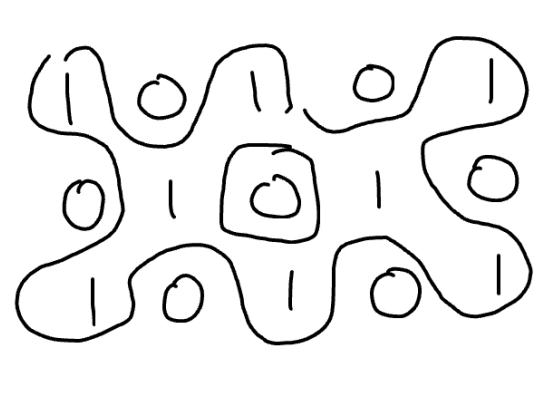
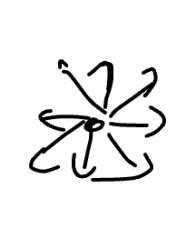

1 0 1 0 1
0 1 0 1 0
1 0 1 0 1

→ 1



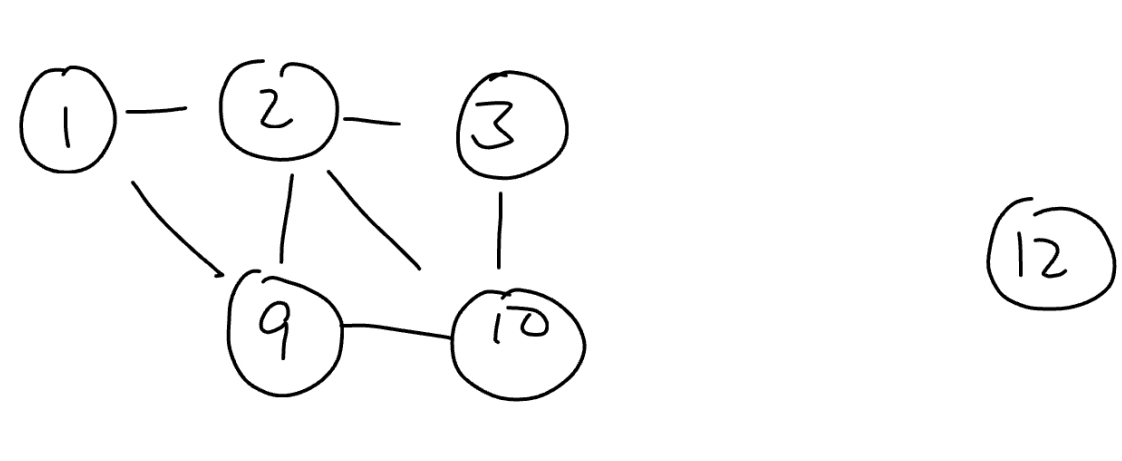
1 0 0 0 1
0 0 1 0 0
1 0 0 0 1 → 5

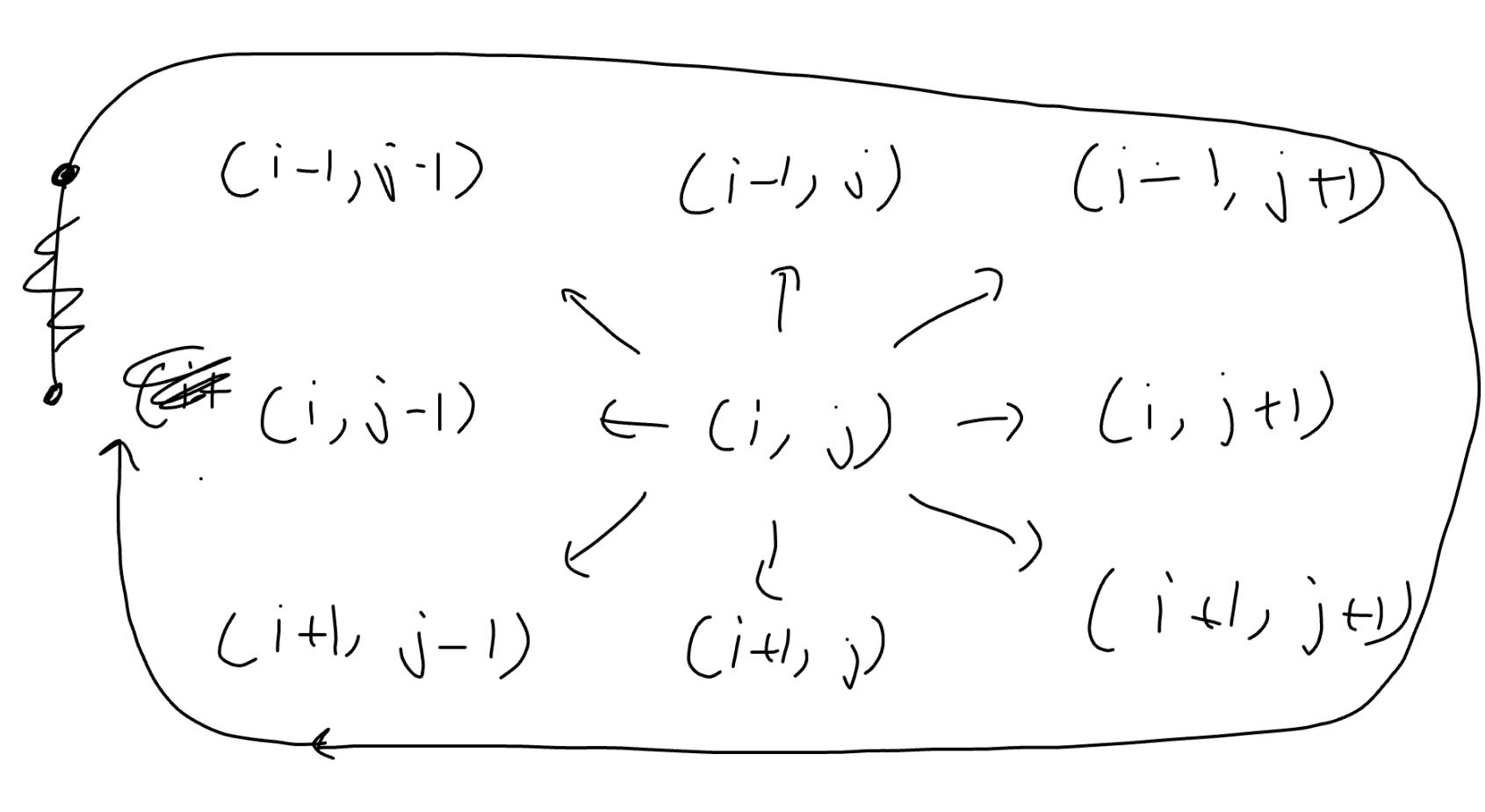
0 1—1—1 0 0 0
0 0 1—1 0 1 0

	0	1	2	3	4	5	6
0	0_0	$\boxed{1_1}$	1_2	1_3	0_4	0_5	0_6
1	0_7	0_8	1_9	1_{10}	0_{11}	1_{12}	0_{13}

n = 2
m = 7

mi + j

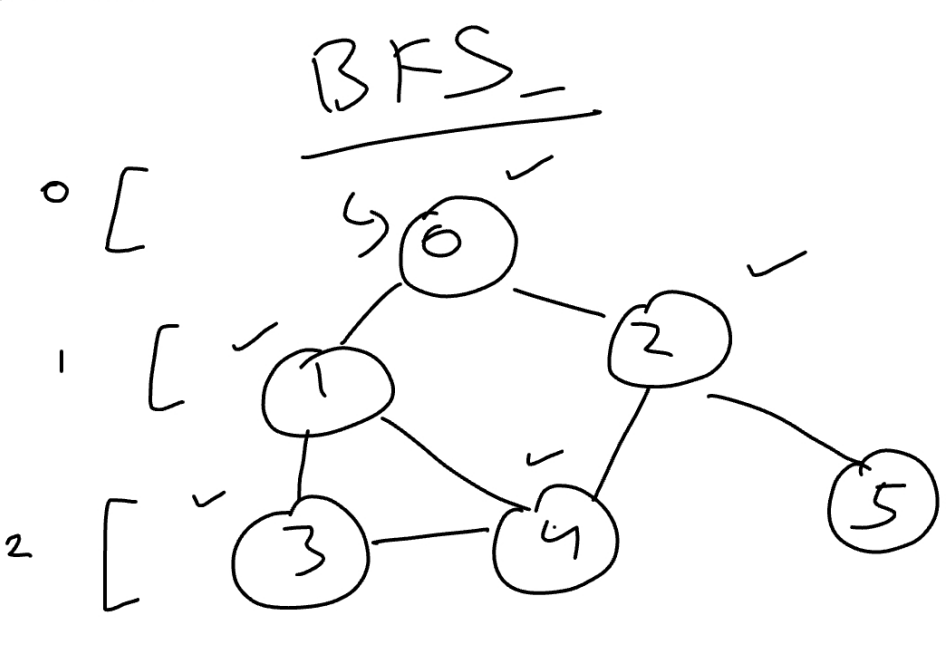



(i-1, j-1)
(i-1, j)
(i-1, j+1)
(i, j-1)
(i, j)
(i, j+1)
(i+1, j-1)
(i+1, j)
(i+1, j+1)

TC = O(V + E) ⇒ TC = O(nm)
nm 8nm
AS =

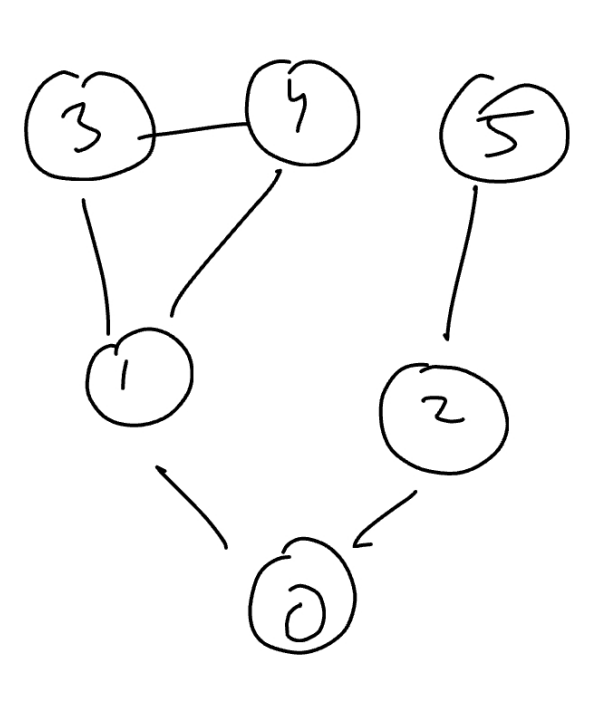
1→1→1→1
1←1←1←1
1→1→1→1

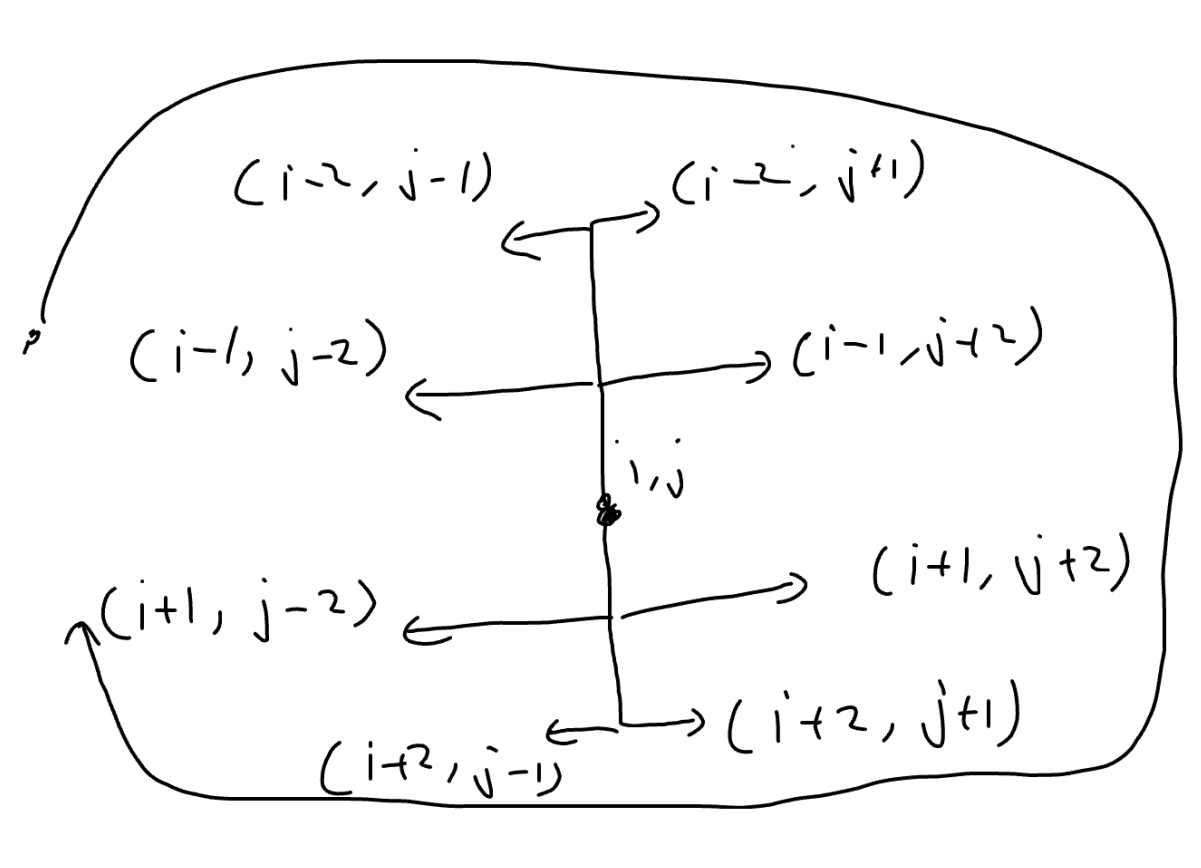
BFS

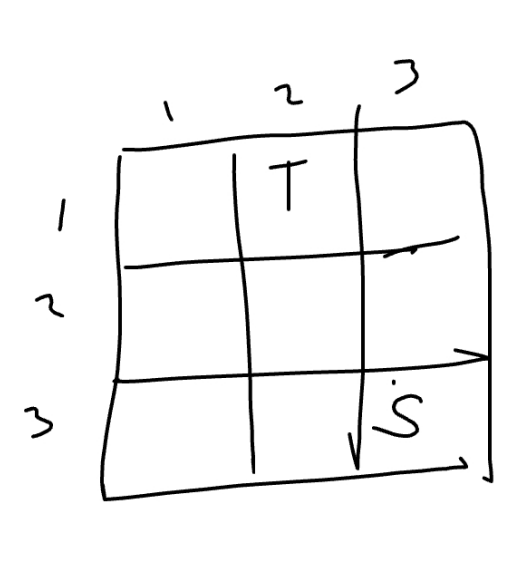


res: 0, 1, 2, 3, 4, 5

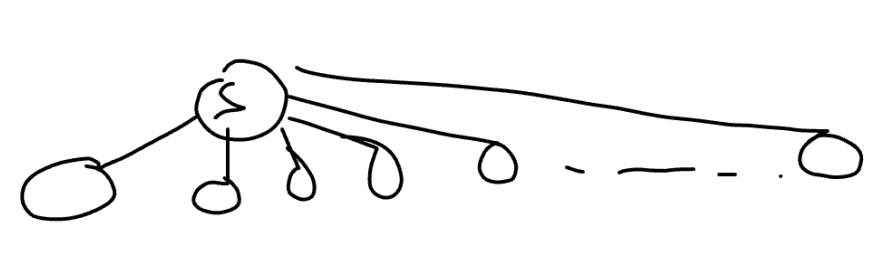
queue: ~~0 1 2 3 4 5~~

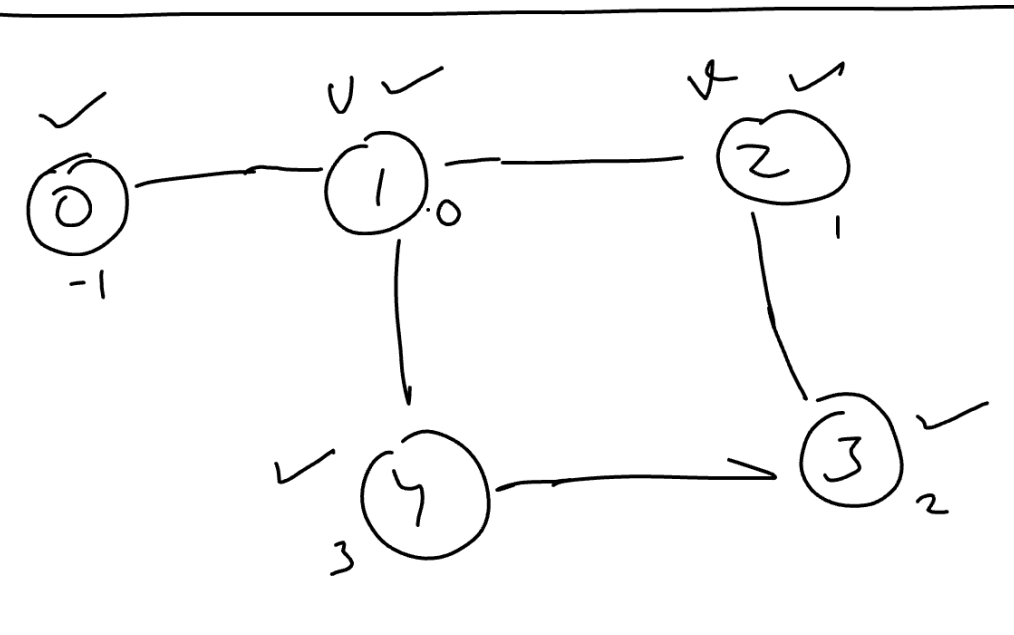



(i-2, j-1)
(i-2, j+1)
(i-1, j-2)
(i-1, j+2)
i, j
(i+1, j-2)
(i+1, j+2)
(i+2, j-1)
(i+2, j+1)



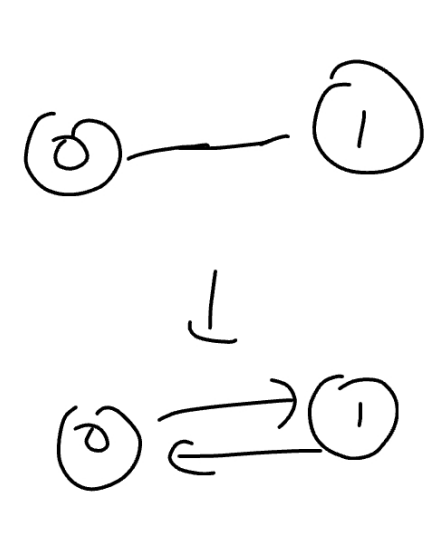
→ 1

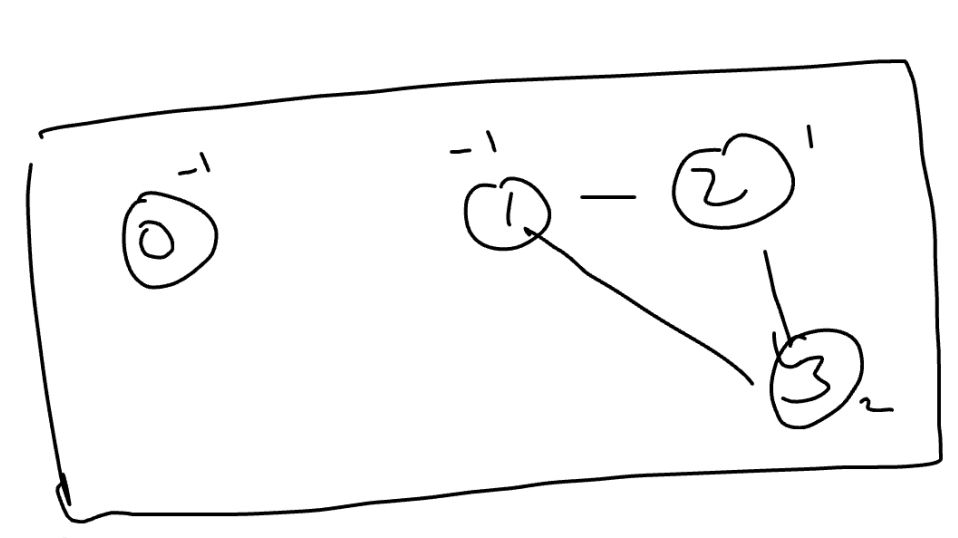



0
1
2
3
4
-1
0
1
2
3

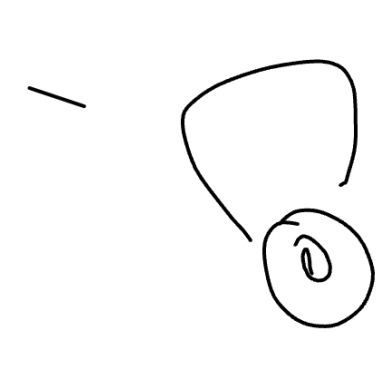
0 → 1
1 → 0, 2, 4
2 → 1, 3
3 → 2, 4
4 → 1, 3

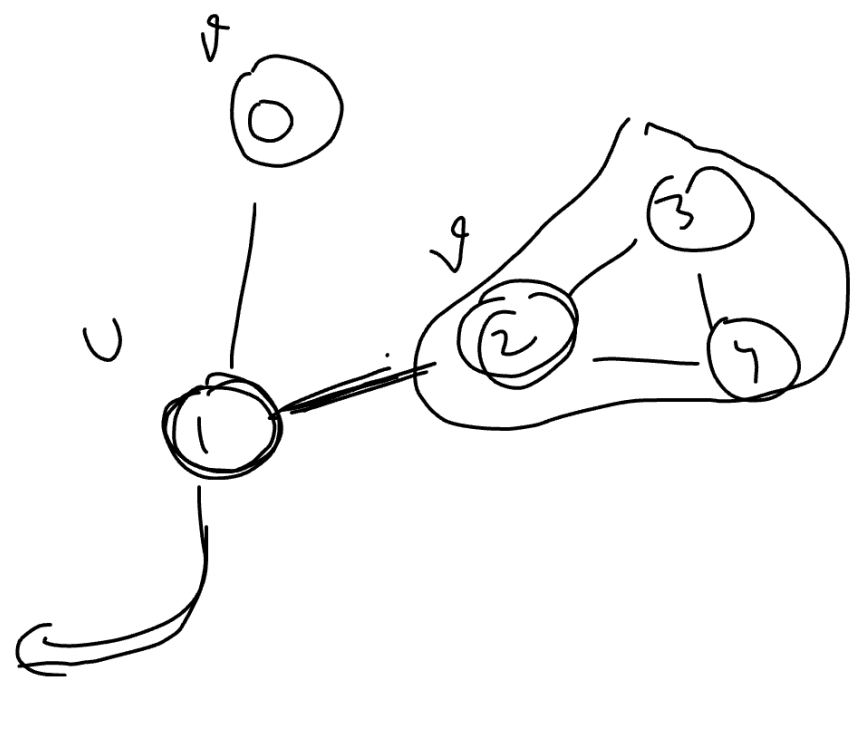
TC: O(V + E)
AS: O(V).

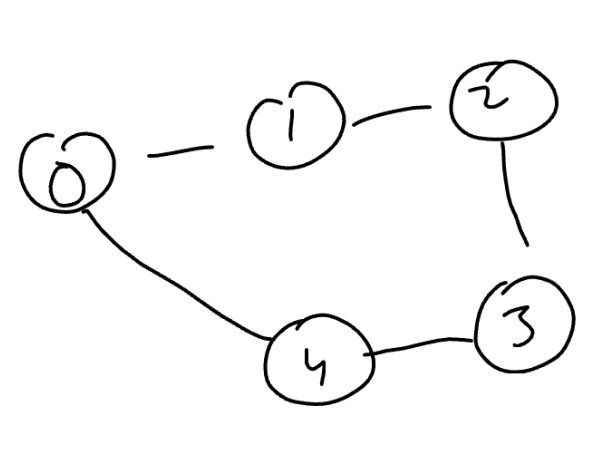


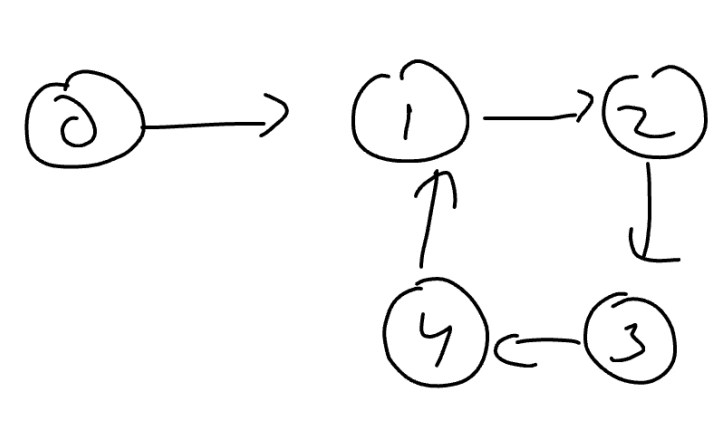


→ True

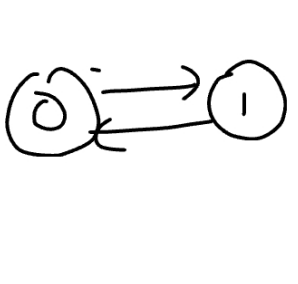




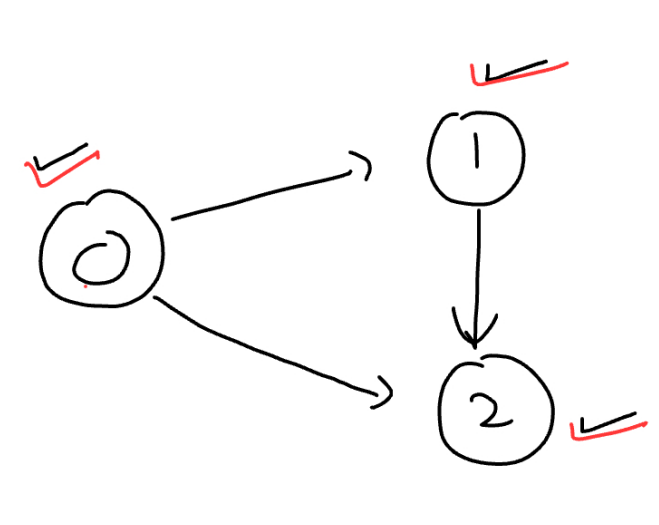




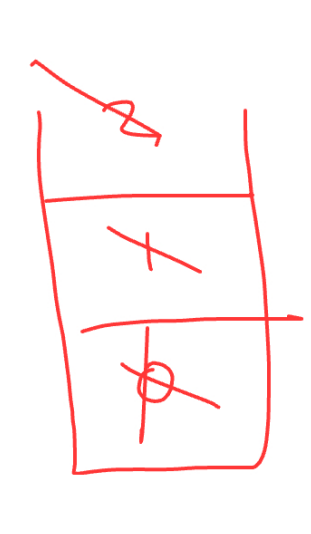
→ True



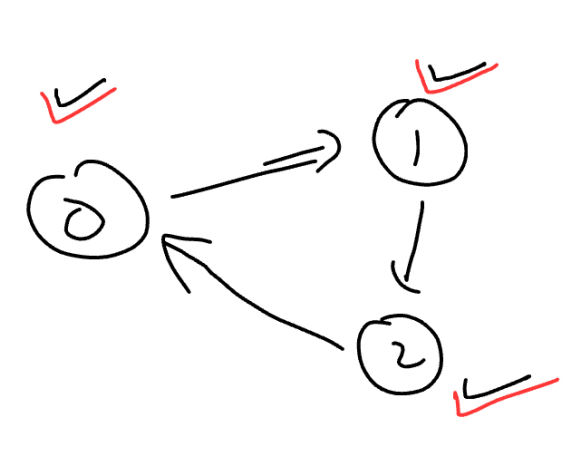
→ True.



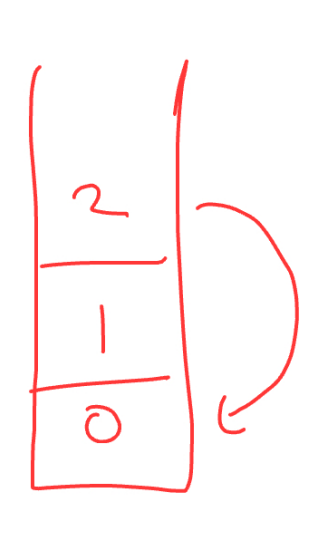
→ False.

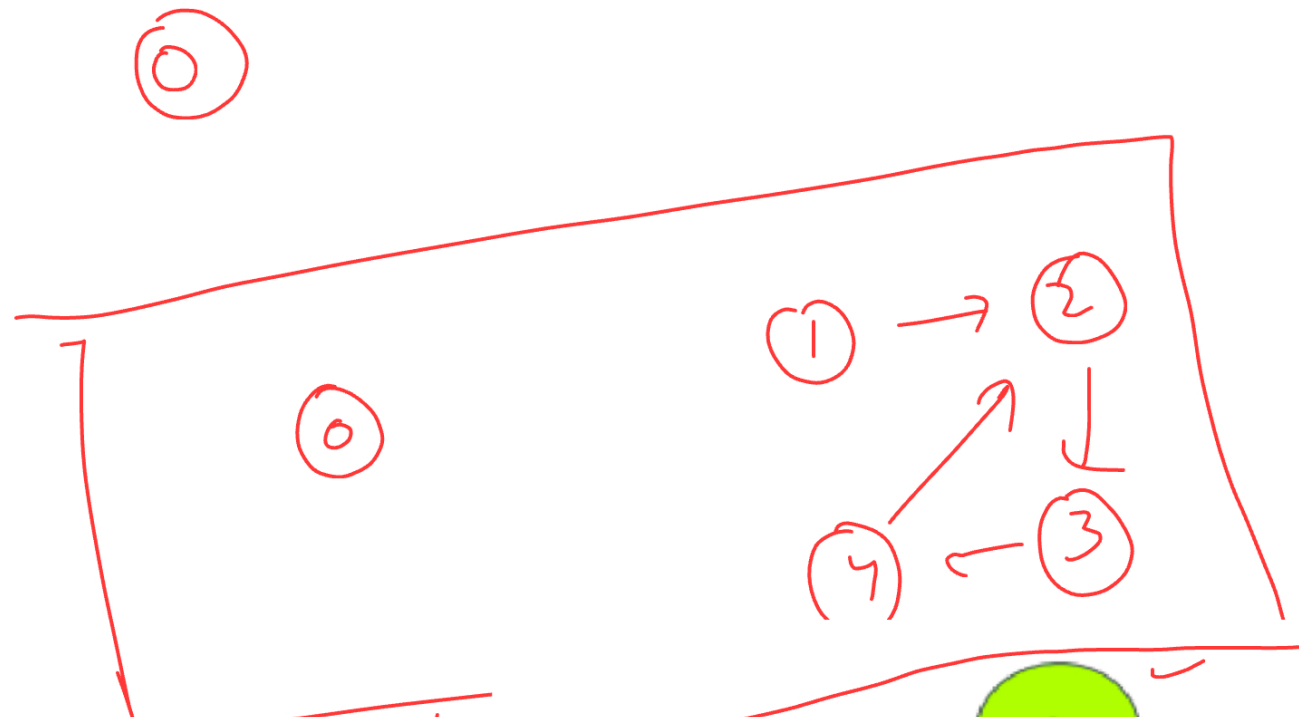


TC: O(V + E)
AS: O(V).

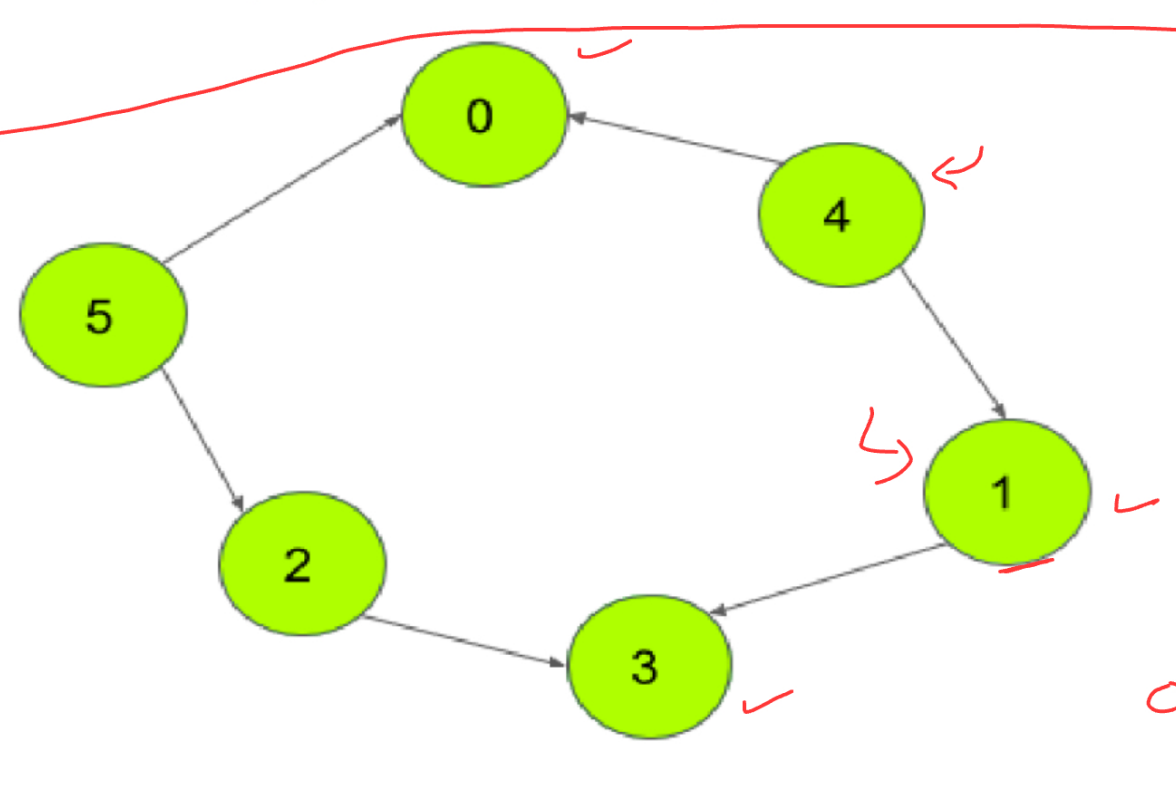


→ True.





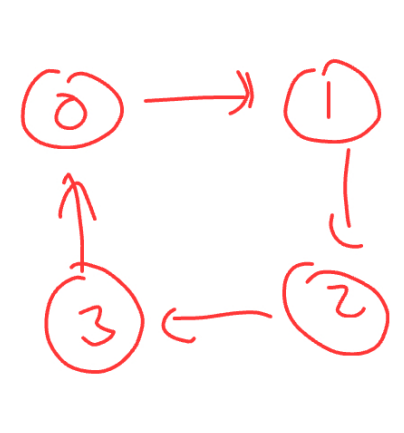
DAG.



0, 1

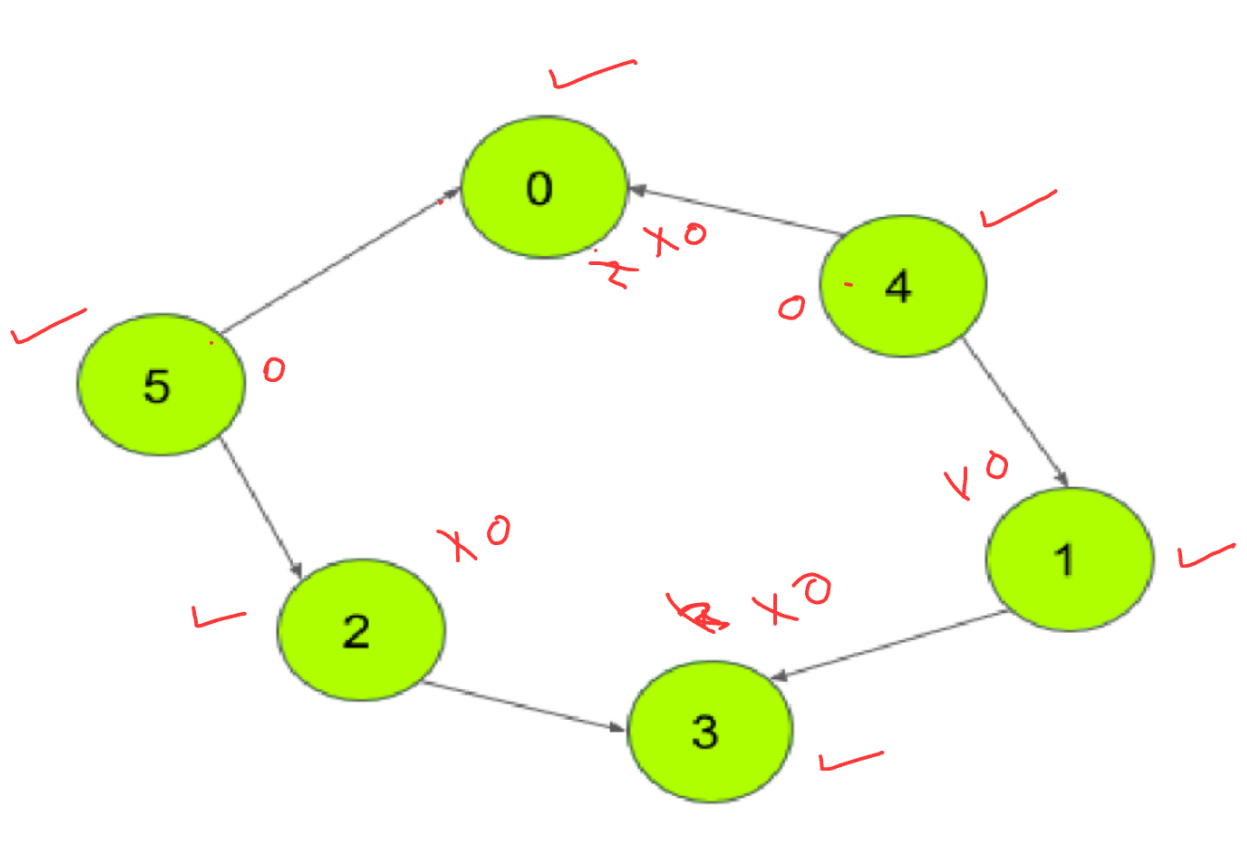
U → V ⇒ U should come before V

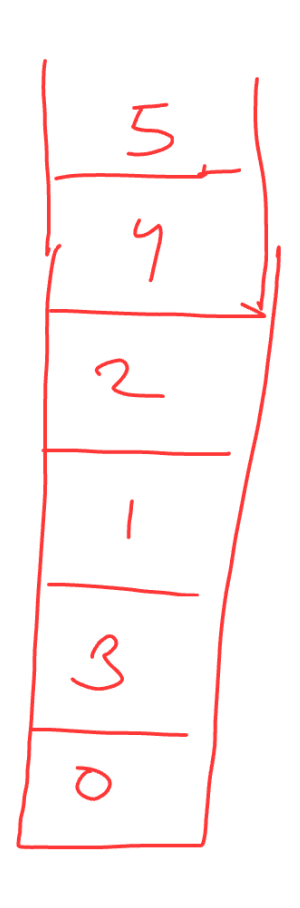
[3, 1, 0, 4



0 1 2 3

4 → [0, 1]


0
4
5
1
2
3
2 × 0
0
0
1 × 0
× 0
× 0



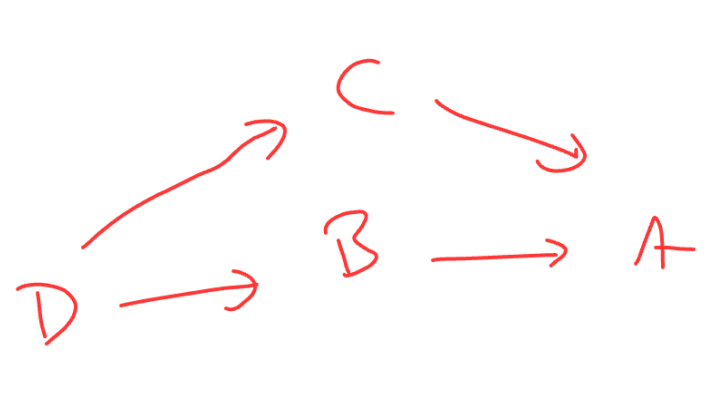
[5, 4, 2, 1, 3, 0].

TC: O(V + E)
AS: O(V).

queue: ~~4~~, ~~5~~, ~~1~~, ~~0~~, ~~2~~, ~~3~~

res: [4, 5, 1, 0, 2, 3]

Courses	Prereq
A	B, C
B	D
C	D



→ [D, B, C, A] /
[D, C, B, A]