In [5]:

```
import random
from pandas import *

matrix = [[10, 30], [30, 70], [70, 2], [2, 100]]
m = [[0] * 4 for i in range(4)]
s = [[0] * 4 for j in range(4)]

def MatrixMultiplication(inp):
    for i in range(inp):
        m[i][i] = 0
    for r in range(1, inp):
        for i in range(inp-r):
            j = i + r
            m[i][j] = m[i+1][j] + matrix[i][0] * matrix[i][1] *
matrix[j][1]
            s[i][j] = i+1
            for k in range(i+1, j):
                judge = m[i][k] + m[k+1][j] + matrix[i][0] * mat
rix[k][1] * matrix[j][1]
                if judge < m[i][j]:
                    m[i][j] = judge
                    s[i][j] = k+1

def printmatrix(left, right):
    if left == right:
        print("A"+str(left+1), end='')
    else:
        print("(", end='')
        printmatrix(left, s[left][right]-1)
        printmatrix(s[left][right], right)
        print(")", end='')

MatrixMultiplication(4)
dm = DataFrame(m, index=list(range(1, 5)), columns=list(range(1,
5)))
ds = DataFrame(s, index=list(range(1, 5)), columns=list(range(1,
5)))
print('Matrix:',matrix)
print("The number of multiplications: \n", dm)
printmatrix(0, 3)
```

```
Matrix: [[10, 30], [30, 70], [70, 2], [2, 100]]
The number of multiplications:
    1      2     3      4
1   0  21000  4800   6800
2   0      0  4200  10200
3   0      0     0  14000
4   0      0     0      0
((A1(A2A3))A4)
```