CSE2012

DAA LAB

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Ex 05: Matrix Chain Multiplication using Dynamic programming

Code:

```
#include<iostream>
#include<limits.h>
using namespace std;
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;
    cout<<"Enter number of matrices\n";
    cin>>n;
    n++;
    int arr[n];
    cout<<"Enter dimensions \n";
    for(i=0;i<n;i++)
    {
        cout<<"Enter d"<<i<<" :: ";
        cin>>arr[i];
    }
    int size = sizeof(arr)/sizeof(arr[0]);
    cout<<"Minimum number of multiplications is "<<MatrixChainMultiplication(arr,
size);
    return 0;
}
```

Output:

```
PS E:\Coding\C++\DAA_LABS\LAB05> cd "e:\Coding\C++\DAA_LABS\LAB05\" ; if ($?) { g++ matrixChainMulDP.cpp -o matri
xChainMulDP } ; if ($?) { .\matrixChainMulDP }
Enter number of matrices
4
Enter dimensions
Enter d0 :: 80
Enter d1 :: 70
Enter d2 :: 50
Enter d3 :: 30
Enter d4 :: 10
Minimum number of multiplications is 106000
PS E:\Coding\C++\DAA_LABS\LAB05>
```