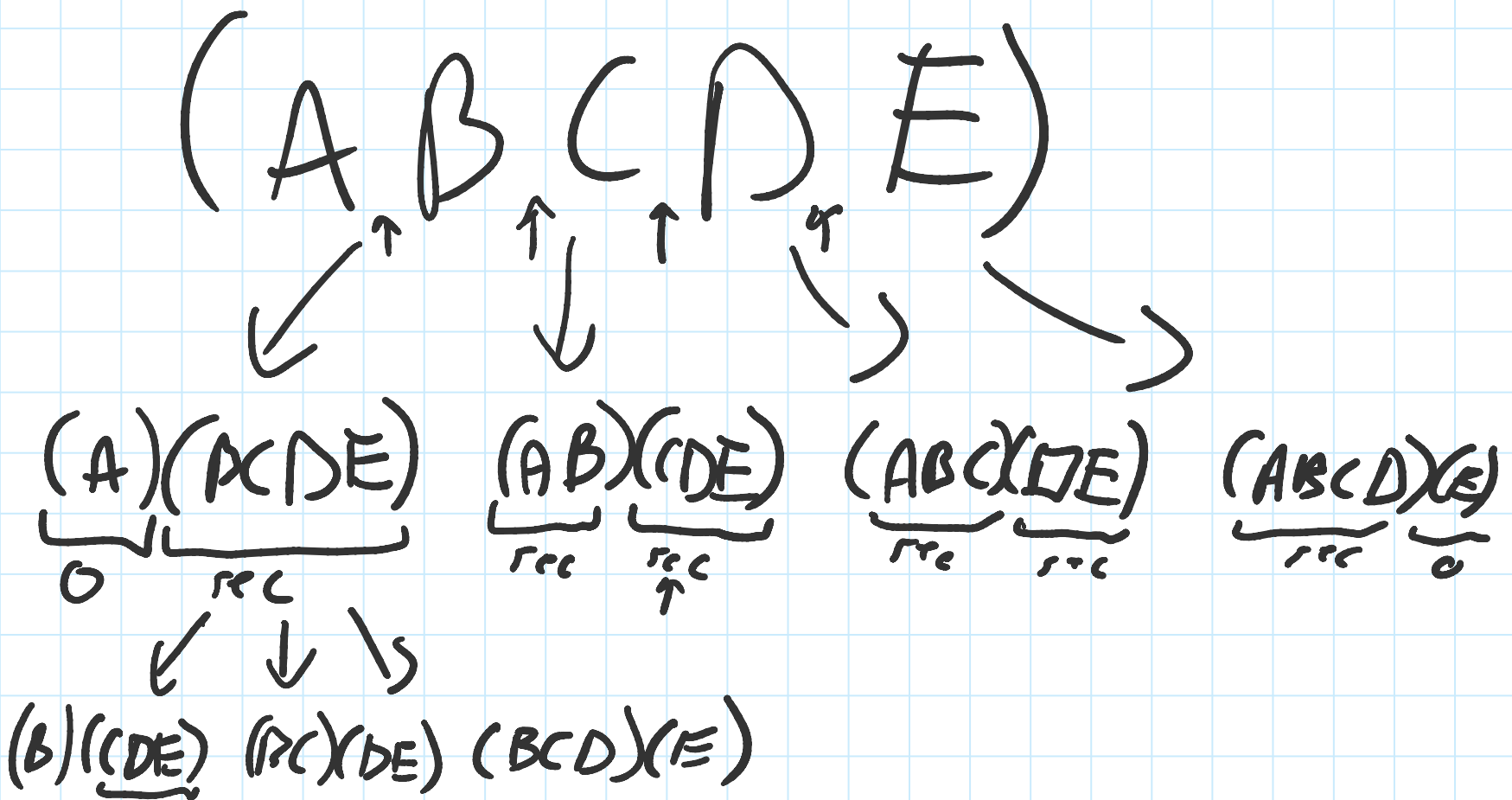


MCM - Matrix Chain Multiplication

4 x 1 1 x 2 2 x 3 3 x 6 6 x 5
 A B C D E



This is terrible

Let's use bottom up

	A	B	C	D	E
A	0	8	18	48	
B	Inv	0	6	24	54
C	Inv	Inv	0	36	96

Σ 0^m

50

C	Inv	Inv	0	36	16
D	Inv	Inv	Inv	0	*90
E	Inv	Inv	Inv	Inv	0

$$AB = \text{num}(A, A) + \text{num}(B, B) + \text{op}(A, AB, B)_8$$

$$4 \times 1 \quad 1 \times 2 \quad 2 \times 3 \quad 3 \times 6 \quad 6 \times 5$$

↑ 4x1x2

$$BC \quad 1 \times 2 \times 3$$

$$CD \quad 2 \times 3 \times 6$$

$$DE \quad 3 \times 6 \times 5$$

ABC

BCD

CDE

ABC → (A)(BC) [A,A] [B,C] operations
 $0 + 6 + 4 \times 1 \times 3 = 18$

(AB)(C) [A,B] [C,C] operations
 $8 + 0 + 4 \times 2 \times 3 = 32$

↑ 4x2 ↑ 2x3

BCD → (B)(CD) [B,B] [C,D] operations
 $0 + 36 + 1 \times 2 \times 6 = 48$

(BC)(D) [B,C] [D,D] operations
 $6 + 0 + 1 \times 3 \times 6 = 24$

$$(CD)(D) = 6 + 0 + 1 \times 3 \times 6 = 24$$

$$CDE \rightarrow (C)(DE) = 0 + 90 + 2 \times 3 \times 5 =$$

$$(CD)(E) = \underline{36 + 0 + 2 \times 6 \times 5 = 96}$$

$$ABCD \rightarrow (A)(BCD) = 0 + 24 + 4 \times 1 \times 6 = \underline{48}$$

$$(AB)(CD) = 8 + 36 + 4 \times 2 \times 6 = 92$$

$$(ABC)(D) = 18 + 0 + 4 \times 3 \times 6 = 90$$

$$(BCDE) \rightarrow (B)(CDE) = 0 + 96 + 1 \times 2 \times 5 =$$

$$(BC)(DE) = 6 + 90 + 1 \times 3 \times 5 =$$

$$(BCD)(E) = 24 + 0 + 1 \times 6 \times 5 = \underline{54}$$

Answer 74

try to find it

on your own.

0-1 Knapsack

~~Space Saving~~ Cap = 15

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ← single array

W V

6 13 ←

1 1 ←

2 2 ←

... in 10, x^h

0 unit)

1 1 ←
 2 3 ←
 7 16 ←
 5 4 ←
 9 20
 5 7

easier to
 trace with
 2D array
 (esp. if no pen)

