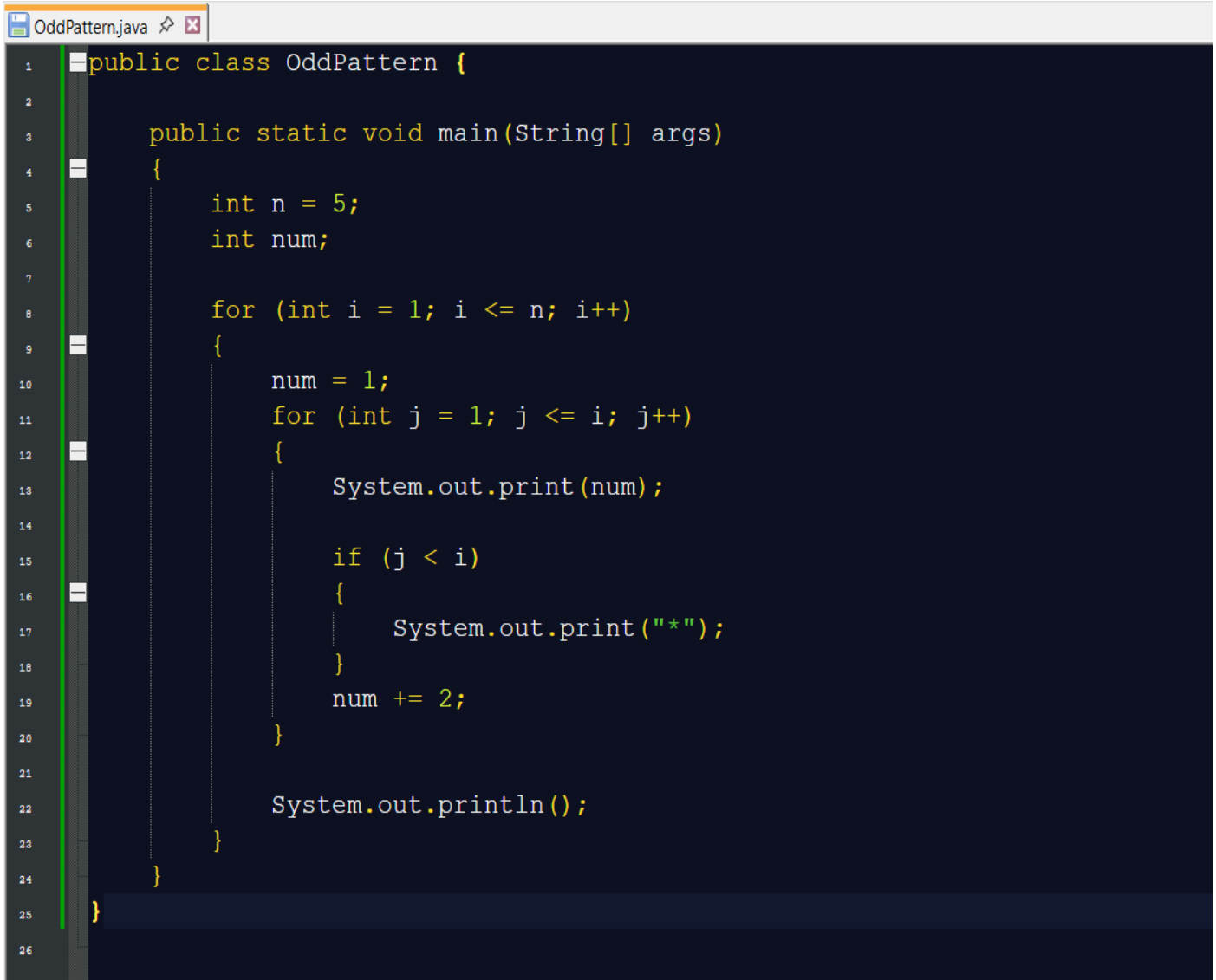
Question 16: Write a program to print the following pattern:

```
1
1*2
1*2*3
1*2*3*4
1*2*3*4*5
```

OddPattern.java   NumberPattern.java

```java
public class NumberPattern {
    public static void main(String[] args)
    {
        int n = 5;

        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= i; j++)
            {
                System.out.print(j);

                if (j < i) {
                    System.out.print("*");
                }
            }

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

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac  NumberPattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java  NumberPattern
1
1*2
1*2*3
1*2*3*4
1*2*3*4*5
```
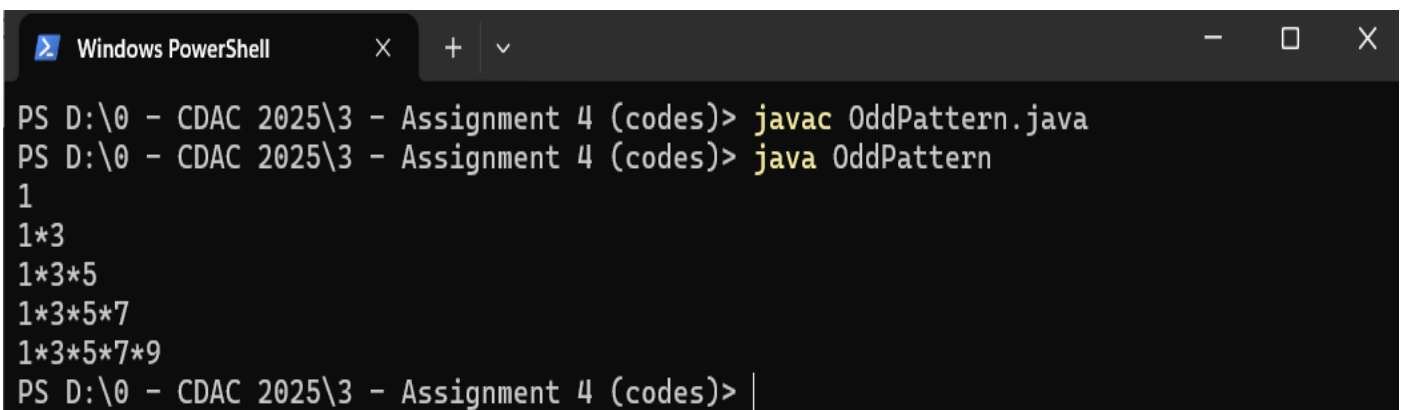
Question 17: Write a program to print the following pattern:

```
1
1*2
1*2*3
1*2*3*4
1*2*3*4*5
```

```java
public class OddPattern {

    public static void main(String[] args)
    {
        int n = 5;
        int num;

        for (int i = 1; i <= n; i++)
        {
            num = 1;
            for (int j = 1; j <= i; j++)
            {
                System.out.print(num);

                if (j < i)
                {
                    System.out.print("*");
                }
                num += 2;
            }

            System.out.println();
        }
    }
}
```
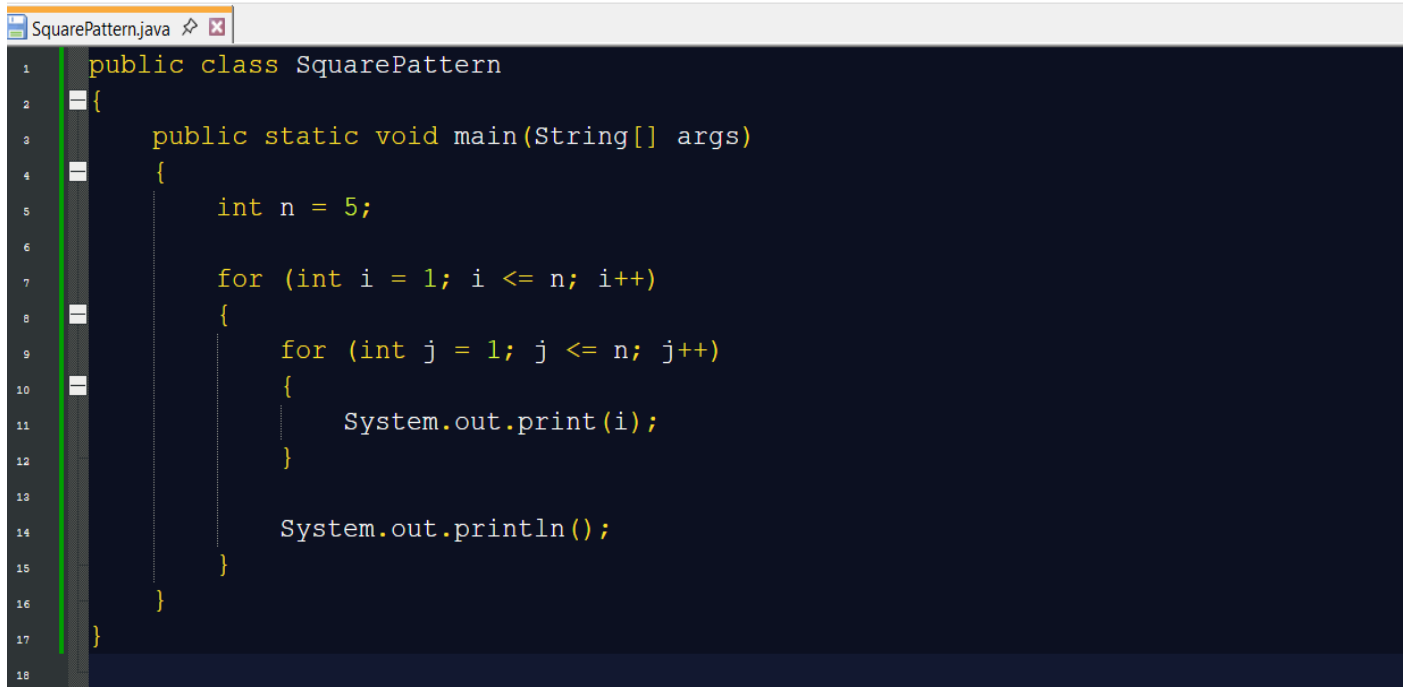
Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac OddPattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java OddPattern
1
1*3
1*3*5
1*3*5*7
1*3*5*7*9
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```
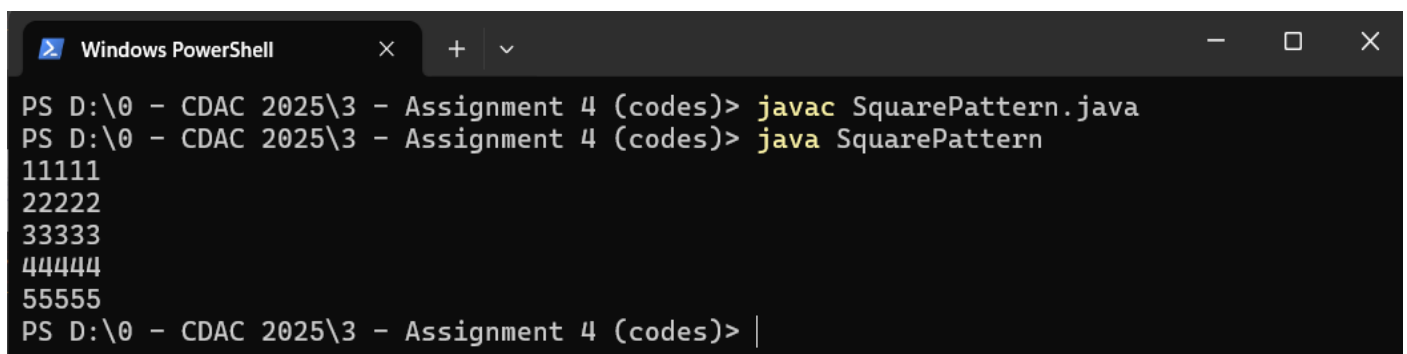
Question 18: Write a program to print the following pattern:

```
11111
22222
33333
44444
55555
```

```java
public class SquarePattern
{
    public static void main(String[] args)
    {
        int n = 5;

        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= n; j++)
            {
                System.out.print(i);
            }

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

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac SquarePattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java SquarePattern
11111
22222
33333
44444
55555
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 19: Write a program to print the following pattern:
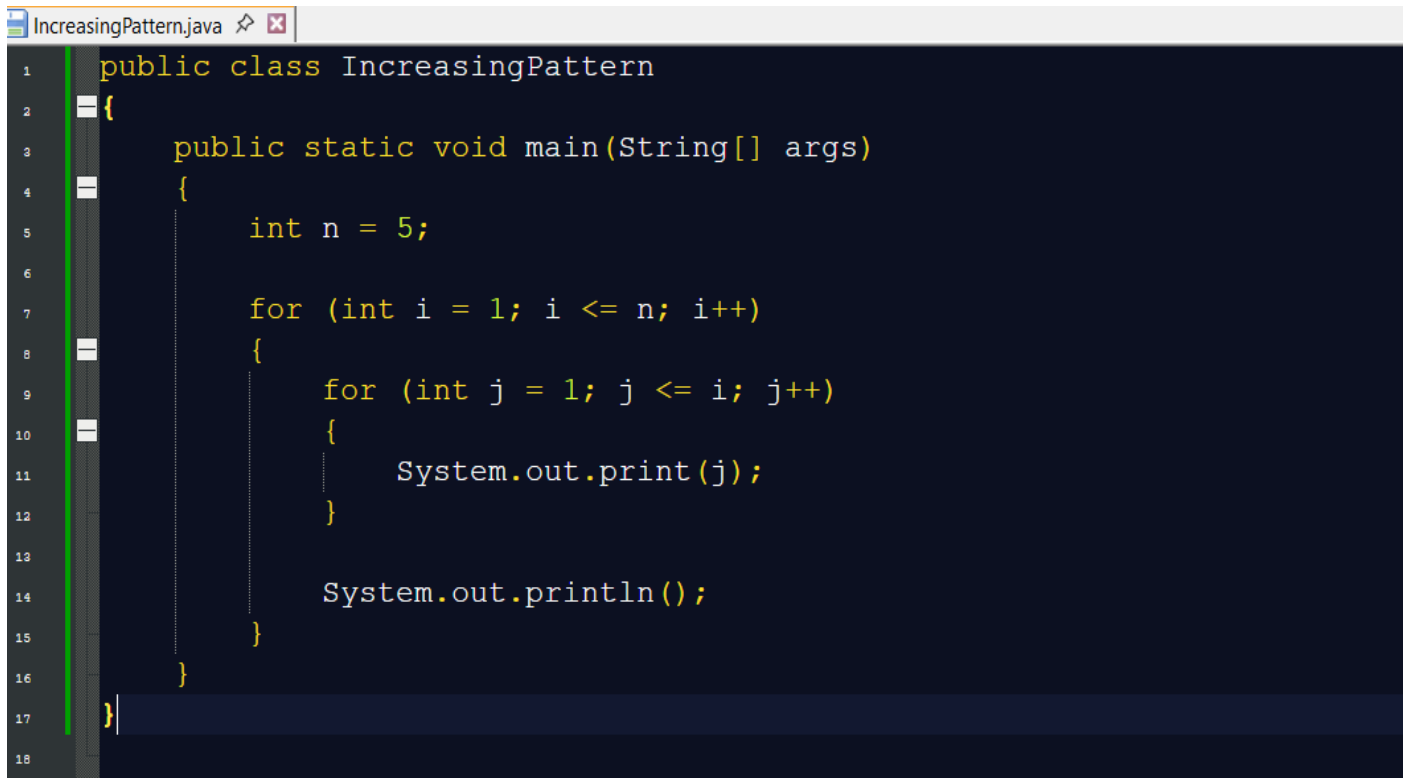
```
1
22
333
4444
55555
```

TrianglePattern.java

```java
public class TrianglePattern
{
    public static void main(String[] args)
    {
        int n = 5;

        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= i; j++)
            {
                System.out.print(i);
            }

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

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac TrianglePattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java TrianglePattern
1
22
333
4444
55555
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```
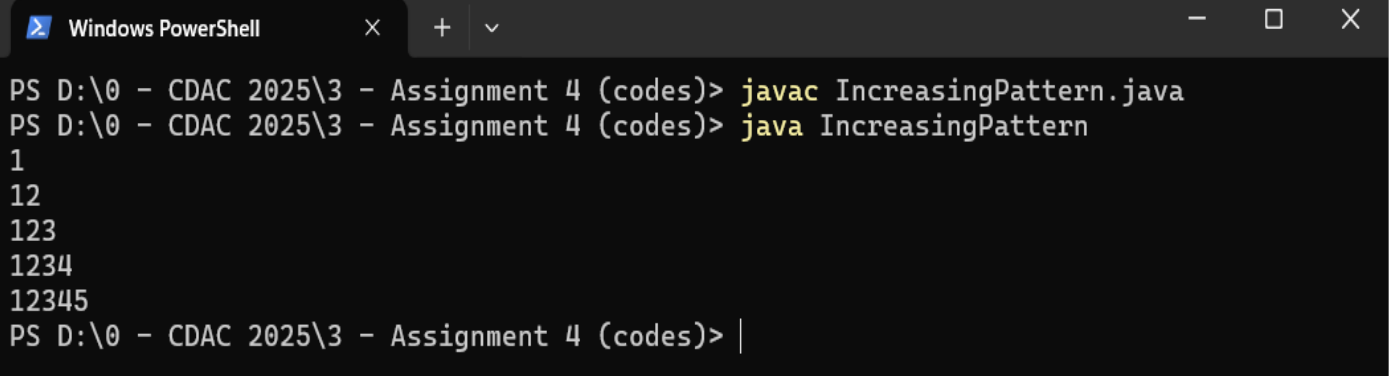
Question 20: Write a program to print the following pattern:

```
1
12
123
1234
12345
```

IncreasingPattern.java

```java
public class IncreasingPattern
{
    public static void main(String[] args)
    {
        int n = 5;

        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= i; j++)
            {
                System.out.print(j);
            }

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

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac IncreasingPattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java IncreasingPattern
1
12
123
1234
12345
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```
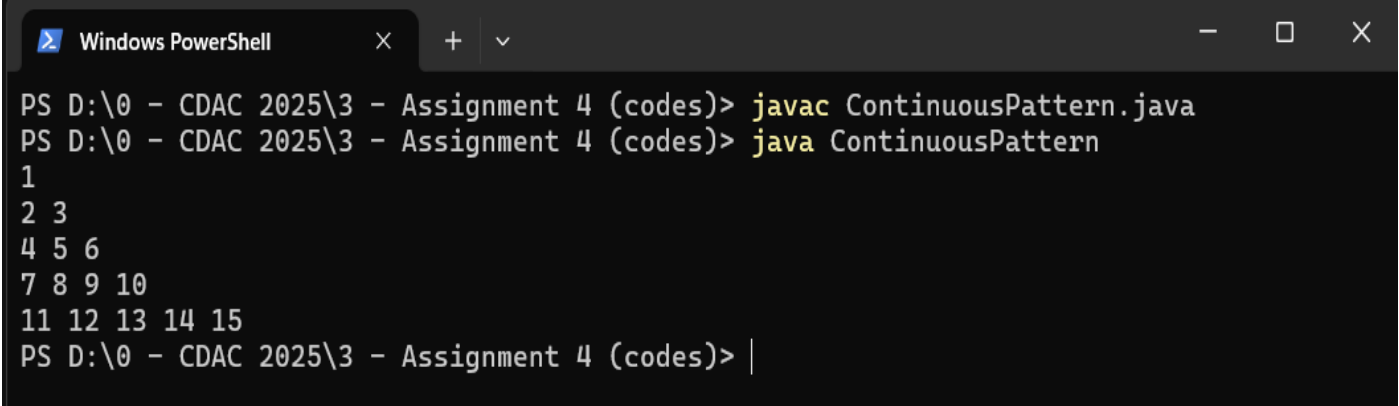
Question 21: Write a program to print the following pattern:

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

```java
public class ContinuousPattern
{
    public static void main(String[] args)
    {
        int n = 5;
        int num = 1;

        for (int i = 1; i <= n; i++)
        {
            for (int j = 1; j <= i; j++)
            {
                System.out.print(num + " ");
                num++;
            }
            System.out.println();
        }
    }
}
```
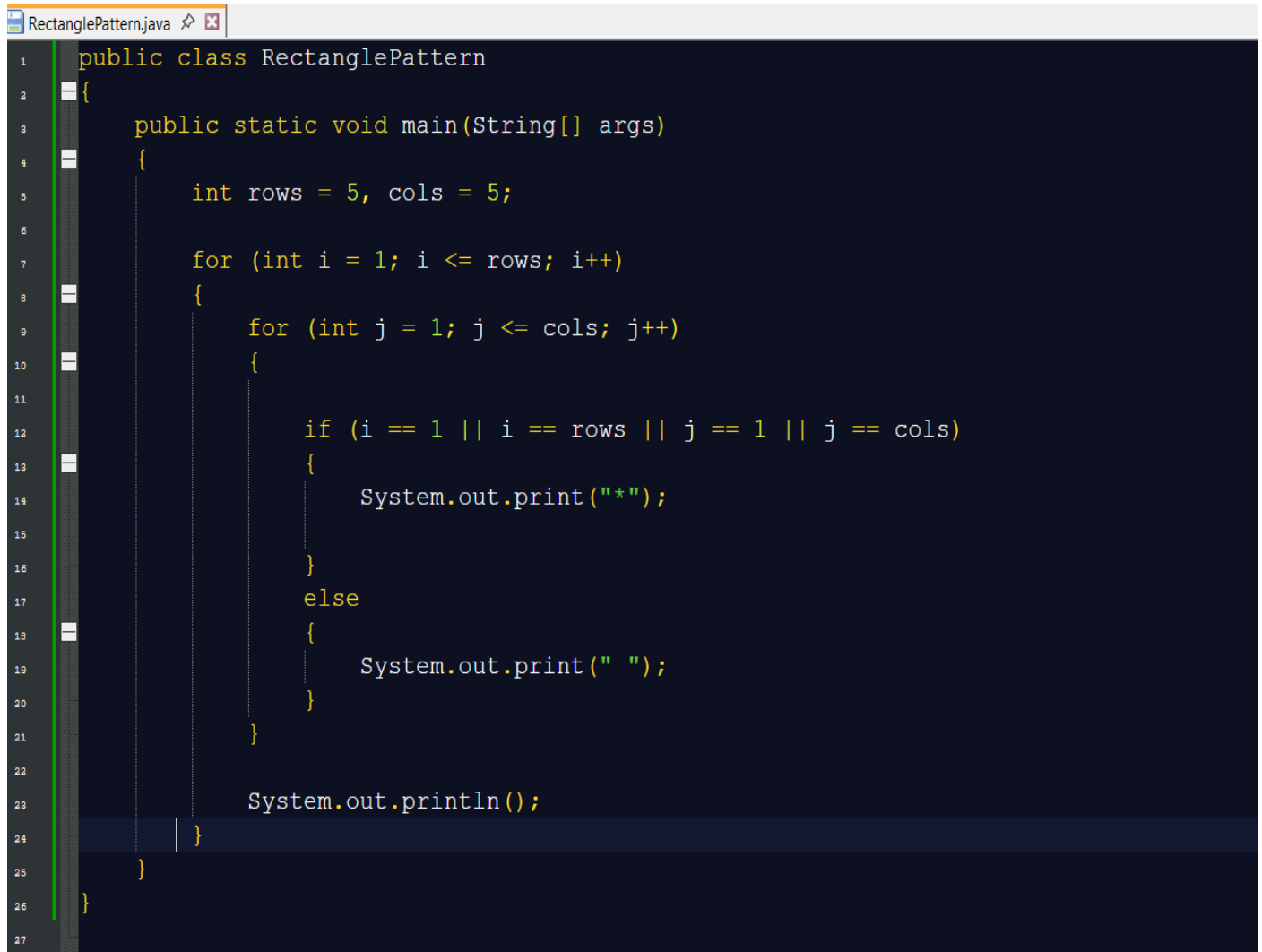
Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac ContinuousPattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java ContinuousPattern
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```
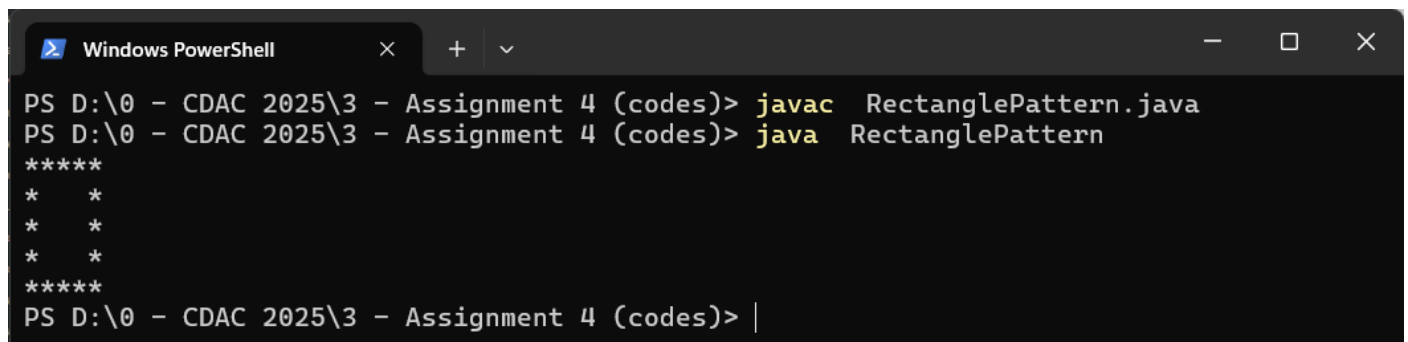
Question 22: Write a program to print the following pattern:

```
******
*    *
*    *
*    *
*    *
******
```

RectanglePattern.java

```java
public class RectanglePattern
{
    public static void main(String[] args)
    {
        int rows = 5, cols = 5;

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

                if (i == 1 || i == rows || j == 1 || j == cols)
                {
                    System.out.print("*");
                }
                else
                {
                    System.out.print(" ");
                }
            }

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

OutPut:

```
Windows PowerShell                    ×    +  ∨                                         —   □   ×

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac  RectanglePattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java  RectanglePattern
*****
*   *
*   *
*   *
*****
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> |
```

Question 23: Write a program to print the following pattern:

```
         *
        ***
       *****
      *******
     *********
    ***********
     *********
      *******
       *****
        ***
         *
```



```java
public class DiamondPattern
{
    public static void main(String[] args) {
        int n = 6;


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

            for (int k = 1; k < (i * 2); k++)
            {
                System.out.print("*");
            }
            System.out.println();
        }


        for (int i = n - 1; i >= 1; i--)
        {
            for (int j = n; j > i; j--)
            {
                System.out.print(" ");
            }

            for (int k = 1; k < (i * 2); k++)
            {
                System.out.print("*");
            }
            System.out.println();
        }
    }
}
```

OutPut:


```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac DiamondPattern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java DiamondPattern
     *
    ***
   *****
  *******
 *********
***********
 *********
  *******
   *****
    ***
     *
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

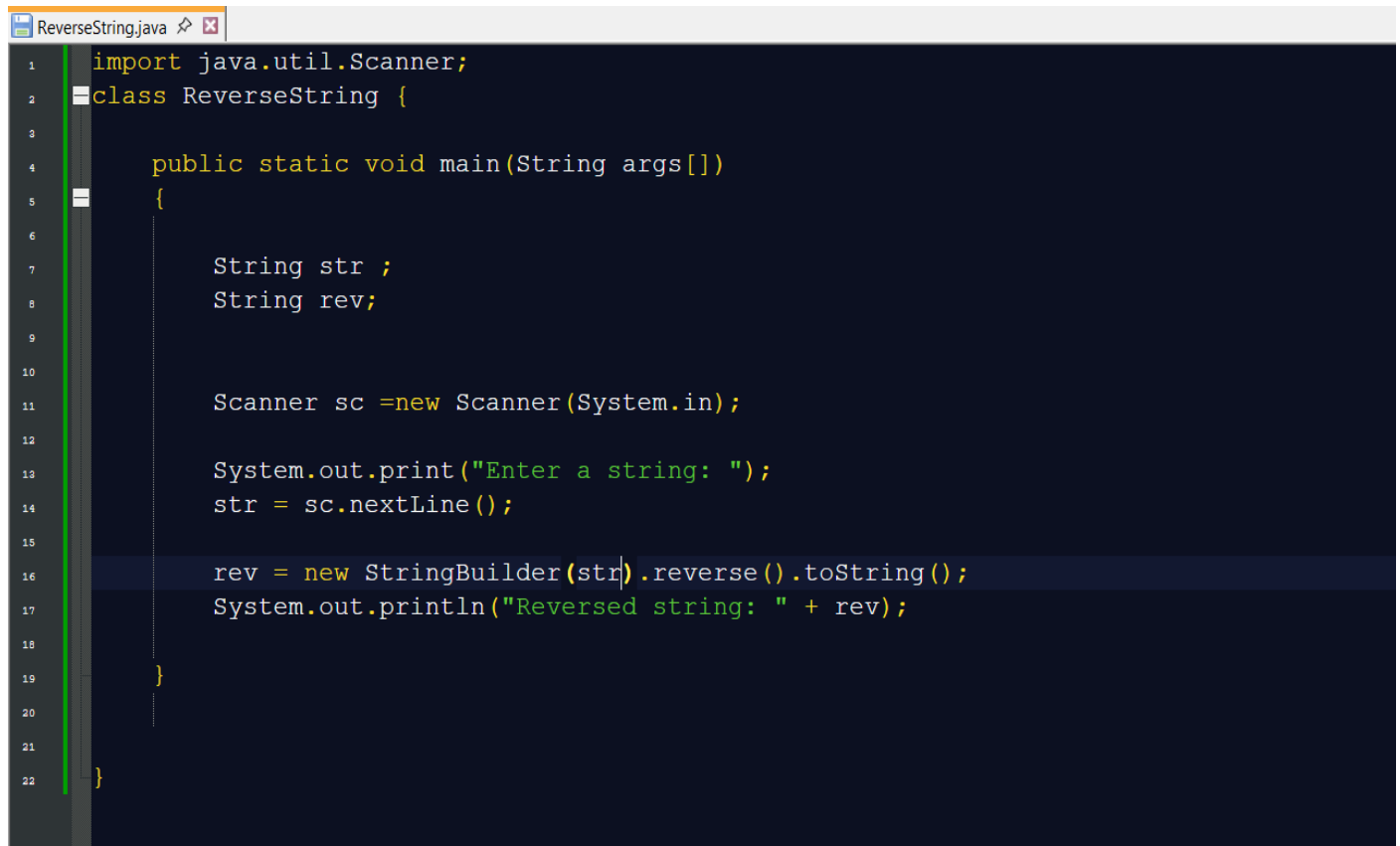## Question 24: Reverse a String

Problem Statement:
Write a Java program that asks the user for a string and then prints the reverse of that string.
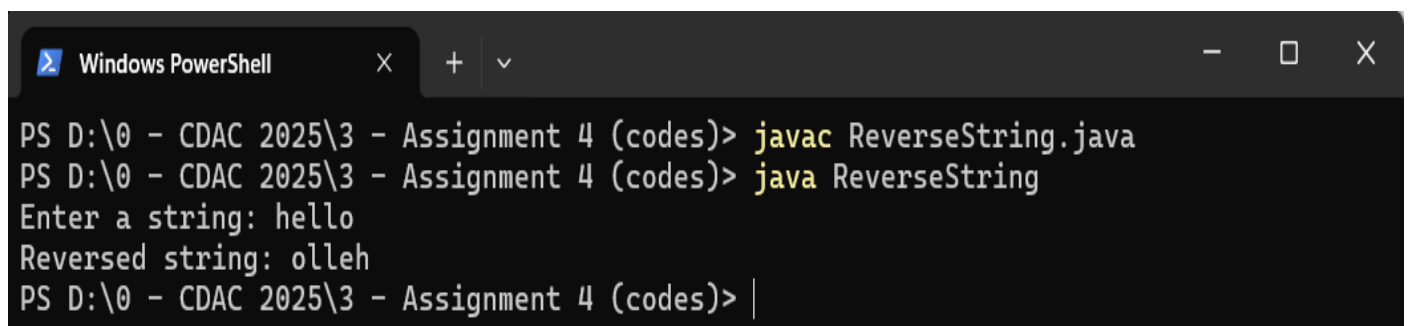**Sample Input:**
Enter a string: hello

Expected Output:
Reversed string: olleh

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

    public static void main(String args[])
    {

        String str ;
        String rev;


        Scanner sc =new Scanner(System.in);

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

        rev = new StringBuilder(str).reverse().toString();
        System.out.println("Reversed string: " + rev);

    }

}
```

Output:

```
Windows PowerShell                    X    +  v

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac ReverseString.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java ReverseString
Enter a string: hello
Reversed string: olleh
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

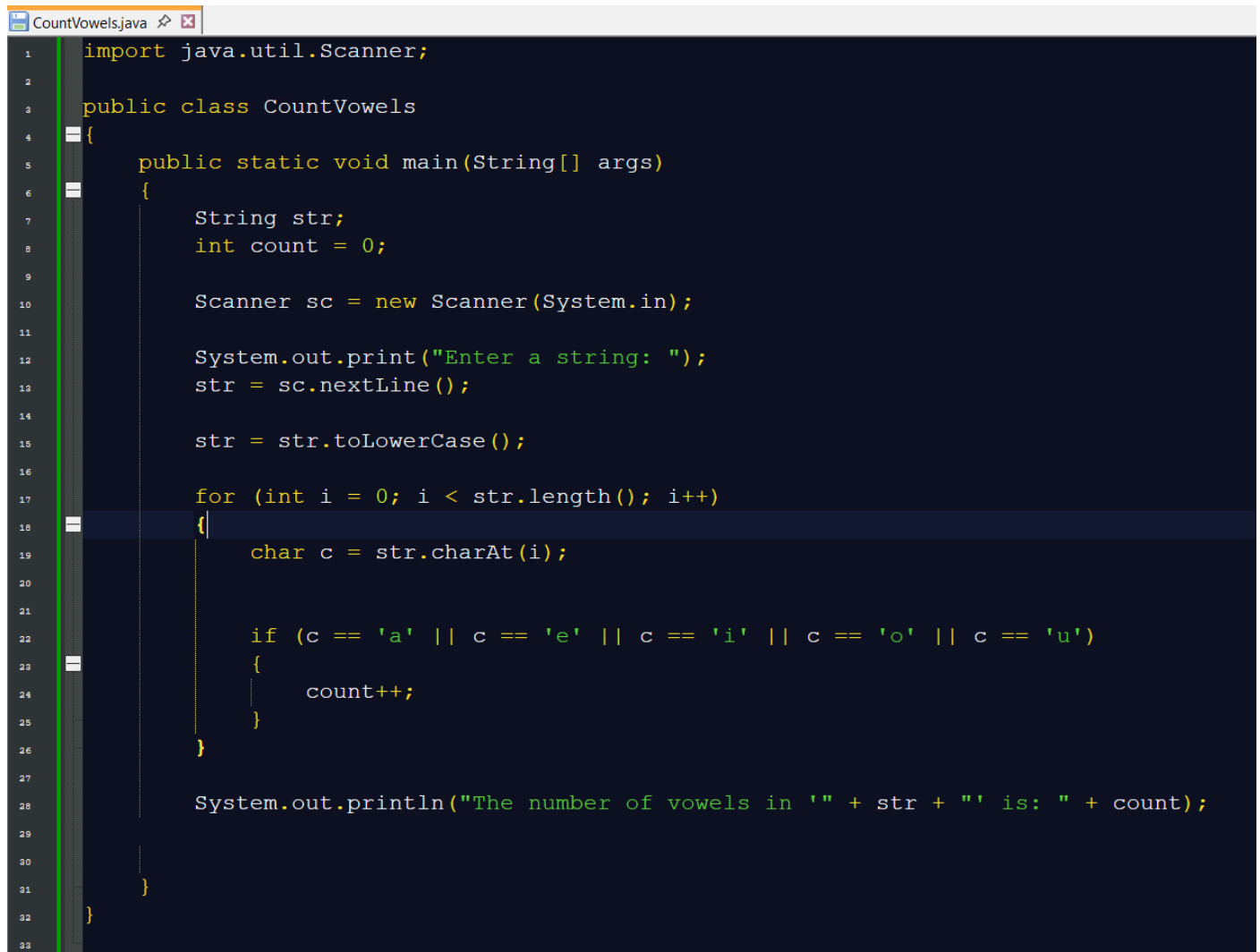## Question 25: Count Vowels in a String Problem Statement:

Write a Java program that asks the user for a string and counts the number of vowels (a, e, i, o, u) in the string. The program should then print the total number of vowels.
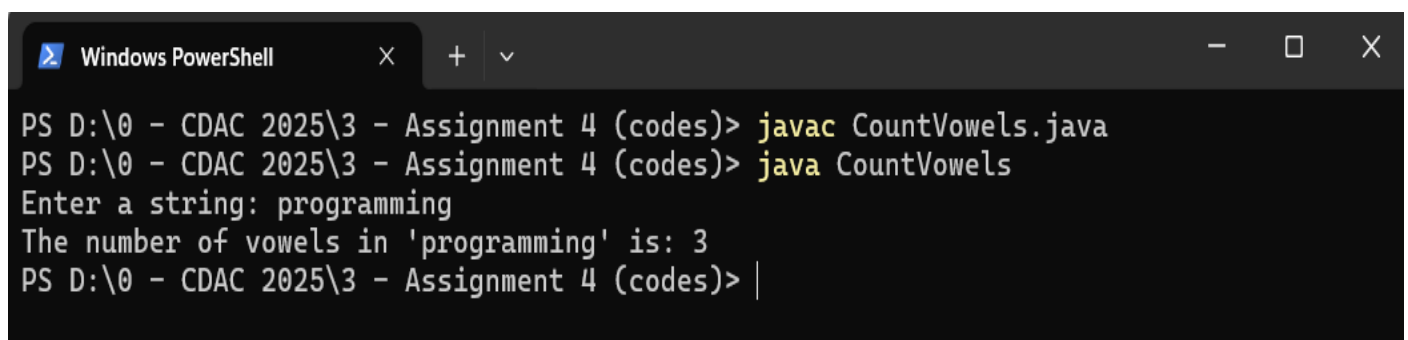
Sample Input:

Enter a string: programming

Expected Output:

The number of vowels in 'programming' is: 3

```java
import java.util.Scanner;

public class CountVowels
{
    public static void main(String[] args)
    {
        String str;
        int count = 0;

        Scanner sc = new Scanner(System.in);

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

        str = str.toLowerCase();

        for (int i = 0; i < str.length(); i++)
        {
            char c = str.charAt(i);


            if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u')
            {
                count++;
            }
        }

        System.out.println("The number of vowels in '" + str + "' is: " + count);


    }
}
```

Output:

```
Windows PowerShell

PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac CountVowels.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java CountVowels
Enter a string: programming
The number of vowels in 'programming' is: 3
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

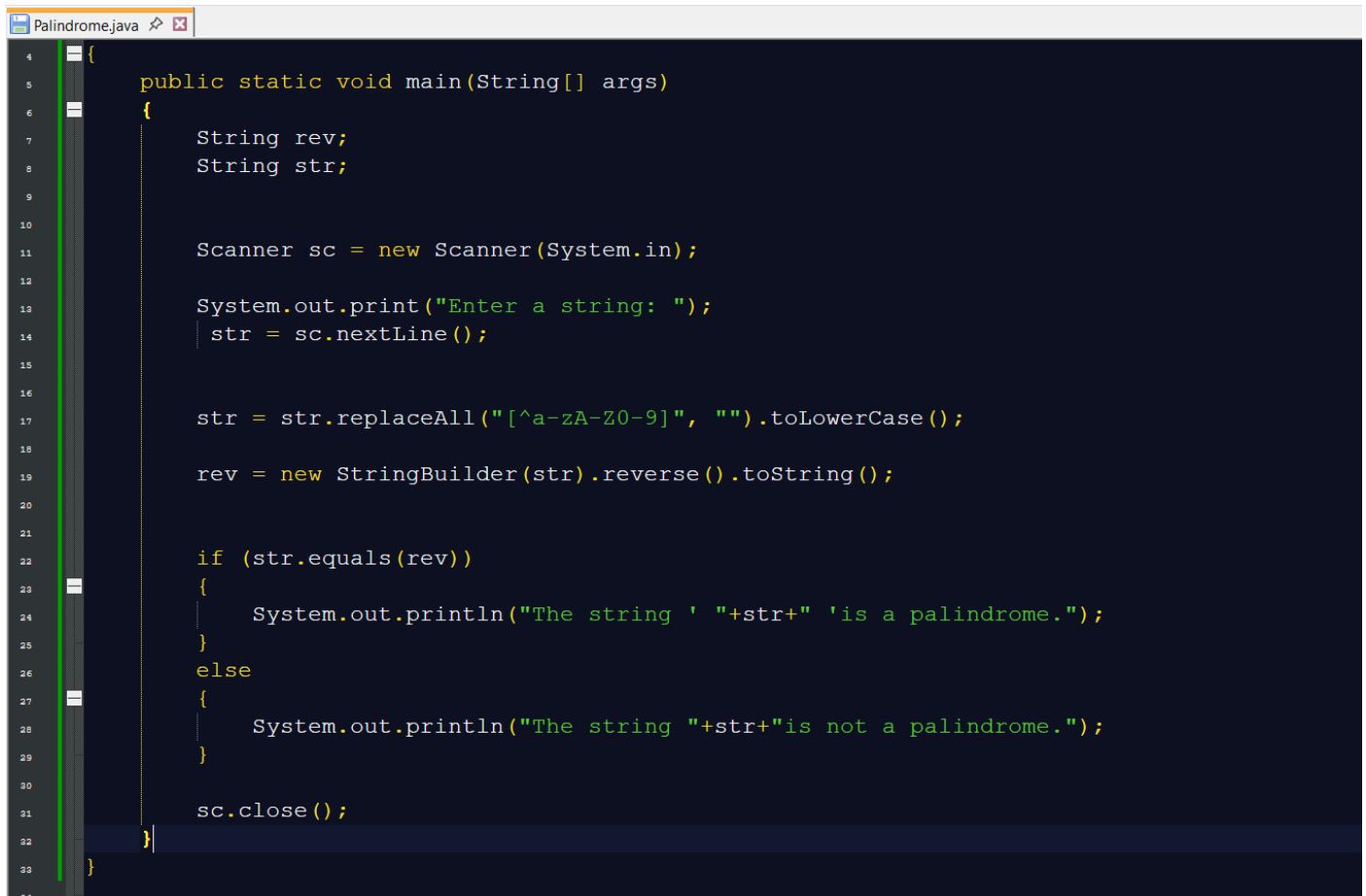## Question 26: Check if a String is a Palindrome Problem Statement:

Write a Java program that asks the user for a string and checks whether the string is a palindrome. A palindrome is a string that reads the same backward as forward (ignoring spaces and punctuation).
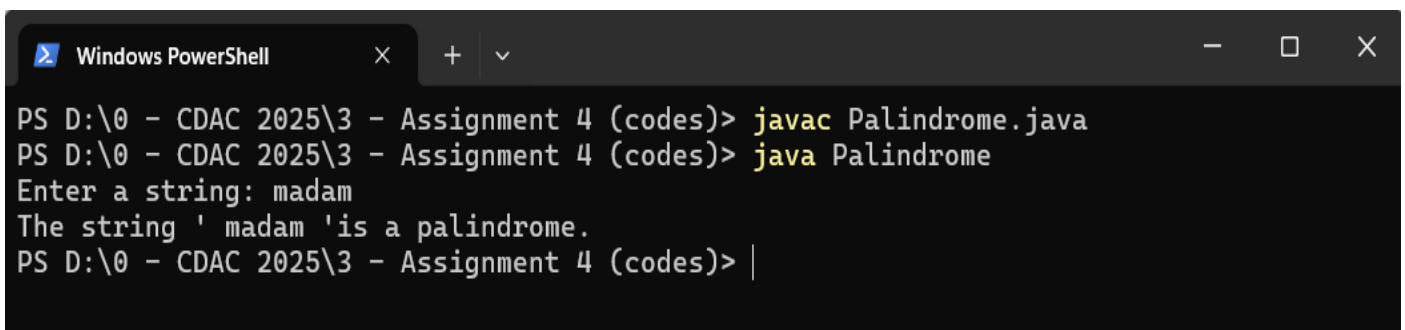
Sample Input:

Enter a string: madam

Expected Output:

The string 'madam' is a palindrome.

```java
{
    public static void main(String[] args)
    {
        String rev;
        String str;


        Scanner sc = new Scanner(System.in);

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



        str = str.replaceAll("[^a-zA-Z0-9]", "").toLowerCase();

        rev = new StringBuilder(str).reverse().toString();


        if (str.equals(rev))
        {
            System.out.println("The string ' "+str+" 'is a palindrome.");
        }
        else
        {
            System.out.println("The string "+str+"is not a palindrome.");
        }

        sc.close();
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac Palindrome.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java Palindrome
Enter a string: madam
The string ' madam 'is a palindrome.
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 27: String Literal and Object Creation Problem Statement:
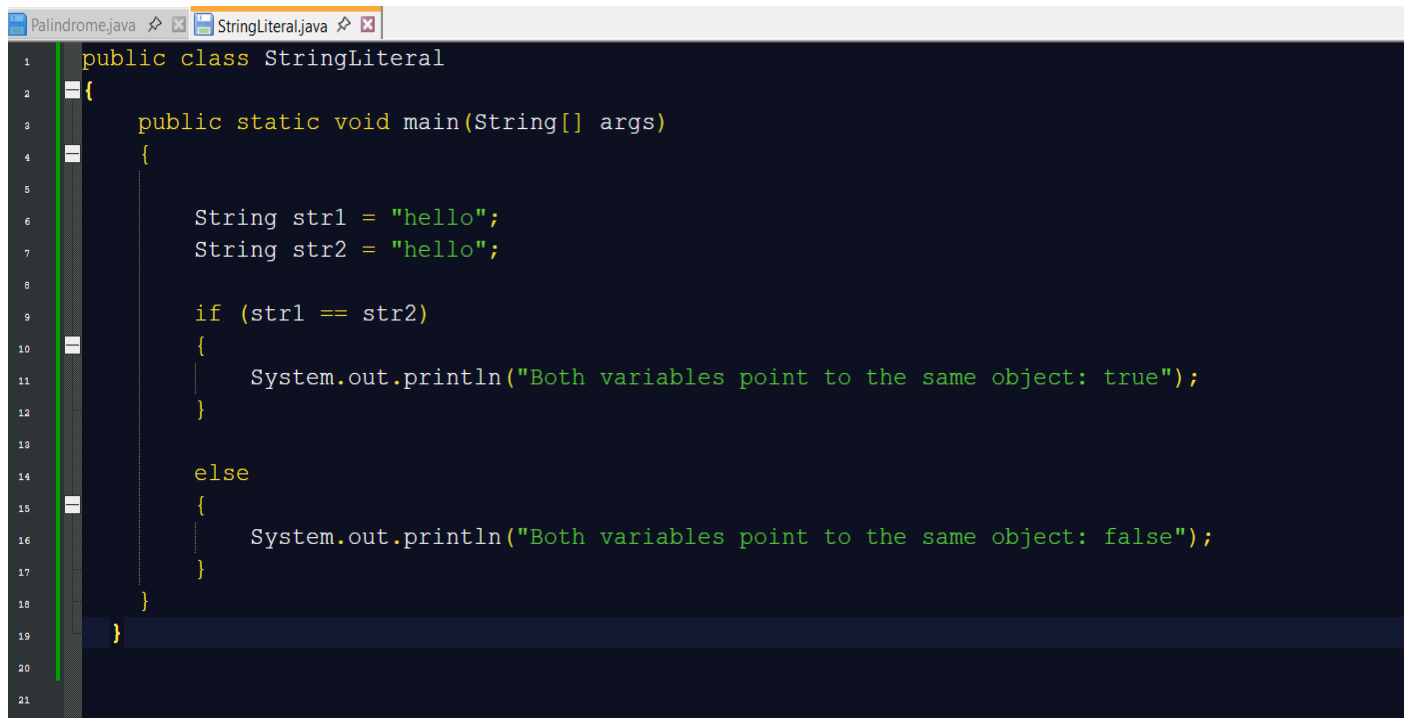
Write a Java program that creates two string variables using string literals with the same content. Then, print whether both variables point to the same object.

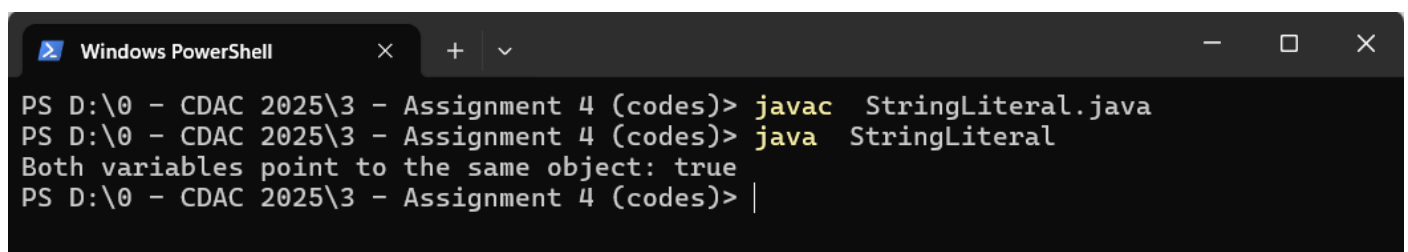**Code Example:**

String str1 = "hello"; String str2 = "hello";

Expected Output:

Both variables point to the same object: true

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

        String str1 = "hello";
        String str2 = "hello";

        if (str1 == str2)
        {
            System.out.println("Both variables point to the same object: true");
        }

        else
        {
            System.out.println("Both variables point to the same object: false");
        }
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac  StringLiteral.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java  StringLiteral
Both variables point to the same object: true
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> |
```

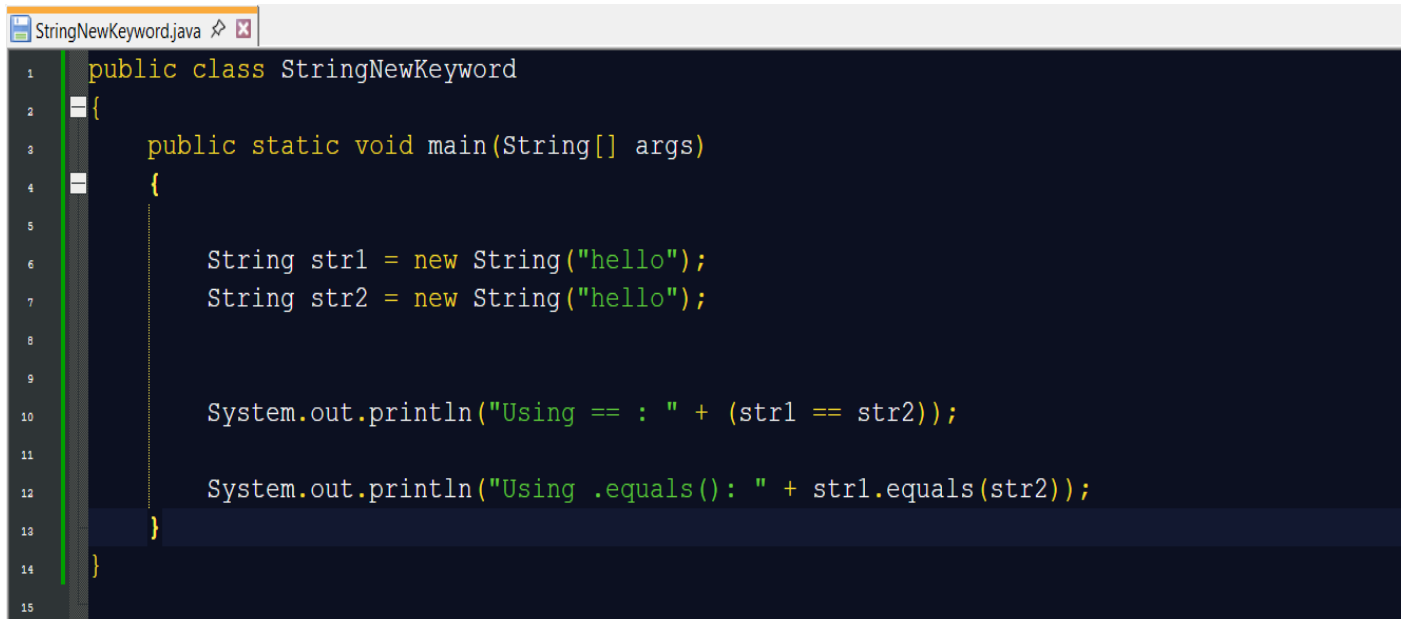## Question 28: String Creation with new Keyword

Problem Statement:

Write a Java program that creates two string objects using the new keyword with the same content. Then, print whether both objects are the same using the == operator and the .equals() method.
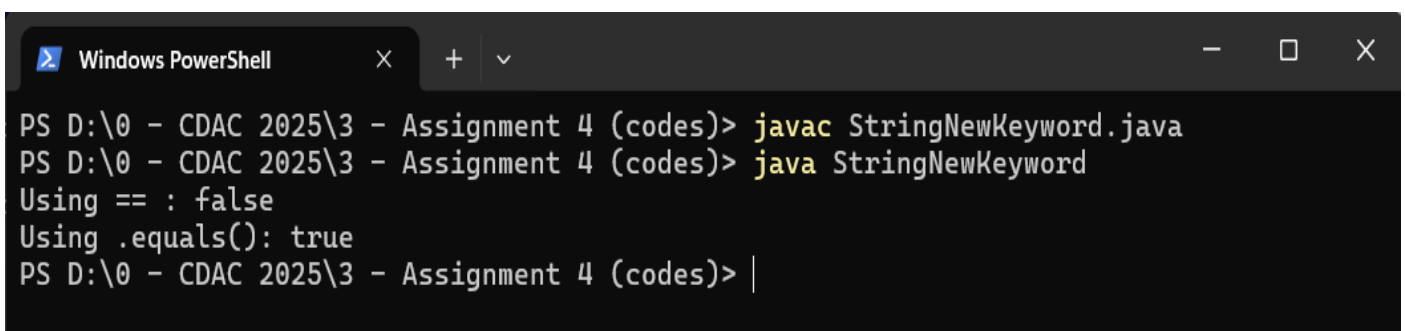
Code Example:

String str1 = new String("hello"); String str2 = new String("hello");

Expected Output: Using == : false Using .equals(): true

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

        String str1 = new String("hello");
        String str2 = new String("hello");


        System.out.println("Using == : " + (str1 == str2));

        System.out.println("Using .equals(): " + str1.equals(str2));
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac StringNewKeyword.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java StringNewKeyword
Using == : false
Using .equals(): true
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

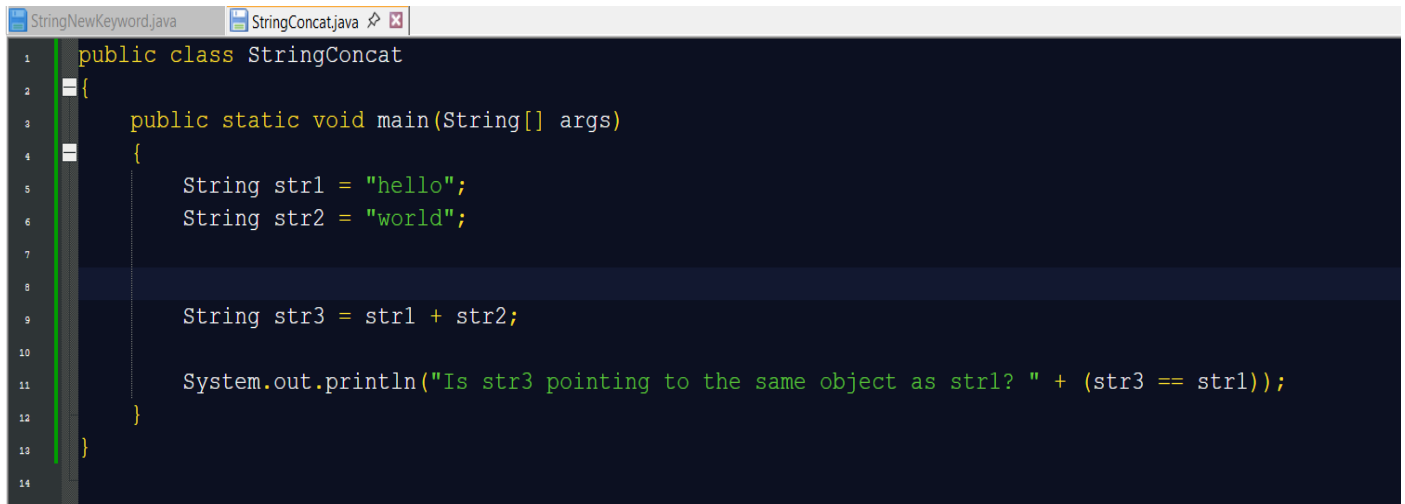## Question 29: String Concatenation and Object Creation Problem Statement:

Write a Java program that concatenates two strings using the + operator. Print whether the concatenated string is a new object or a reference to an existing string object using the == operator.

Code Example:

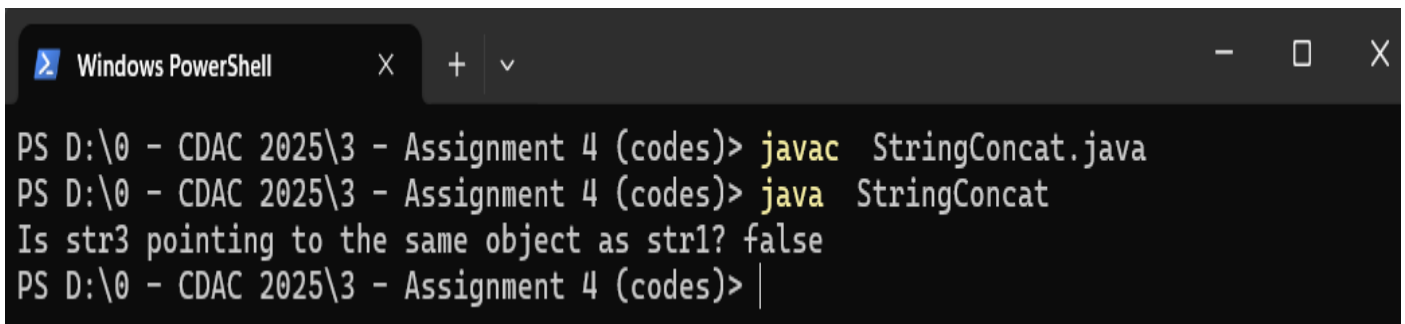String str1 = "hello"; String str2 = "world"; String str3 = str1 + str2;

Expected Output:

Is str3 pointing to the same object as str1? false

```java
public class StringConcat
{
    public static void main(String[] args)
    {
        String str1 = "hello";
        String str2 = "world";


        String str3 = str1 + str2;

        System.out.println("Is str3 pointing to the same object as str1? " + (str3 == str1));
    }
}
```

OutPut:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac  StringConcat.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java  StringConcat
Is str3 pointing to the same object as str1? false
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

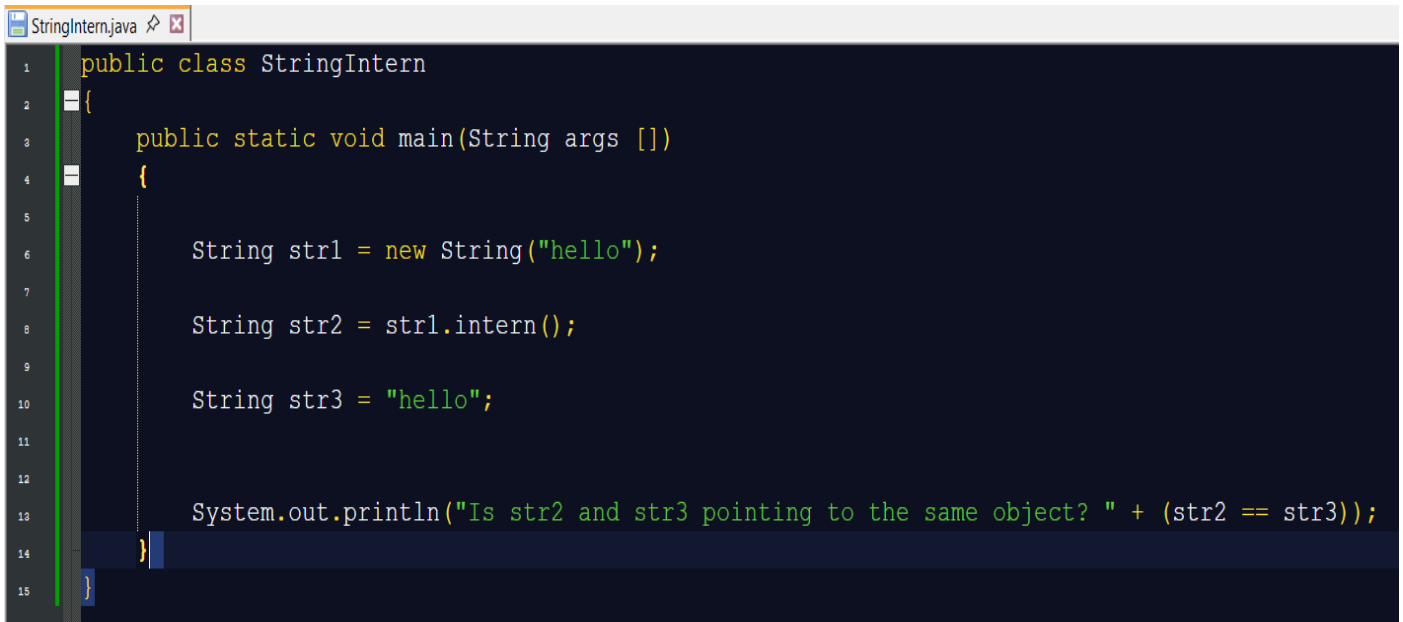# Question 30: String Pool with intern() Method Problem Statement:

Write a Java program that creates a string using the new keyword and then calls the intern() method. Print whether the interned string is pointing to the same object as the original string literal.

Code Example:

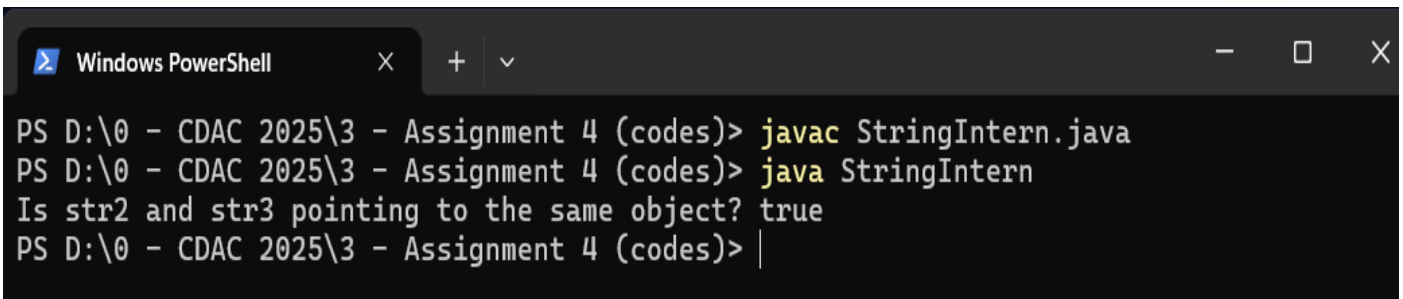String str1 = new String("hello"); String str2 = str1.intern();
String str3 = "hello";

Expected Output:

Is str2 and str3 pointing to the same object? true

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

        String str1 = new String("hello");

        String str2 = str1.intern();

        String str3 = "hello";


        System.out.println("Is str2 and str3 pointing to the same object? " + (str2 == str3));
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac StringIntern.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java StringIntern
Is str2 and str3 pointing to the same object? true
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```

Question 31: Multiple String Literals with Same Content
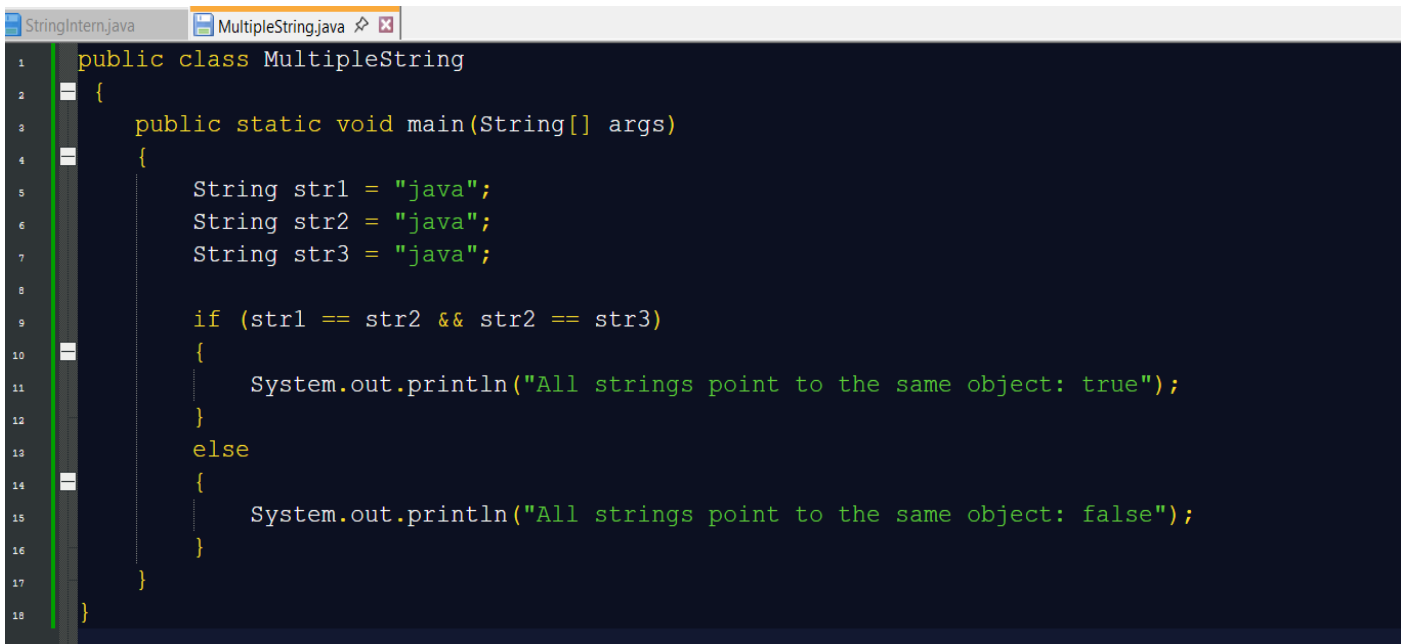
Problem Statement:
Write a Java program that declares three string literals with the same content and prints whether all three strings refer to the same object using the == operator.

Code Example:
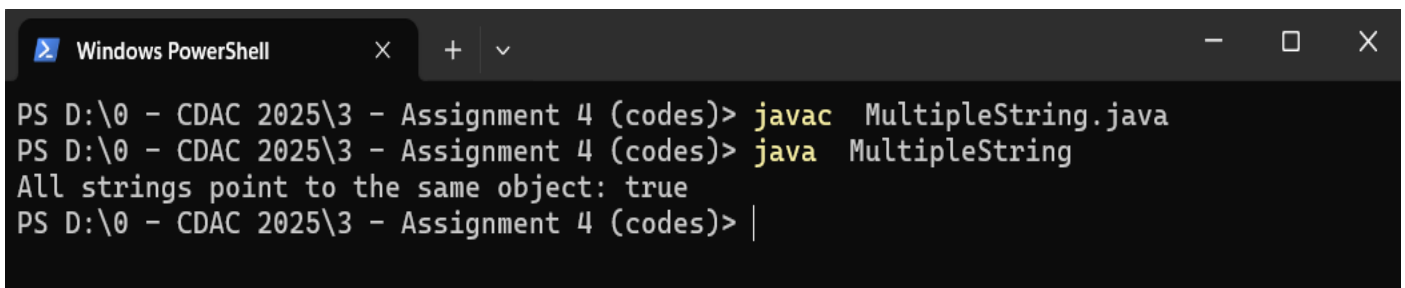String str1 = "java"; String str2 = "java"; String str3 = "java";

Expected Output:
All strings point to the same object: true

```java
public class MultipleString
{
    public static void main(String[] args)
    {
        String str1 = "java";
        String str2 = "java";
        String str3 = "java";

        if (str1 == str2 && str2 == str3)
        {
            System.out.println("All strings point to the same object: true");
        }
        else
        {
            System.out.println("All strings point to the same object: false");
        }
    }
}
```

Output:

```
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> javac  MultipleString.java
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)> java  MultipleString
All strings point to the same object: true
PS D:\0 - CDAC 2025\3 - Assignment 4 (codes)>
```