Leetcode 1504. Count Submatrices With All Ones

11 July 2020 02:37 PM

① $n^4 \rightarrow n^3 \rightarrow n^2$

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

(0,1) ⇒ w = 2, w = 3, w = 2 — min 2, 2, 2 = 6

(1,1) ⇒ w = 3, w = 2 — min 3, 2 = 5

$n \{ \rightarrow m$

$n^2 m^2 \Rightarrow O(n^4)$

② width precomputation

0	1	1	0
0	1	1	1
1	1	1	0

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

(0,1) ⇒ 2+2+2 = 6
(0,2) ⇒ 1+1+1 ⇒ 3
(1,1) ⇒ 3+2 ⇒ 5
(1,2) ⇒ 2+1 ⇒ 3 (1,3) ⇒ 1
(2,0) ⇒ 3
(2,1) ⇒ 2
(2,2) ⇒ 1
24

$O(n^2) + O(n^3) \Rightarrow O(n^3)$

$O(n^2)$

③ Concept:

0 1 1 0 1 1 1

1 → 5
2 → 3
3 → 1
9

1 1 1 ⇒ 1+2+3+4

1 1 1 — 1+2+3 = 6

2 — 1+2 — 3

+ 3 — 1+2+3 — 6 ⇒ 9

⇒ Using one dimensional approach

0	0	1	1	0
1	0	1	1	1
2	1	1	1	0

row (0→0): 0 1 1 0 ⇒ 3

row (0→1): 0 1 1 0, 0 1 1 1 — 0 1 1 0 — 3

row (0→2): 0 1 1 0, 0 1 1 1, 1 1 1 0 — 0 1 1 0

row (1→1): 0 1 1 1 ⇒ 1+2+3 = 6

row (1→2): 0 1 1 1, 1 1 1 0 — 0 1 1 0 — 3

row (2→2): 1 1 1 0 — 6

Ans = 24

0→0 0→1 0→2

$O(n^3)$

0 → 0 0 → 1 0 → 2

$O(n^2) \times n \Rightarrow O(n^3)$

0 1 1 0

1+2 = 3

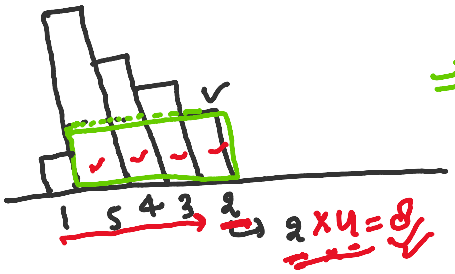
$O(n^3)$ $O(n)$

(4) Using stack

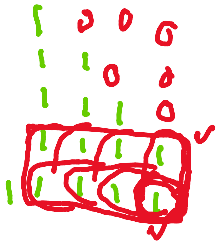
if stack not empty

sum(i) = sum(prev index)

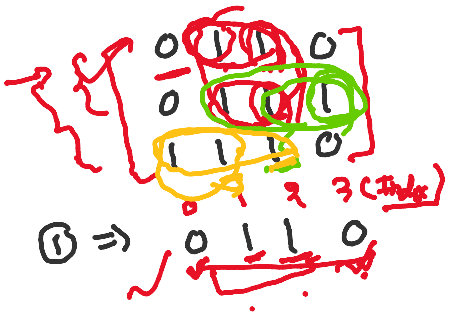
Idea:



⇒



sum | 0 | 1 | 2 | 0 | → 3



Index

Stack

empty

→ 4 × 1 (i+1)

→ Not 4×n = 4

1 × 1 = 2

1 × 2 = 2

② ⇒

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

⇒ 9

sum | 0 | 2 | 4 | 3

③

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

⇒

sum | 1 | 3 | 6 | 0

4 1 4

4 7

12

1 × 1

3 × 1

3 × 2

0 × 4

12 + 9 + 3

= 24

n × n ⇒ $O(n^2)$

$O(n)$