Experiment 5

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Branch: CSE
Section/Group: 702 A
Semester: 5th
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Subject Name: DAA Lab
Subject Code: 20-CSP-312

1. Aim/Overview of the practical:

Code and analyze to find an optimal solution to matrix chain multiplication using dynamic programming.

2. Task to be done/ Which logistics used:

To write code and analyze to find an optimal solution to matrix chain multiplication using dynamic programming.

3. Algorithm/Flowchart (For programming based labs):

4. Steps for experiment/practical/Code:

```
package com.DAA;

public class DAA_exp5 {

	static int MatrixChainOrder(int p[], int n)
	{
		int m[][] = new int[n][n];

	    int i, j, k, L, q;


	    for (i = 1; i < n; i++)
	        m[i][i] = 0;


	    for (L = 2; L < n; L++) {
	        for (i = 1; i < n - L + 1; i++) {
	            j = i + L - 1;
	            if (j == n)
	                continue;
	            m[i][j] = Integer.MAX_VALUE;
	            for (k = i; k <= j - 1; k++) {

	                q = m[i][k] + m[k + 1][j] + p[i - 1] * p[k] * p[j];
	                if (q < m[i][j])
	                    m[i][j] = q;
	            }
	        }
	    }

	    return m[1][n - 1];
	}


	public static void main(String args[])
	{
	    int arr[] = new int[] { 1, 2, 3, 4 };
	    int size = arr.length;
```

```
        System.out.println();

        System.out.println("Minimum number of multiplications is "
                + MatrixChainOrder(arr, size));
    }
}
```

5. Observations/Discussions/ Complexity Analysis:

Time complexity is O(1).

6. Result/Output/Writing Summary:

```
Minimum number of multiplications is 18
```

Learning outcomes (What I have learnt):

1. **Learnt about dynamic programming.**
2. **Learnt how to make optimal algorithm.**
3. **Learnt about matrix application using dynamic programming.**
4. **Learnt about the implementation of dynamic programming.**
5.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			