CS 312: Algorithm Analysis

Homework Assignment #16

Show all work neatly.

Question 1: (5) You are given five matrices with the following dimensions:
- $M_1$: 20 x 5
- $M_2$: 5 x 10
- $M_3$: 10 x 12
- $M_4$: 12 x 6
- $M_5$: 6 x 25

You wish to compute the product of the matrix chain $M_1 \cdot M_2 \cdot M_3 \cdot M_4 \cdot M_5$. What is the optimal (minimal) number of scalar multiplications required to compute this product? Use dynamic programming to compute the answer and show your work.

Question 2: (5) For the following graph, step through Floyd’s algorithm (Floyd-Warshall), showing the $D$ matrix at each step, and report the resulting shortest paths between all pairs of vertices.