Object Oriented Programming Using - JAVA

PRACTICAL – 5

Aim: Write a program in Java to multiply two Matrix.

Theory: The matrix multiplication program is used to find the product of two square matrices. First, the user enters the size of the matrix and then provides the elements of the two matrices. Using three nested loops, the program takes each row of the first matrix and multiplies it with each column of the second matrix, then adds up the results. This gives us the value of one element in the new matrix. The process continues until all elements of the product matrix are calculated. In the end, the program prints the final multiplied matrix.

Code:

```
import java.util.Scanner;

public class matrix {
   public static void main(String[] args) {
      Scanner input = new Scanner(System.in);

      System.out.print("Enter size of matrix: ");
      int n = input.nextInt();

      int[][] a = new int[n][n];
      int[][] b = new int[n][n];
      int[][] c = new int[n][n];

      System.out.println("Enter elements of first matrix:");
      for (int i = 0; i < n; i++) {
         for (int j = 0; j < n; j++) {
            a[i][j] = input.nextInt();
         }
      }
      System.out.println("Enter elements of second matrix:");
      for (int i = 0; i < n; i++) {
         for (int j = 0; j < n; j++) {
            b[i][j] = input.nextInt();
         }
      }
      System.err.println("Multiplying the matrices.....");
      for (int i = 0; i < n; i++) {
         for (int j = 0; j < n; j++) {
            for (int k = 0; k < n; k++) {
               c[i][j] += a[i][k] * b[k][j];
            }
```


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```
        }
      }

     System.out.println("Product of matrices:");
      for (int i = 0; i < n; i++) {
         for (int j = 0; j < n; j++) {
            System.out.print(c[i][j] + " ");
         }
         System.out.println();
      }
      input.close();
   }
}
```

Output:

```
Output
Enter size of matrix: 3 3
Enter elements of first matrix:
5 18 11
9 25 14
7 15 20
Enter elements of second matrix:
2 23 16
12 6 3
22 10 19
Multiplying the matrices.....
Product of matrices:
194 462 279
439 680 557
437 442 514
```

Conclusion: The matrix multiplication program helps us understand how two matrices can be multiplied using simple loops. It shows how each element of the result matrix is built step by step by combining rows and columns. This makes it easy to see how programming can handle bigger mathematical problems in a structured way.