# Homework 7

due March 31, 2025

## Problem 1:

Find the best order of multiplication (or equivalently, the least costly parenthesization) of the product $A \cdot B \cdot C \cdot D \cdot E \cdot F$ with $A$ an $5 \times 8$ matrix, $B$ an $8 \times 7$ matrix, $C$ an $7 \times 12$ matrix, $D$ a $12 \times 6$ matrix, $E$ a $6 \times 20$ matrix, and $F$ a $20 \times 10$ matrix.

## Problem 2:

Given the following tableau already filled in, find the best selection of the following items: A with weight 2 and value 4, B with weight 3 and value 5, C with weight 4 and value 9, D with weight 5 and value 13, E with weight 6 and value 16, F with weight 7 and value 19, and G with weight 8 and value 20. The capacity is 17.

| | / | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|---|
| 0 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 : | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 : | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3 : | 0 | 4 | 5 | 5 | 5 | 5 | 5 | 5 |
| 4 : | 0 | 4 | 5 | 9 | 9 | 9 | 9 | 9 |
| 5 : | 0 | 4 | 9 | 9 | 13 | 13 | 13 | 13 |
| 6 : | 0 | 4 | 9 | 13 | 13 | 16 | 16 | 16 |
| 7 : | 0 | 4 | 9 | 14 | 17 | 17 | 19 | 19 |
| 8 : | 0 | 4 | 9 | 14 | 18 | 20 | 20 | 20 |
| 9 : | 0 | 4 | 9 | 18 | 22 | 22 | 23 | 23 |
| 10 : | 0 | 4 | 9 | 18 | 22 | 25 | 25 | 25 |
| 11 : | 0 | 4 | 9 | 18 | 26 | 29 | 29 | 29 |
| 12 : | 0 | 4 | 9 | 18 | 27 | 29 | 32 | 32 |
| 13 : | 0 | 4 | 9 | 18 | 27 | 33 | 35 | 35 |
| 14 : | 0 | 4 | 9 | 18 | 31 | 34 | 36 | 36 |
| 15 : | 0 | 4 | 9 | 18 | 31 | 38 | 39 | 39 |
| 16 : | 0 | 4 | 9 | 18 | 31 | 38 | 41 | 41 |
| 17 : | 0 | 4 | 9 | 18 | 31 | 42 | 44 | 44 |

## Problem 3:

Find the Levenshtein distance and the minimum edits between ATAGGCT and GTGGAT.