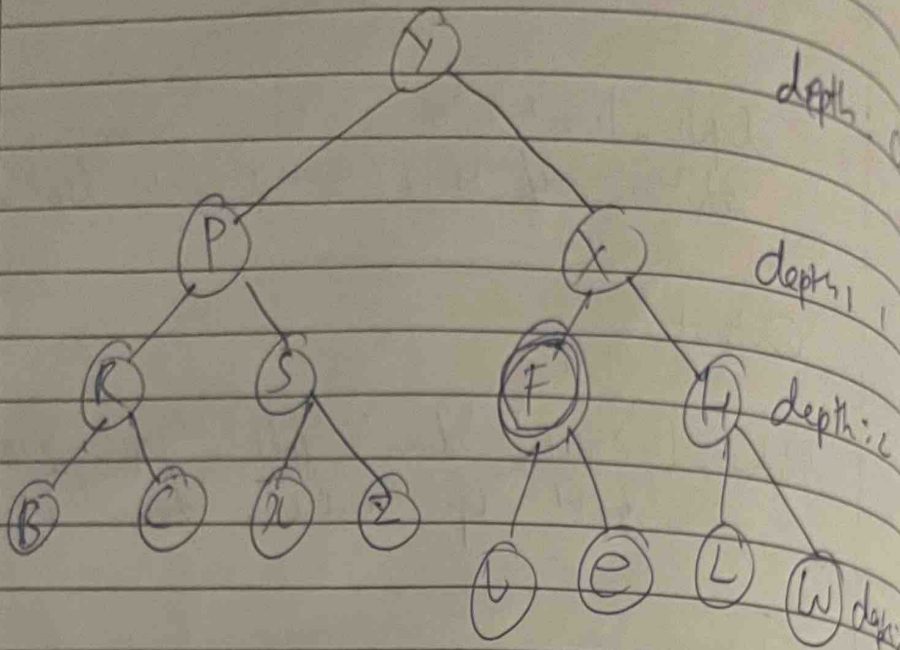


# Iterative deepening search algorithm

Given graph :



Initial state : Y

Goal state : F

Iteration 1: depth: 0  
Y

Goal state not found  
depth + 1

Iteration 2: depth: 1  
Y P X

~~Goal state not found / depth + 1~~

Iteration 3: depth: 2  
Y P R S X

Iteration 4: depth: 2  
Y P R S X F

Goal state found

# 8 puzzle

Date     /    /      
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Initial  
state

1	2	3
8	0	4
7	6	5

Goal  
state

2	0	1
0	4	3
7	6	5

- 1) Find neighbors of blank space
- 2) ~~calculate the~~ For each neighbor:
  - i) calculate the heuristic distance and store it in  $h$
  - ii) calculate the distance from initial state to current state and store it in  $g$
  - iii) calculate  $f = h + g$
- 3) Choose the state with the lowest  $f$  value and repeat the above steps until goal state is reached

Iteration 1: neighbors are 2, 8, 6, 4

~~h for 2: 1  
g for 2: 1  
 $f = 1 + 1 = 2$~~

~~h for 8: 2  
g for 8: 1  
 $f = 2 + 1 = 3$~~

~~h for 6: 0  
g for 6: 1  
 $f = 0 + 1 = 1$~~

~~h for 4: 1  
g for 4: 1  
 $f = 1 + 1 = 2$~~



2) ~~initial current state:~~

move 0 up

$h = 7$

$g = 1$

$f = 8$

1 0 3

8 2 4

7 6 5

move 0 left

$h = 9$

$g = 1$

$f = 10$

1 2 3

0 8 4

7 6 5

move 0 right

$h = 9$

$g = 1$

$f = 10$

1 2 3

8 4 0

7 6 5

choose  $\nearrow$  up

initial state:

Goal state:

1 2 3

4 0 6

7 5 8

1 2 3

4 5 6

7 8 0

move 0 ~~back~~ up

$h = 3$

$g = 1$

$f = 14$

1 0 3

4 2 6

7 5 8



move 0 down

1 2 3  
4 5 6  
7 0 8

$$h = 1$$

$$s = 1$$

$$j = 1 + 1 = 2$$

move 0 left

1 2 3  
0 4 6  
7 8 9

$$h = 3$$

$$s = 1$$

$$j = 4$$

Choose down

1 2 3  
4 5 6  
7 0 9

2) move 0 up

$$h = 2$$

$$s = 2$$

$$j = 2 + 2 = 4$$

1 2 3  
4 0 6  
7 5 8

move 0 right

1 2 3  
4 5 6  
7 8 0

$$h = 0$$

$$s = 2$$

$$j = 0 + 2 = 2$$



move left

1 2 3  
4 5 6  
0 7 8

$$h = 2$$

$$g = 2$$

$$f = 2 + 2 = 4$$

Best move : Right

1 2 3  
4 5 6  
7 8 0

Final state : Goal reached

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