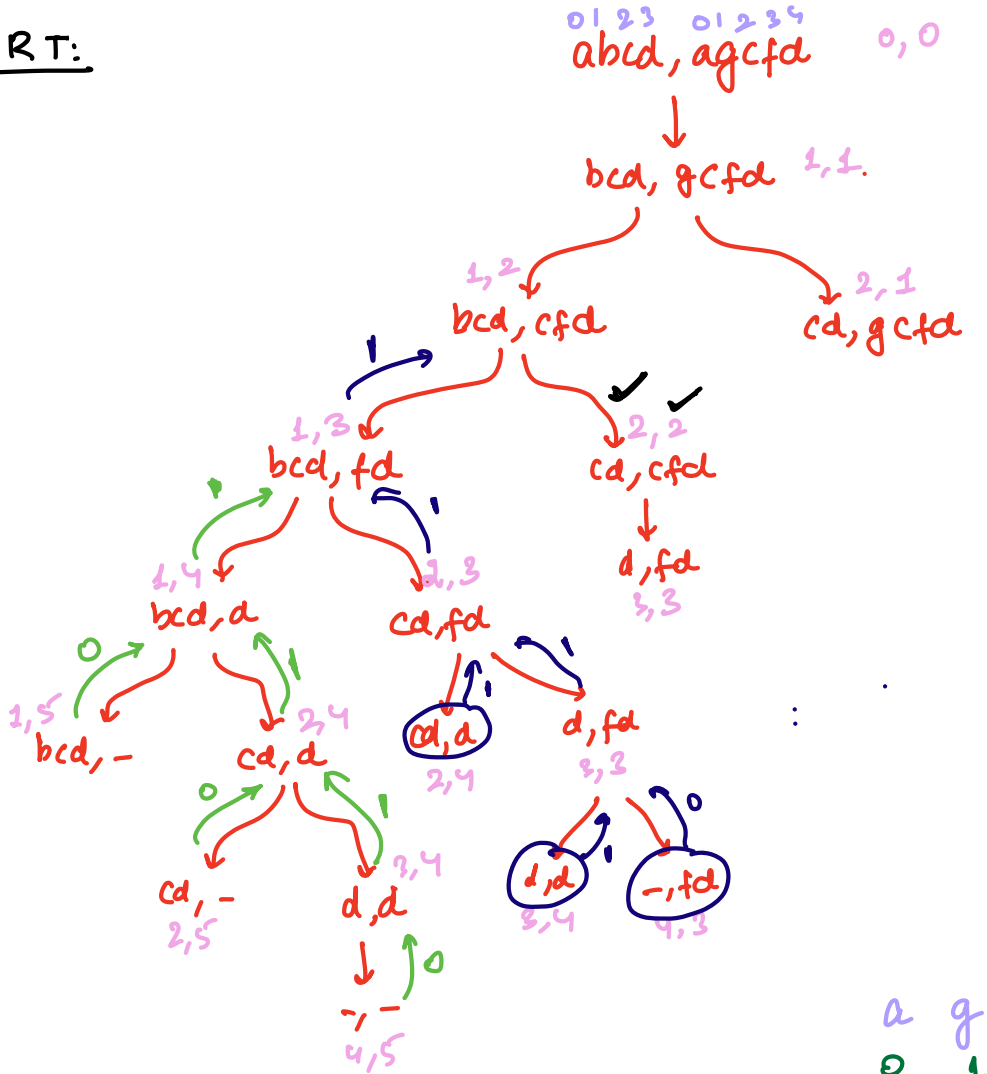
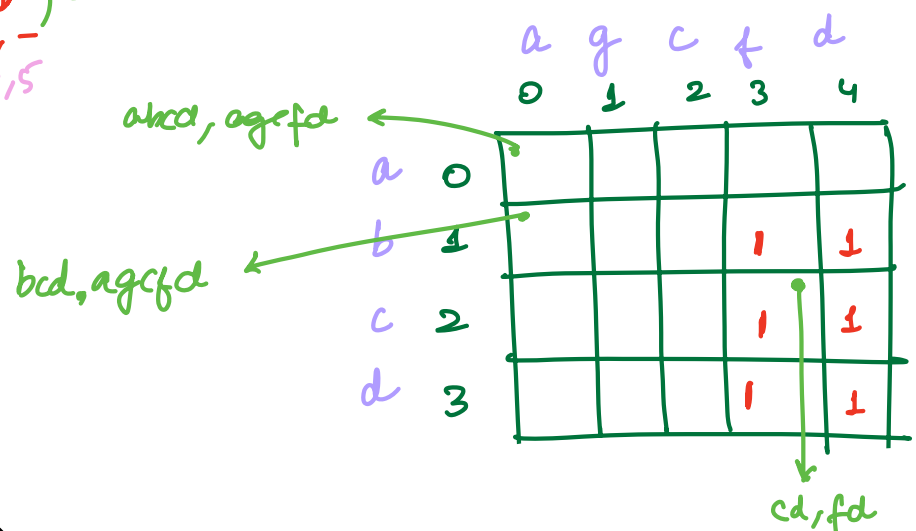
LCS RT:

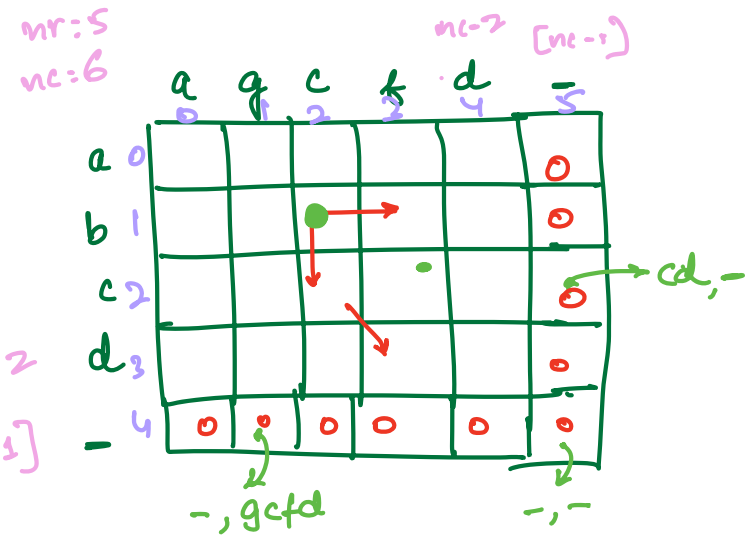




LCS BU: (Iteratively)

- Strg size ? 2D, size TD
- TD BC → BU fill
  - ↳ string empty → 0

abcd_, agcfd_



- cell meaning

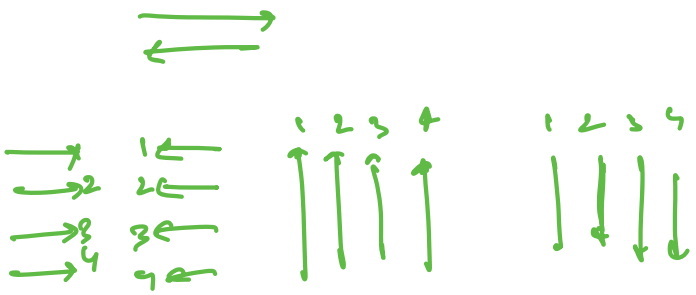
2,3 : cd, fd LCS length

0,3 : abcd, fd LCS length

0,0 : abcd, aqcfd LCS length

Some people also do:
2,3: abc, aqcf

- filling dirn



1,2 cell bcd, cfd (5)

(max result)

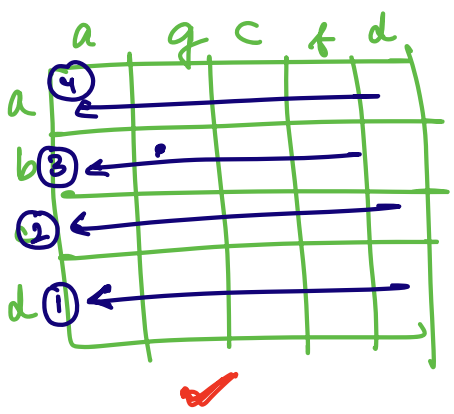
1,3 bcd, fd (5)

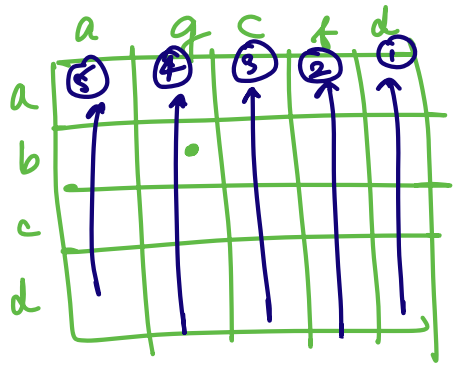
2,2 cd, cfd (4)

result 1+1=2

2,2 cell cd, cfd

(1) 3,3 d, fd





- filling

- findLCS 0,0

Constraints:

s1 → 10^5

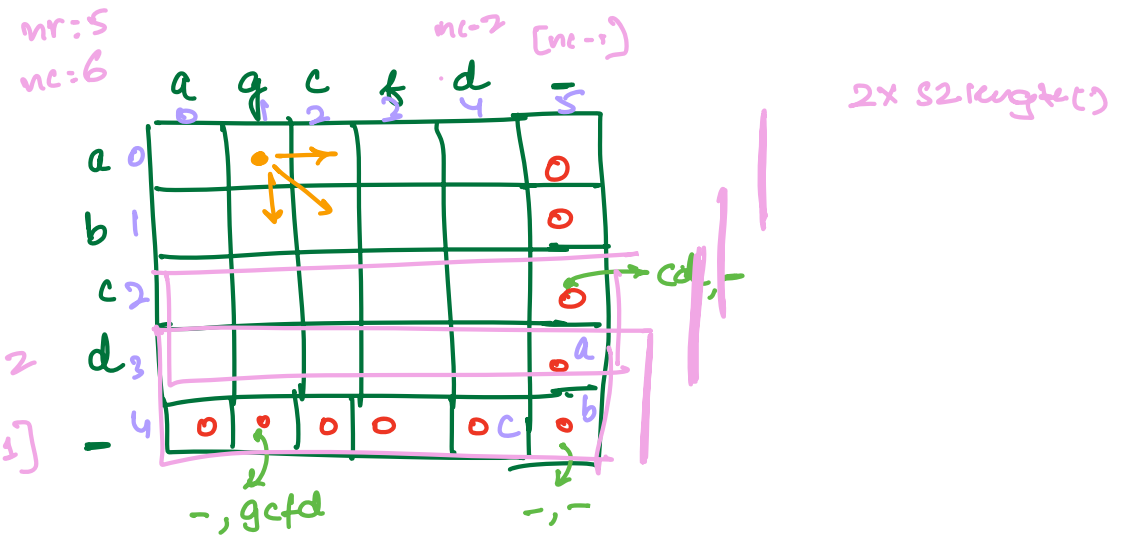
s2 → 10^5

$10^5 \times 10^5$ array

↓

fail

SE



Edit Distance

Given two strings str1 and str2 and below operations that can be performed on str2. Find minimum number of edits (operations) to convert str2 to str1.

1. Insert
2. Remove
3. Replace

All of the above operations are of equal cost.

Eg:

s1: abcd

s2: agcfd → abcfd → abcd

2 ops:

→ g replace with b

→ f delete

Eg:

s1: Saturday

s2: Sunday → Saunday → Satunday → Saturday

3 ops:

→ Insert a

→ Insert t

→ Replace n with r

Case 1:

0123 01234
abcd, agcfd ans 0,0

↓

bcd, gcfd ans 1,1

Case 2:

idx1, idx2
1, 1
bcd, gcfd min(x,y,z)+1

3 ops: insert, delete, replace

insert → bcd, bgcfd
delete → bcd, cfd y (1,2; idx1, idx2+1)
replace g→b → bcd, bcfd

bcd, gcfd x (2,4; idx1+1, idx2)
cd, cfd z (2,2)

cd, cfd (2,2) bcd, fd cd, cfd (idx1+1, idx2+1)

d, gcfd cd, cfd (2,2) d, cfd

d, fd

-, fd d, d -, d

-, fd: 2 delete
-, d: 1 delete

4, 3 (idx1, idx2)
4 5 → s2.length

cfd, -
3 insert

0123 01234
abcd, agcfd

nr = 5
nc = 6

	0	1	2	2	4	5
	a	g	c	f	d	-
0 a	4					4
1 b		3				3
2 c			2			2
3 d				1		1
	4	3	2	1	0	0

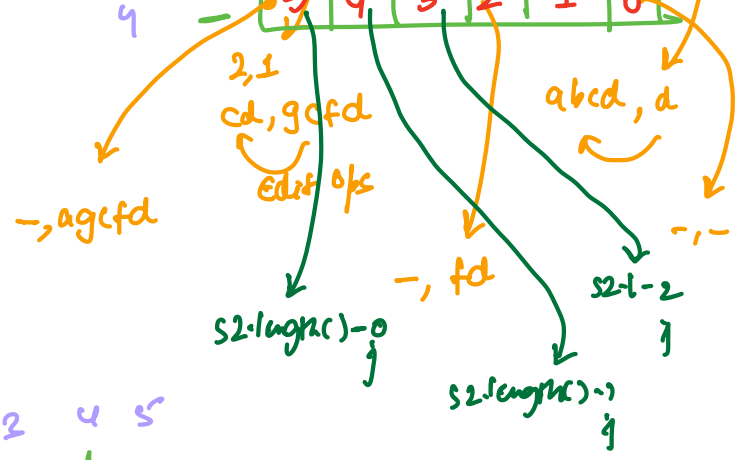
cd, -

abcd, agcfd

ED BU:

- strg dimensions?
- TD BC → BU fill

- cell meaning
- filling dir^n
- fill
- final ans: 0,0



		0 a	1 g	2 c	3 f	4 d	5 -
0	a	2	3	3	3	3	4
1	b	3	2	2	2	2	3
2	c	3	2	1	1	1	2
3	d	4	3	2	1	0	1
4	-	5	4	3	2	1	0

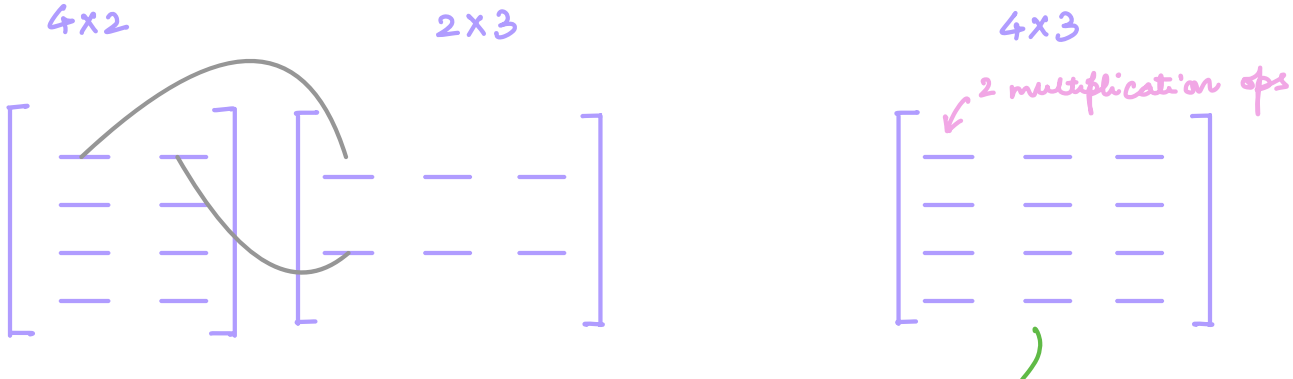
Matrix Chain Multiplication :

array: [4, 2, 3, 5, 1] (indices 0 1 2 3 4)

array represents 4 matrices:

M_1 : 4x2
M_2 : 2x3
M_3 : 3x5
M_4 : 5x1

what is the minimum no. of multiplication ops needed to multiply these 4 matrices ?



4×3 cells fill

total multiplications = 4×3×2 = 24

$i \times j$ $\quad$ $j \times k$ $\longrightarrow$ $i \times k$

↳ $i \times k$ cells fill

1 cell: j multiplication ops

total: $i \times k \times j$

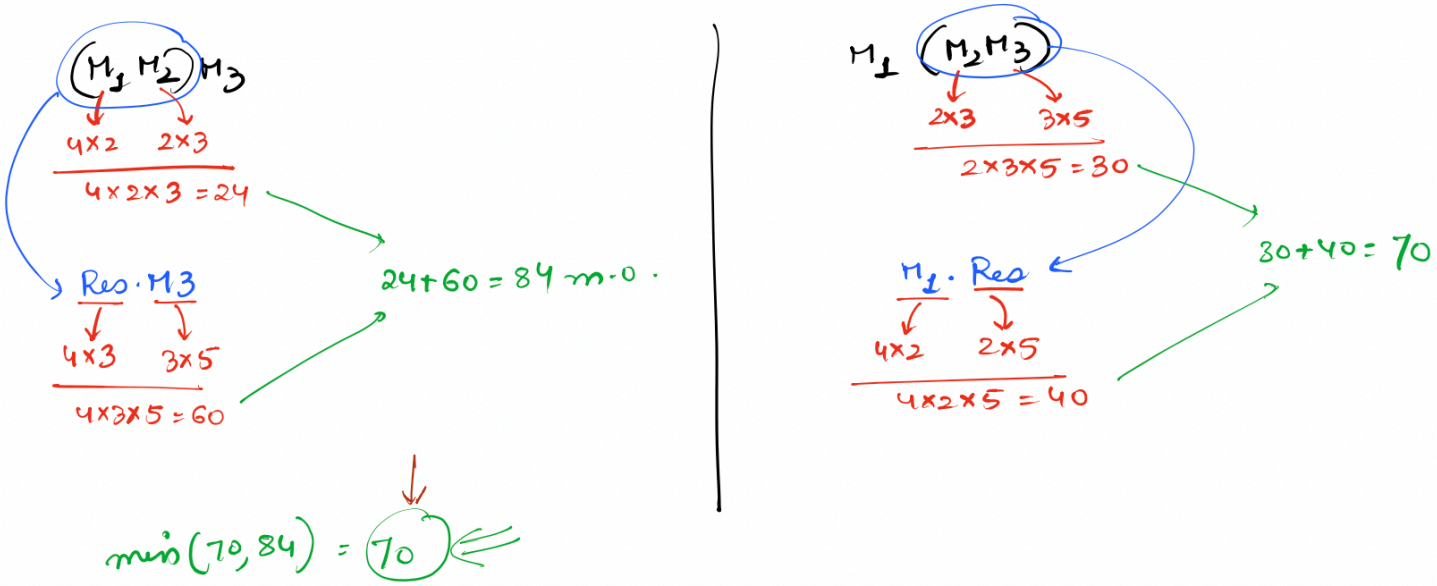
: $i \times j \times k$

$M_1 M_2 M_3$ → $(M_1 M_2) M_3$, $M_1 (M_2 M_3)$

} Matrix multiplication result same

no. of multiplication ops are different

M_1: 4×2 $\quad$ M_2: 2×3 $\quad$ M_3: 3×5



min (70, 84) = 70