

# Csci 335 Assignment 5

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*Due May 14, 2019*

## **Find optimal order of matrix multiplications using dynamic programming (100)**

Given the sizes of a number of matrices, calculate the optimal multiplication ordering using dynamic programming. The sizes will be presented in a file containing dimensions in a sequence:

For example

dimensions\_file.txt can be

50

10

40

30

5

That means that  $c_0 = 50$ ,  $c_1 = 10$ ,  $c_2 = 40$ ,  $c_3 = 30$ , and  $c_4 = 5$ . Therefore the matrices to be multiplied have sizes:

Matrix 1: 50 x 10

Matrix 2: 10 x 40

Matrix 3: 40 x 30

Matrix 4: 30 x 5

Obviously when the dimensions\_file.txt contains  $N$  numbers, then the matrices to be multiplied are  $N - 1$ .

Write a program that runs as follows:

`./optimal_multiplications dimensions_file.txt`

The program should produce the optimal number of multiplications.

For extra credit also produce the optimal ordering as well.