

## DAA LAB06

### 1)matrix chain multiplication

Code:

```
#include <bits/stdc++.h>
using namespace std;
int n; // no. of matrix
int k[10001][10001]={0}; // matrix for remember cuts

void p_o_p(int i,int j){ //priint_optimal_parens -> prints the multiplication order
    if(i==j)
        cout<<"A"<<i;
    else{
        cout<<"(";
        p_o_p(i,k[i][j]);
        p_o_p(k[i][j]+1,j);
        cout<<")";
    }
}

int main() {
    int n;
    cin>>n;
    int p[n+1]; // order array
    int c[n+1][n+1]={0}; // cost array

    for(int i=0;i<=n;i++)cin>>p[i];
    for(int i=1;i<=n;i++)c[i][i]=0;

    for(int l=2;l<=n;l++){
        for(int i=1;i<=n-l+1;i++){
            int j=i+l-1;
            c[i][j] = INT_MAX;
            for(int a=i;a<=j;a++){
                int q = c[i][a]+c[a+1][j]+ (p[i-1]*p[a]*p[j]);
                if(q < c[i][j]){
                    c[i][j] = q;
                    k[i][j] = a;
                }
            }
        }
    }
}
```

```

        cout<<"no. of multiplications :"<<c[1][n]<<"\n";
        cout<<"multiplication order :";

        p_o_p(1,n);
        return 0;
    }

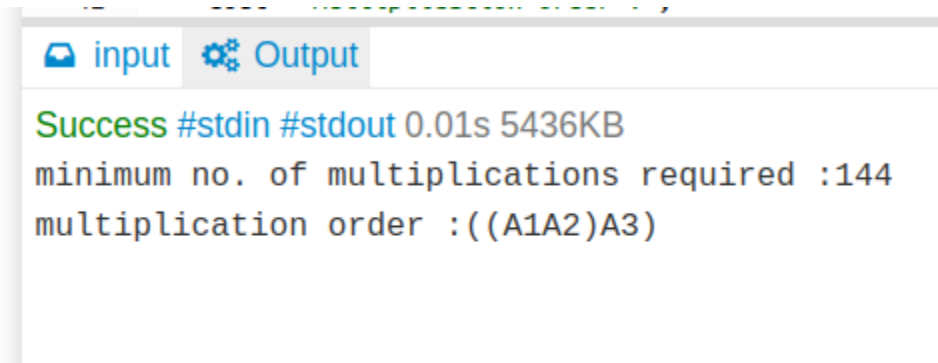
```

INPUT 1:

No .of matrix = 3;

Matrix order array={3,5,4,7}

OUTPUT 1:



The screenshot shows a code execution interface with two tabs: 'input' and 'Output'. The 'Output' tab is active, displaying the following text: 'Success #stdin #stdout 0.01s 5436KB', 'minimum no. of multiplications required :144', and 'multiplication order :((A1A2)A3)'.

INPUT 2:

No .of matrix = 4;

Matrix order array={3,5,4,7,2}

OUTPUT 2:



The screenshot shows a code execution interface with two tabs: 'input' and 'Output'. The 'Output' tab is active, displaying the following text: 'Success #stdin #stdout 0.01s 5372KB', 'minimum no. of multiplications required :126', and 'multiplication order :(A1(A2(A3A4)))'.

INPUT 3:

No .of matrix = 6;

Matrix order array={30, 35, 15, 5 ,10, 20, 25}

OUTPUT 3:

 input  Output

Success #stdin #stdout 0.01s 5512KB

minimum no. of multiplications required :15125

multiplication order :((A1(A2A3))((A4A5)A6))