Experiment-2.1

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Subject Name: DAA lab

1. Aim/Overview of the practical:

Write a program for matrix chain multiplication using dynamic programming.

2. Task to be done/which logistics used:

In this program we are going to implement a program to multiply matrices using dynamic programming

3. Algorithm/Flowchart:

1 .matrix class order (p)

2. N=p.length-1

3. For p=1 to n

4. m[i,j]=0

5. for l=2 to n

6. for i=1 to n-2+1

7. j=i+l-1

8. m[i,j]=infinity

9. for k=i to j-1

10. q=m[i,k]+m[k+1,j]+p i-1 pk pj

11. if q<mm[i,j]

12. M[i,j]-q

13. s[i,j]=k

14. return m and s

4. Steps for experiment/practical/Code:

```c
#include<stdio.h>
#include<limits.h>
 int MatrixChainMultiplication(int p[], int n)
{
    int m[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;
            m[i][j] = INT_MAX;

            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])
```
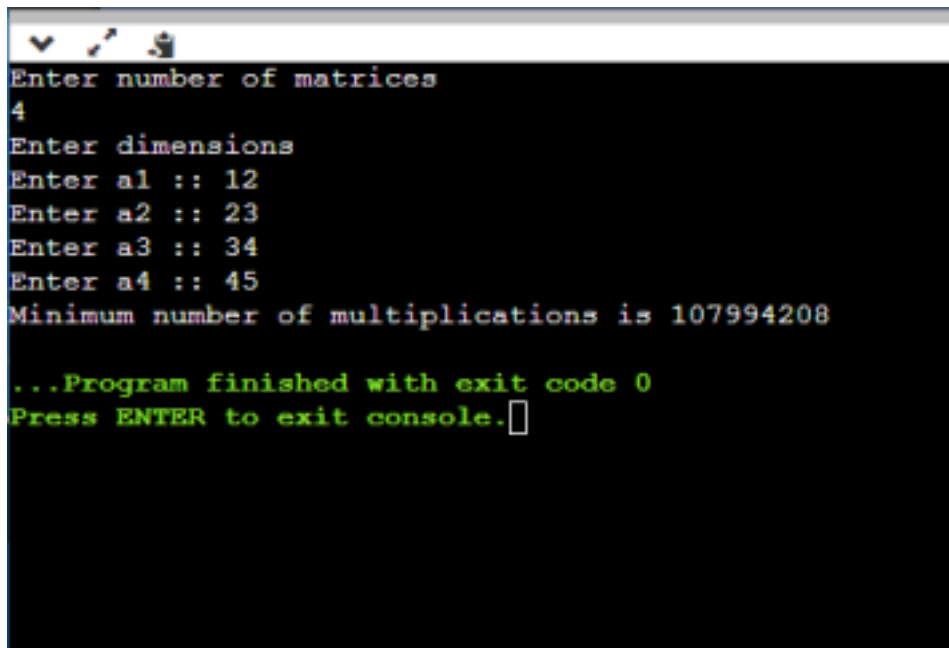
```
            {

                m[i][j] = q;



            }

        }

      }

    }


    return m[1][n-1];


}


int main()
{
   int n,i;
   printf("Enter number of matrices\n");
   scanf("%d",&n);


   n++;


   int arr[n];


   printf("Enter dimensions \n");
```

```c
    for(i=1;i<n;i++)
    {
        printf("Enter a%d :: ",i);
        scanf("%d",&arr[i]);
    }
    int size = sizeof(arr)/sizeof(arr[0]);


    printf("Minimum number of multiplications is %d ", MatrixChainMultiplication(arr, size));


    return 0;
}
```

5. Observations/Discussions/ Complexity Analysis:

```
Enter number of matrices
4
Enter dimensions
Enter a1 :: 12
Enter a2 :: 23
Enter a3 :: 34
Enter a4 :: 45
Minimum number of multiplications is 107994208

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