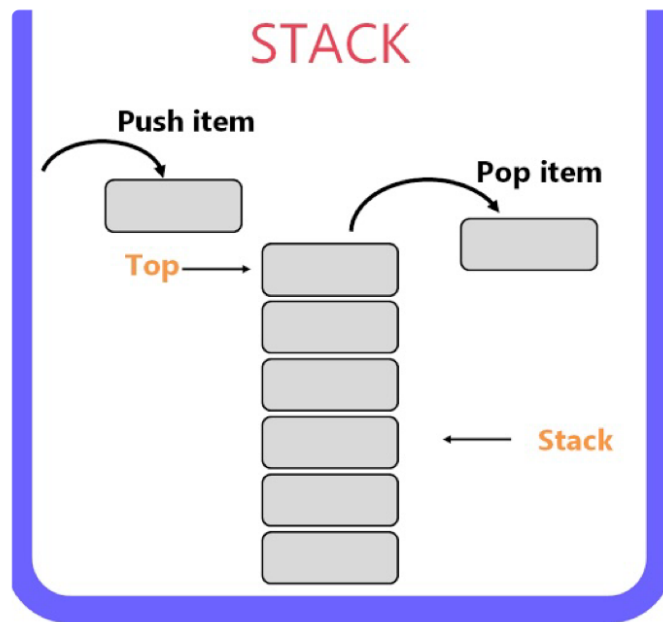


STACK...
video - 17





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code story with MIK



Easy

Company :-



85. Maximal Rectangle

Hard 9777 169 Add to List Share

Given a `rows x cols` binary `matrix` filled with `0`'s and `1`'s, find the largest rectangle containing only `1`'s and return its area.

Example 1:

1 * 4 = 4

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

$1 \times 5 = 5$
 $1 \times 3 = 3$
 $3 \times 2 = 6$
 Output = 6

can we apply DFS & find no. of connected 1's?

why it is marked as **HARD**?

→ It has more than one 0n hidden inside it.

Otherwise it's Easy. **TRUST ME ...**

Thought Process

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

2-D

3

1	0	0	1	0
---	---	---	---	---

Hidden Qn-1...

1-D Array.

1	1	0	1	1	1	1	0	1	1
---	---	---	---	---	---	---	---	---	---

$$1 \times 2 \\ = 2$$

$$1 \times 2 \\ = 2$$

0

$$1 \times 4 \\ 4$$

$$1 \times 4 \\ 4$$

$$1 \times 4 \\ 4$$

$$1 \times 4 \\ 4$$

$$1 \times 2 \\ 2$$

$$1 \times 2 \\ 2$$

$$\underline{\underline{m = 4}}$$

Hidden Qn-2:- MAH

→

2	1	0	2	2	2	2	0	2	1
---	---	---	---	---	---	---	---	---	---

$$2 \times 1 \\ = 2$$

$$1 \times 2 \\ = 2$$

$$2 \times 4 \\ 8$$

$$2 \times 4 \\ 8$$

$$2 \times 4 \\ 8$$

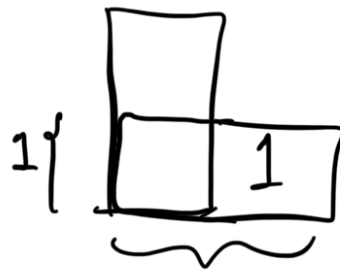
$$2 \times 4 \\ 8$$

$$2 \times 1$$

$$1 \times 2$$

$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$
 $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$
 $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$
 $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$

$= 2$
 $= 2$



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

$\text{max Area} = 3$
~~6~~
~~6~~

Row = 0, 1, 2, 3

0	1	2	3	4
4	0	0	3	0

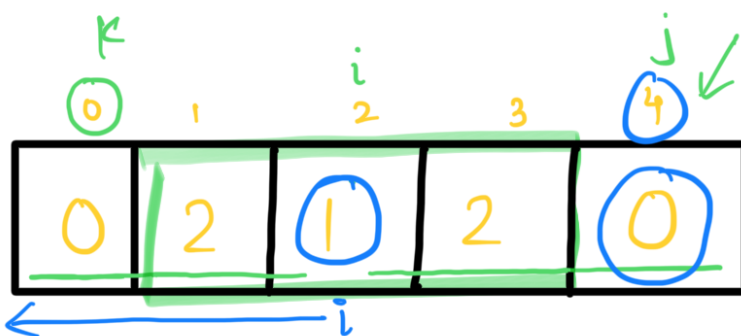
$4 \times 1 = 4$
 $3 \times 1 = 3$

(.) Height \rightarrow

(.) width \rightarrow ???

(.) Area \rightarrow Height[i] * width[i]

Hidden Qn-3 (width) :-



$O(n^2)$

Hidden Qn-4
NSR (Next smaller to Right)
NSL (Next smaller to Left)

$$4 - 0 - 1 = 3$$

$i \rightarrow$ Right hand side smaller $\rightarrow j$
 \rightarrow Left hand side $m \rightarrow k$

$$\begin{aligned} \text{width} &= j - k - 1 \\ &= 4 - 0 - 1 = 3 \end{aligned}$$

This is not optimal

width

~~$O(n^2)$~~

0	1	2	3	4
0	2	1	2	0

0	1	2	3	4
x_1	x_2	4	x_4	x_5

NSR

0	1	2	3	4
y_1	y_2	0	y_4	y_5

NSL

width

$x_1 - y_1$ -1		$y_4 - x_2 - 1$ =3		
-------------------	--	-----------------------	--	--

$$\text{width}[i] = \text{NSR}[i] - \text{NSL}[i] - 1$$

0	1	2	3	4

0	2	1	<u>2</u>	<u>0</u>
---	---	---	----------	----------

NSR



0	1	2	3	4
5	2	4	4	5

NSR index