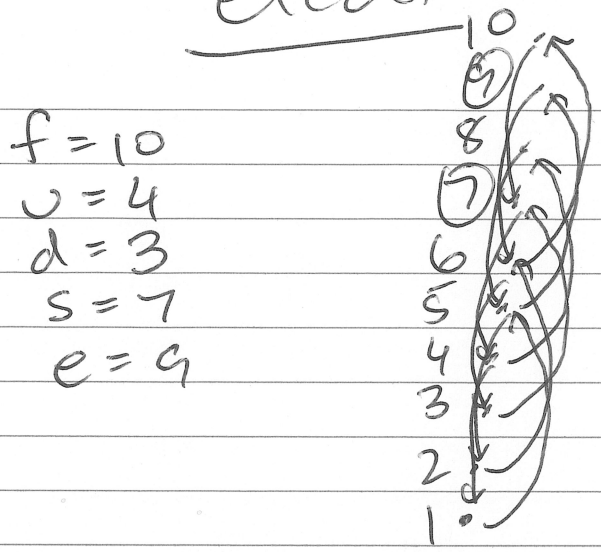
elevator

Intro CP
6/24/2025



f = 10
u = 4
d = 3
s = 7
e = 9

7 → 4 → 1 → 5 → 9

In implementation, there's no need to build the graph!

	1	2	3	4	5	6	7	8	9	10
DIST	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	0	~~x~~	~~x~~	-1
	2	4	6	1	3	5		2	4	6

q: ~~7~~ ~~4~~ ~~8~~ ~~6~~ ~~1~~ ~~5~~ ~~2~~ ~~9~~ ~~6~~ ~~10~~ 3

Mans

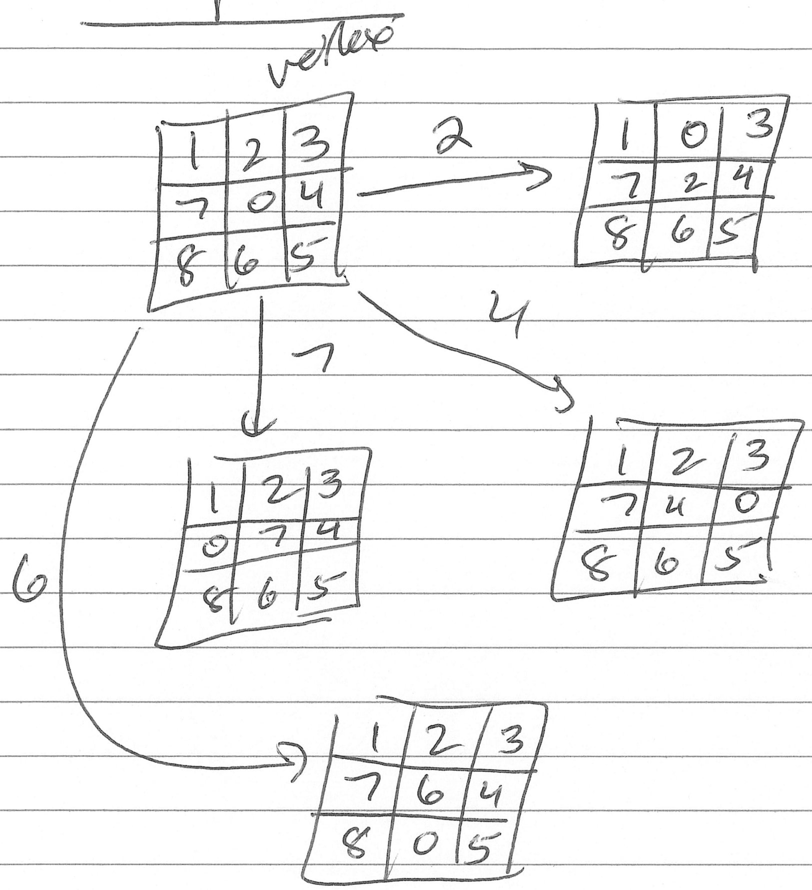
1	0	0	1	1
1	0	S	R	0
0	U	0	L	0
0	1	0	0	1

	2	1	
	1	0	
	2	1→2	

$$\frac{9!}{2} \sim 180{,}000$$

vertices in this graph

8-puzzle



Run time

$O(V+E)$

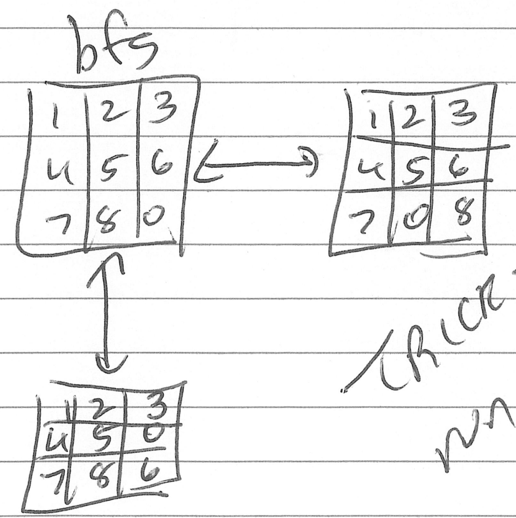
↑ # vertices ↑ # edges

max is ~ 720,000

Run-Time 10,000 cases × 720,000 steps/case = 7.2×10^9 too big!

0 → 1,3
1 → 0,2,4
2 → 1,5

0 1 2
3 4 5
6 7 8



TRICK - reverse graph run 1 BFS from solution board

map<string, int>

dist["123456780"] = 0
dist["123456708"] = 1