# KIET Group of Institutions, Ghaziabad

## Department of Computer Applications

**(An ISO – 9001: 2015 Certified & 'A' Grade accredited Institution by NAAC)**

**Design and Analysis of Algorithm**

**RCA 352: Session 2020-21**

**DAA Lab**

**Experiment-No.**

**Objective**: Implement matrix chain multplication

| Scheduled Date: | Compiled Date: | Submitted Date: |
|---|---|---|
| 23-10-20 | 23-10-20 | 23-110-20 |
| | | |

# *Matrix Chain Order(p)*

1. *n ← length[p]-1*
2. *for I ← 1 t0 n*
3. *do X[i,i] ← 0*
4. *for I ← 2 to n*
5. *do for I ← 1 to n-l+1*
6. *do j ← i+i-1*
7. *x[i, j] ← ∞*
8. *for k ← I to j-1*
9. *do q ← x[i ,k] + x[k+1,j]+$p_{i-1}p_kp_j$*
10. *if q < x[i,j]*
11. *then m[i, j] ← q*
12. *Y[i ,j] ← k*
13. ***return** x and y*

# Implementation of matrix chain multiplication

```
#include<stdio.h>

#include<conio.h>

#define  inf 9999

void matrix_chain_multiplication(int p[],int n,int X[11][11],int Y[11][11])
```

```
{
  int i,j,k,l,q;
  for(l=2;l<=n;l++)
  {
    for(i=1;i<=n-1l+1;i++)
    {
          j=i+l-1;
          X[i][j]=inf;
          for(k=1;k<=j-1;k++)
          {
            q=X[i][k] + X[k+1][j]+p[i-1]*p[k]*p[j];
            if(q<X[i][j])
            {
                X[i][j]=q;
                Y[i][j]=k;
            }
          }

    }
 }
}
void putdata(int S[11][11],int row,int column)
{
   int i,j;
   for(i=1;i<=row;i++)
```

```
  {
        for(j=1;j<=column;j++)
        {
         printf("%d\t",S[i][j]);
        }
        printf("\n");
  }
}
void main()
{
 int X[11][11],Y[11][11],i,n,j,p[11];
 for(i=0;i<=10;i++)
 {
  for(j=0;j<=10;j++)
  {
          X[i][j]=0;
          Y[i][j]=0;
   }
   p[i]=0;
}
printf("enter total number of matrices:");
scanf("%d",&n);
printf("enter chain of matrice:");
for(i=0;i<=n;i++)
  scanf("%d",&p[i]);
```

```
matrix_chain_multiplication(p,n,X,Y);

printf("\noutput");

putdata(X,n,n);

printf("\noutput");

putdata(Y,n,n);

getch();

}
```