

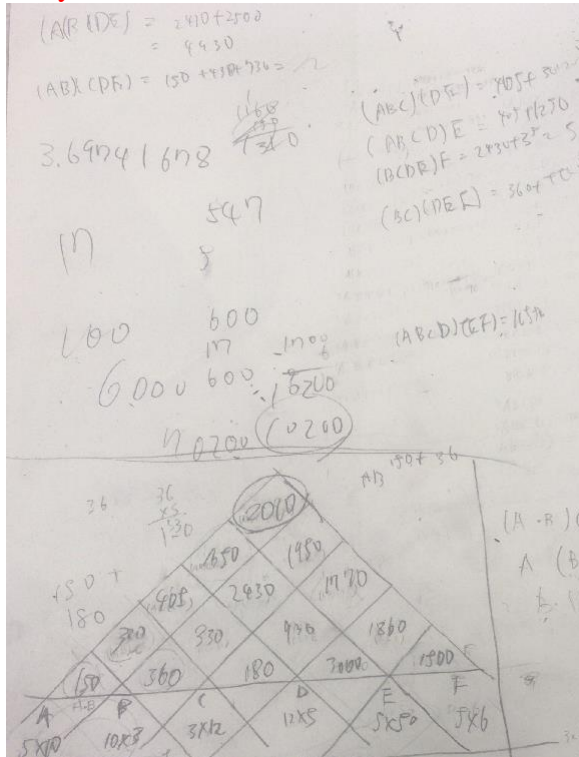
Exercise 9. Answer Sheet

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Problem 1. (40 points) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $\langle 5, 10, 3, 12, 5, 50, 6 \rangle$. Show your work (costs matrix **m**, number of multiplications).

Put your answer here.



Cost is 2010

$((AB)((CD)(EF)))$

Problem 2. (60 points) Write a program implementing the algorithms Matrix-Chain-Order and Print-Optimal-Parens given in the lecture. Upload your code. Using your program, find the optimal parenthesization for the following matrix-chain products and show your **m** and **s** matrices.

a) (20 points) $p = [30, 35, 15, 5, 10, 20, 25]$

Put your answer here.

Please enter the number of matrix chain

6

Please enter the order of chain matrix

35 15 5 10 20 25

30 35 15 5 10 20

//Cost of Matrix//

0 2625 4375 7125 10500 15125

0 0 750 2500 5375 9500

0 0 0 1000 3500 7250
0 0 0 0 5000 12500
0 0 0 0 0 15000
0 0 0 0 0 0

//Sequence of Matrix//

0 1 2 2 2 2
0 0 2 2 2 2
0 0 0 3 4 5
0 0 0 0 4 5
0 0 0 0 0 5
0 0 0 0 0 0

((AB)((CD)E)F))

Cost of Matrix chain multiplication is 15125

b) (20 points) $p = [10, 20, 10, 15, 20, 10]$

Put your answer here.

Please enter the number of matrix chain

5

Please enter the order of chain matrix

20 10 15 20 10

10 20 10 15 20

//Cost of Matrix//

0 3000 7000 6500 7500
0 0 3000 4500 5500
0 0 0 3000 4500
0 0 0 0 2000
0 0 0 0 0

//Sequence of Matrix//

0 1 1 1 1
0 0 2 2 4
0 0 0 3 4
0 0 0 0 4
0 0 0 0 0

(A((B(CD))E))

Cost of Matrix chain multiplication is 7500

c) (20 points) $p = [100, 10, 100, 1, 1000, 100]$

Put your answer here.

Please enter the number of matrix chain

5

Please enter the order of chain matrix

10 100 1 1000 100

100 10 100 1 1000

//Cost of Matrix//

0 1000 11000 102000 112000

0 0 100000 110000 120000

0 0 0 100000 110000

0 0 0 0 100000000

0 0 0 0 0

//Sequence of Matrix//

0 1 2 2 2

0 0 2 2 2

0 0 0 3 4

0 0 0 0 4

0 0 0 0 0

((AB)((CD)E))

Cost of Matrix chain multiplication is 112000