

BFS

DFS

Max Adjacency

Min Separation

BFS

Dijkstra

DFS

Backtrack

Concepts of Neighbors

Greedy algorithm

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \begin{bmatrix} 1 & 4 \\ 2 & 5 \\ 3 & 6 \end{bmatrix} = \begin{bmatrix} 13 & 32 \\ 32 & 77 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} 9 & 12 & 15 \\ 19 & 26 & 33 \\ 29 & 40 & 51 \end{bmatrix}$$

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \times \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$$

$$= \begin{bmatrix} c_{11} & c_{12} \\ c_{21} & c_{22} \end{bmatrix}$$

$$c_{ik} = \sum_j a_{ij} \cdot b_{jk}$$

$$i \begin{bmatrix} j \\ j \end{bmatrix} \begin{bmatrix} k \\ k \end{bmatrix} = i \begin{bmatrix} k \\ k \end{bmatrix}$$

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$$

$$c_{ik} = \min_j (a_{ij} + b_{jk})$$

$$M = M_1 M_2 M_3 M_4$$

$$10 \times 11, 11 \times 25, 25 \times 40, 40 \times 12$$

$$\left(\left((M_1 \times M_2) \times M_3 \right) \times M_4 \right)$$

Need 17550 Multiplication

$$\left(M_1 \left(M_2 \left(M_3 \times M_4 \right) \right) \right)$$

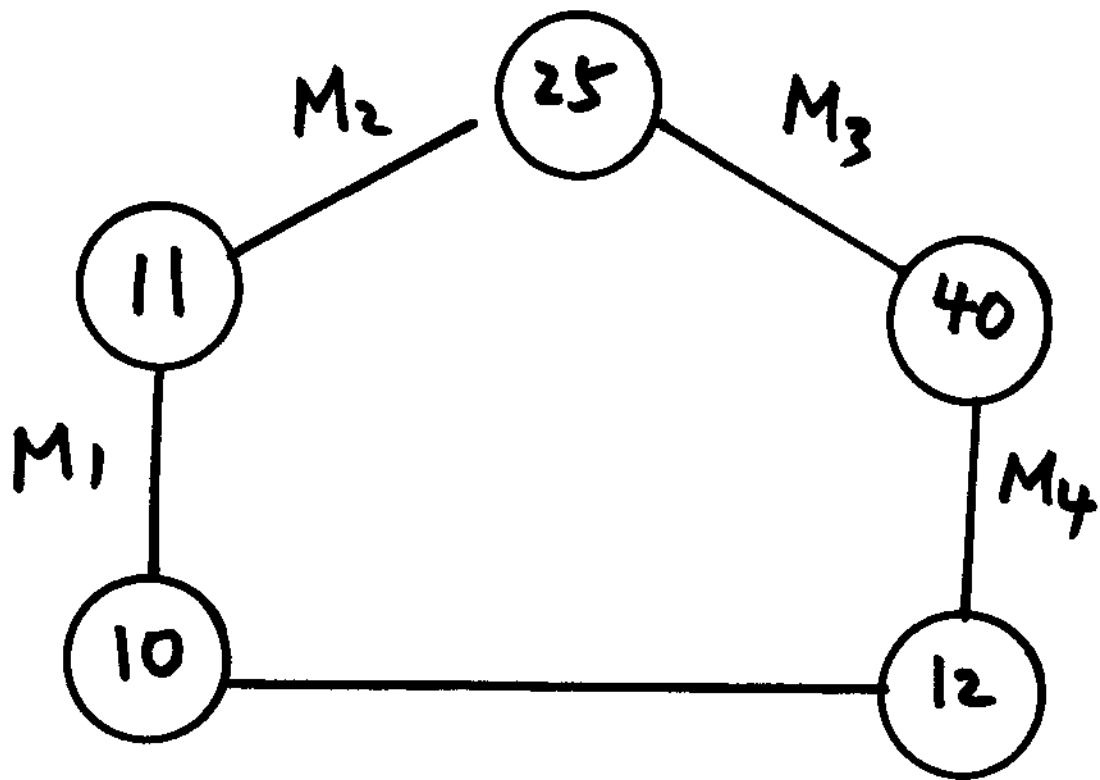
Need 16620 multiplications

For n matrices

$$\equiv \frac{[2(n-2)]!}{(n-2)!(n-1)!} \quad \text{ways to}$$

put the $(n-2)$ parentheses

Catalan Numbers



$$25 \times 40 \times 12 = 12000$$

$$11 \times 25 \times 12 = 3300$$

$$10 \times 11 \times 12 = 1320$$

$$16620$$