Blind Searches
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Problem	Method	MAX_OPEN _LENGTH	Length of Path	Number of Nodes expanded	Path from Start to Goal
Farmer, Fox, Chicken, Grain	DFS	3	9 edges	10	M on left:3 C on left:3 M on right:0 C on right:0 boat is on the left. len(OPEN)=1; len(CLOSED)=0; COUNT = 0 OPEN is now: M on left:0 C on left:3 M on right:3 C on right:0 boat is on the right. , ... See full
Farmer, Fox, Chicken, Grain	BFS	3	7	8	Initial State: Farmer on LEFT:1 Fox on LEFT:1 Chicken on LEFT:1 Grain on LEFT:1 Farmer on RIGHT:0 Fox on RIGHT:0 Chicken on RIGHT:0 Grain on RIGHT:0 boat is on the left. len(OPEN)=1; len(CLOSED)=0; COUNT = 0 OPEN is now: Farmer on LEFT:0 Fox on LEFT:1 Chicken on LEFT:1 Grain on LEFT:1 Farmer on RIGHT:1 Fox on RIGHT:0 Chicken on RIGHT:0 Grain on RIGHT:0 boat is on the right. See full
Missionaries and Cannibals	DFS	2	9 edges	10 states	Initial State: M on left:3 C on left:3 M on right:0 C on right:0 boat is on the left. len(OPEN)=1; len(CLOSED)=0; COUNT = 0 OPEN is now: M on left:0 C on left:3

					M on right:3 C on right:0 boat is on the right. …… See full
Missionaries and Cannibals	BFS	3	7 edges	8 states	Initial State: M on left:3 C on left:3 M on right:0 C on right:0 boat is on the left. len(OPEN)=1; len(CLOSED)=0; COUNT = 0 OPEN is now: M on left:0 C on left:3 M on right:3 C on right:0 boat is on the right. …… See full
Towers of Hanoi 4	DFS	7	40 edges	40 states	[[4, 3, 2, 1] ,[] ,[]] len(OPEN)=1; len(CLOSED)=0; COUNT = 0 OPEN is now: [[4, 3, 2] ,[1] ,[]], [[4, 3, 2] ,[] ,[1]] len(OPEN)=2; len(CLOSED)=1; COUNT = 1 OPEN is now: [[4, 3] ,[1] ,[2]], [[4, 3, 2] ,[] ,[1]] len(OPEN)=2; len(CLOSED)=2; COUNT = 2……. See full
Towers of Hanoi 4	BFS	28	28 edges	67 states	nitial State: [[4, 3, 2, 1] ,[] ,[]] len(OPEN)=1; len(CLOSED)=0; COUNT = 0 OPEN is now: [[4, 3, 2] ,[1] ,[]], [[4, 3, 2] ,[] ,[1]] len(OPEN)=2; len(CLOSED)=1; COUNT = 1 OPEN is now: [[4, 3] ,[1] ,[2]], [[4, 3, 2] ,[] ,[1]] len(OPEN)=2; len(CLOSED)=2; COUNT = 2 OPEN is now: [[4, 3, 1] ,[] ,[2]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]] len(OPEN)=3; len(CLOSED)=3; COUNT = 3…… See full

Appendices

Farmer Fox Chicken Grain: DFS

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M on left:3
 C on left:3
   M on right:0
   C on right:0
 boat is on the left.

len(OPEN)=1; len(CLOSED)=0; COUNT = 0
OPEN is now:
 M on left:0
 C on left:3
   M on right:3
   C on right:0
 boat is on the right.
,
 M on left:2
 C on left:2
   M on right:1
   C on right:1
 boat is on the right.

len(OPEN)=2; len(CLOSED)=1; COUNT = 1
OPEN is now:
 M on left:2
 C on left:2
   M on right:1
   C on right:1
 boat is on the right.

len(OPEN)=1; len(CLOSED)=2; COUNT = 2
OPEN is now:
 M on left:3
 C on left:2
   M on right:0
   C on right:1
 boat is on the left.

len(OPEN)=1; len(CLOSED)=3; COUNT = 3
OPEN is now:
 M on left:0
 C on left:2
   M on right:3
   C on right:1
 boat is on the right.
,
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=4; COUNT = 4
OPEN is now:
 M on left:2
 C on left:2
   M on right:1
   C on right:1
 boat is on the left.
,
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=5; COUNT = 5
OPEN is now:
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the right.
,
 M on left:0
 C on left:1
   M on right:3
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=6; COUNT = 6
OPEN is now:
 M on left:3
 C on left:1
   M on right:0
   C on right:2
 boat is on the left.
,
 M on left:0
 C on left:1
   M on right:3
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=7; COUNT = 7
OPEN is now:
 M on left:0
 C on left:1
   M on right:3
   C on right:2
 boat is on the right.

len(OPEN)=1; len(CLOSED)=8; COUNT = 8
OPEN is now:
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the left.

len(OPEN)=1; len(CLOSED)=9; COUNT = 9
OPEN is now:
 M on left:0
 C on left:0
   M on right:3
   C on right:3
 boat is on the right.

len(OPEN)=1; len(CLOSED)=10; COUNT = 10
Congratulations on successfully guiding the missionaries and
cannibals across the river!
Solution path:

 M on left:3
 C on left:3
   M on right:0
   C on right:0
 boat is on the left.


 M on left:2
 C on left:2
   M on right:1
```

C on right:1
boat is on the right.

M on left:3
C on left:2
M on right:0
C on right:1
boat is on the left.

M on left:0
C on left:2
M on right:3
C on right:1
boat is on the right.

M on left:2
C on left:2
M on right:1
C on right:1
boat is on the left.

M on left:1
C on left:1
M on right:2
C on right:2
boat is on the right.

M on left:3
C on left:1
M on right:0
C on right:2
boat is on the left.

M on left:0
C on left:1
M on right:3
C on right:2
boat is on the right.

M on left:1
C on left:1
M on right:2
C on right:2
boat is on the left.

M on left:0
C on left:0
M on right:3
C on right:3
boat is on the right.

Farmer Fox Chicken Grain: BFS

Initial State:

Farmer on LEFT:1
Fox on LEFT:1
Chicken on LEFT:1
Grain on LEFT:1
Farmer on RIGHT:0
Fox on RIGHT:0
Chicken on RIGHT:0
Grain on RIGHT:0
boat is on the left.

len(OPEN)=1; len(CLOSED)=0; COUNT = 0
OPEN is now:
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:1
Grain on LEFT:1
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:0
Grain on RIGHT:0
boat is on the right.
,
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the right.

len(OPEN)=2; len(CLOSED)=1; COUNT = 1
OPEN is now:
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the right.

len(OPEN)=1; len(CLOSED)=2; COUNT = 2
OPEN is now:
Farmer on LEFT:1
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:0
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the left.

len(OPEN)=1; len(CLOSED)=3; COUNT = 3
OPEN is now:
Farmer on LEFT:0
Fox on LEFT:0
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:1
Fox on RIGHT:1
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the right.
,
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:1
boat is on the right.

len(OPEN)=2; len(CLOSED)=4; COUNT = 4
OPEN is now:
Farmer on LEFT:1
Fox on LEFT:0
Chicken on LEFT:1
Grain on LEFT:1
Farmer on RIGHT:0
Fox on RIGHT:1
Chicken on RIGHT:0
Grain on RIGHT:0

boat is on the left.
,
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:1
boat is on the right.

len(OPEN)=2; len(CLOSED)=5; COUNT = 5
OPEN is now:
Farmer on LEFT:0
Fox on LEFT:0
Chicken on LEFT:1
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:1
Chicken on RIGHT:0
Grain on RIGHT:1
boat is on the right.
,
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:1
boat is on the right.

len(OPEN)=2; len(CLOSED)=6; COUNT = 6
OPEN is now:
Farmer on LEFT:1
Fox on LEFT:0
Chicken on LEFT:1
Grain on LEFT:0
Farmer on RIGHT:0
Fox on RIGHT:1
Chicken on RIGHT:0
Grain on RIGHT:1
boat is on the left.
,
Farmer on LEFT:1
Fox on LEFT:1
Chicken on LEFT:1
Grain on LEFT:0
Farmer on RIGHT:0
Fox on RIGHT:0
Chicken on RIGHT:0
Grain on RIGHT:1
boat is on the left.
,
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:1
boat is on the right.

len(OPEN)=3; len(CLOSED)=7; COUNT = 7
OPEN is now:
Farmer on LEFT:0
Fox on LEFT:0
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:1
Chicken on RIGHT:1
Grain on RIGHT:1
boat is on the right.
,
Farmer on LEFT:1
Fox on LEFT:1
Chicken on LEFT:1
Grain on LEFT:0
Farmer on RIGHT:0
Fox on RIGHT:0
Chicken on RIGHT:0
Grain on RIGHT:1
boat is on the left.
,
Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:1
boat is on the right.

len(OPEN)=3; len(CLOSED)=8; COUNT = 8
Congratulations on successfully transfer all people from LEFT to right!
Solution path:

Farmer on LEFT:1
Fox on LEFT:1
Chicken on LEFT:1
Grain on LEFT:1
Farmer on RIGHT:0
Fox on RIGHT:0
Chicken on RIGHT:0
Grain on RIGHT:0
boat is on the left.

Farmer on LEFT:0
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:1
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the right.

Farmer on LEFT:1
Fox on LEFT:1
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:0
Fox on RIGHT:0
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the left.

Farmer on LEFT:0
Fox on LEFT:0
Chicken on LEFT:0
Grain on LEFT:1
Farmer on RIGHT:1
Fox on RIGHT:1
Chicken on RIGHT:1
Grain on RIGHT:0
boat is on the right.

Farmer on LEFT:1
Fox on LEFT:0
Chicken on LEFT:1
Grain on LEFT:1
Farmer on RIGHT:0
Fox on RIGHT:1
Chicken on RIGHT:0
Grain on RIGHT:0
boat is on the left.

Farmer on LEFT:0
Fox on LEFT:0
Chicken on LEFT:1
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:1
Chicken on RIGHT:0
Grain on RIGHT:1
 boat is on the right.

Farmer on LEFT:1
Fox on LEFT:0
Chicken on LEFT:1
Grain on LEFT:0
Farmer on RIGHT:0
Fox on RIGHT:1
Chicken on RIGHT:0
Grain on RIGHT:1
 boat is on the left.

Farmer on LEFT:0
Fox on LEFT:0
Chicken on LEFT:0
Grain on LEFT:0
Farmer on RIGHT:1
Fox on RIGHT:1
Chicken on RIGHT:1
Grain on RIGHT:1
 boat is on the right.

Missionaries : DFS

Initial State:
 M on left:3
 C on left:3
   M on right:0
   C on right:0
 boat is on the left.

len(OPEN)=1; len(CLOSED)=0; COUNT = 0
OPEN is now:
 M on left:0
 C on left:3
   M on right:3
   C on right:0
 boat is on the right.
,
 M on left:2
 C on left:2
   M on right:1
   C on right:1
 boat is on the right.

len(OPEN)=2; len(CLOSED)=1; COUNT = 1
OPEN is now:
 M on left:2
 C on left:2
   M on right:1
   C on right:1
 boat is on the right.

len(OPEN)=1; len(CLOSED)=2; COUNT = 2
OPEN is now:
 M on left:3
 C on left:2
   M on right:0
   C on right:1
 boat is on the left.

len(OPEN)=1; len(CLOSED)=3; COUNT = 3
OPEN is now:
 M on left:0
 C on left:2
   M on right:3
   C on right:1
 boat is on the right.
,
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=4; COUNT = 4
OPEN is now:
 M on left:2
 C on left:2
   M on right:1
   C on right:1
 boat is on the left.
,
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=5; COUNT = 5
OPEN is now:
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the right.
,
 M on left:0
 C on left:1
   M on right:3
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=6; COUNT = 6
OPEN is now:
 M on left:3
 C on left:1
   M on right:0
   C on right:2
 boat is on the left.
,
 M on left:0
 C on left:1
   M on right:3
   C on right:2
 boat is on the right.

len(OPEN)=2; len(CLOSED)=7; COUNT = 7
OPEN is now:
 M on left:0
 C on left:1
   M on right:3
   C on right:2
 boat is on the right.

len(OPEN)=1; len(CLOSED)=8; COUNT = 8
OPEN is now:
 M on left:1
 C on left:1
   M on right:2
   C on right:2
 boat is on the left.

len(OPEN)=1; len(CLOSED)=9; COUNT = 9
OPEN is now:
 M on left:0
 C on left:0
   M on right:3
   C on right:3
 boat is on the right.

len(OPEN)=1; len(CLOSED)=10; COUNT = 10

Congratulations on successfully guiding the missionaries and cannibals across the river!
Solution path:

M on left:3
C on left:3
M on right:0
C on right:0
boat is on the left.

M on left:2
C on left:2
M on right:1
C on right:1
boat is on the right.

M on left:3
C on left:2
M on right:0
C on right:1
boat is on the left.

M on left:0
C on left:2
M on right:3
C on right:1
boat is on the right.

M on left:2
C on left:2
M on right:1
C on right:1
boat is on the left.

M on left:1
C on left:1
M on right:2
C on right:2
boat is on the right.

M on left:3
C on left:1
M on right:0
C on right:2
boat is on the left.

M on left:0
C on left:1
M on right:3
C on right:2
boat is on the right.

M on left:1
C on left:1
M on right:2
C on right:2
boat is on the left.

M on left:0
C on left:0
M on right:3
C on right:3
boat is on the right.

Missionaries : BFS

Initial State:

M on left:3
C on left:3
M on right:0
C on right:0
boat is on the left.

len(OPEN)=1; len(CLOSED)=0; COUNT = 0
OPEN is now:
M on left:0
C on left:3
M on right:3
C on right:0
boat is on the right.
,
M on left:2
C on left:2
M on right:1
C on right:1
boat is on the right.

len(OPEN)=2; len(CLOSED)=1; COUNT = 1
OPEN is now:
M on left:2
C on left:2
M on right:1
C on right:1
boat is on the right.

len(OPEN)=1; len(CLOSED)=2; COUNT = 2
OPEN is now:
M on left:3
C on left:2
M on right:0
C on right:1
boat is on the left.

len(OPEN)=1; len(CLOSED)=3; COUNT = 3
OPEN is now:
M on left:0
C on left:2
M on right:3
C on right:1
boat is on the right.
,
M on left:1
C on left:1
M on right:2
C on right:2
boat is on the right.

len(OPEN)=2; len(CLOSED)=4; COUNT = 4
OPEN is now:
M on left:2
C on left:2
M on right:1
C on right:1
boat is on the left.
,
M on left:1
C on left:1
M on right:2
C on right:2
boat is on the right.

len(OPEN)=2; len(CLOSED)=5; COUNT = 5
OPEN is now:
M on left:0
C on left:1
M on right:3
C on right:2
boat is on the right.
,
M on left:1
C on left:1
M on right:2
C on right:2
boat is on the right.

len(OPEN)=2; len(CLOSED)=6; COUNT = 6
OPEN is now:
 M on left:1
 C on left:1
  M on right:2
  C on right:2
 boat is on the left.
,
 M on left:3
 C on left:1
  M on right:0
  C on right:2
 boat is on the left.
,
 M on left:1
 C on left:1
  M on right:2
  C on right:2
 boat is on the right.

len(OPEN)=3; len(CLOSED)=7; COUNT = 7
OPEN is now:
 M on left:0
 C on left:0
  M on right:3
  C on right:3
 boat is on the right.
,
 M on left:3
 C on left:1
  M on right:0
  C on right:2
 boat is on the left.
,
 M on left:1
 C on left:1
  M on right:2
  C on right:2
 boat is on the right.

len(OPEN)=3; len(CLOSED)=8; COUNT = 8
Congratulations on successfully guiding the missionaries and cannibals across the river!
Solution path:

 M on left:3
 C on left:3
  M on right:0
  C on right:0
 boat is on the left.

 M on left:2
 C on left:2
  M on right:1
  C on right:1
 boat is on the right.

 M on left:3
 C on left:2
  M on right:0
  C on right:1
 boat is on the left.

 M on left:0
 C on left:2
  M on right:3
  C on right:1
 boat is on the right.

 M on left:2
 C on left:2
  M on right:1
  C on right:1
 boat is on the left.

M on left:0
C on left:1
  M on right:3
  C on right:2
boat is on the right.

M on left:1
C on left:1
  M on right:2
  C on right:2
boat is on the left.

M on left:0
C on left:0
  M on right:3
  C on right:3
boat is on the right.

Towers of Hanoi : DFS

Initial State:
[[4, 3, 2, 1] ,[] ,[]]
len(OPEN)=1; len(CLOSED)=0; COUNT = 0
OPEN is now: [[4, 3, 2] ,[1] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=2; len(CLOSED)=1; COUNT = 1
OPEN is now: [[4, 3] ,[1] ,[2]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=2; len(CLOSED)=2; COUNT = 2
OPEN is now: [[4, 3, 1] ,[] ,[2]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=3; len(CLOSED)=3; COUNT = 3
OPEN is now: [[4, 3] ,[] ,[2, 1]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=3; len(CLOSED)=4; COUNT = 4
OPEN is now: [[4] ,[3] ,[2, 1]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=3; len(CLOSED)=5; COUNT = 5
OPEN is now: [[4, 1] ,[3] ,[2]], [[4] ,[3, 1] ,[2]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=6; COUNT = 6
OPEN is now: [[4] ,[3, 1] ,[2]], [[4, 1] ,[3, 2] ,[]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=7; COUNT = 7
OPEN is now: [[4, 2] ,[3, 1] ,[]], [[4, 1] ,[3, 2] ,[]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=8; COUNT = 8
OPEN is now: [[4, 2, 1] ,[3] ,[]], [[4, 2] ,[3] ,[1]], [[4, 1] ,[3, 2] ,[]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=9; COUNT = 9
OPEN is now: [[4, 2] ,[3] ,[1]], [[4, 2, 1] ,[] ,[3]], [[4, 1] ,[3, 2] ,[]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=10; COUNT = 10
OPEN is now: [[4] ,[3, 2] ,[1]], [[4, 2, 1] ,[] ,[3]], [[4, 1] ,[3, 2] ,[]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=11; COUNT = 11
OPEN is now: [[4, 1] ,[3, 2] ,[]], [[4] ,[3, 2, 1] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=12; COUNT = 12
OPEN is now: [[4] ,[3, 2, 1] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=13; COUNT = 13
OPEN is now: [[] ,[3, 2, 1] ,[4]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=14; COUNT = 14
OPEN is now: [[1] ,[3, 2] ,[4]], [[] ,[3, 2] ,[4, 1]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=15; COUNT = 15
OPEN is now: [[] ,[3, 2] ,[4, 1]], [[1] ,[3] ,[4, 2]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=16; COUNT = 16
OPEN is now: [[2] ,[3] ,[4, 1]], [[1] ,[3] ,[4, 2]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=17; COUNT = 17
OPEN is now: [[2, 1] ,[3] ,[4]], [[2] ,[3, 1] ,[4]], [[1] ,[3] ,[4, 2]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]

len(OPEN)=6; len(CLOSED)=18; COUNT = 18
OPEN is now: [[2] ,[3, 1] ,[4]], [[2, 1] ,[] ,[4, 3]], [[1] ,[3] ,[4, 2]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=19; COUNT = 19
OPEN is now: [[] ,[3, 1] ,[4, 2]], [[2, 1] ,[] ,[4, 3]], [[1] ,[3] ,[4, 2]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=20; COUNT = 20
OPEN is now: [[1] ,[3] ,[4, 2]], [[] ,[3] ,[4, 2, 1]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=21; COUNT = 21
OPEN is now: [[] ,[3] ,[4, 2, 1]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=22; COUNT = 22
OPEN is now: [[3] ,[] ,[4, 2, 1]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=23; COUNT = 23
OPEN is now: [[3, 1] ,[] ,[4, 2]], [[3] ,[1] ,[4, 2]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=24; COUNT = 24
OPEN is now: [[3] ,[1] ,[4, 2]], [[3, 1] ,[2] ,[4]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=25; COUNT = 25
OPEN is now: [[3, 2] ,[1] ,[4]], [[3, 1] ,[2] ,[4]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=26; COUNT = 26
OPEN is now: [[3, 2, 1] ,[] ,[4]], [[3, 2] ,[] ,[4, 1]], [[3, 1] ,[2] ,[4]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=27; COUNT = 27
OPEN is now: [[3, 2] ,[] ,[4, 1]], [[3, 2, 1] ,[4] ,[]], [[3, 1] ,[2] ,[4]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=28; COUNT = 28
OPEN is now: [[3] ,[2] ,[4, 1]], [[3, 2, 1] ,[4] ,[]], [[3, 1] ,[2] ,[4]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=29; COUNT = 29
OPEN is now: [[3, 1] ,[2] ,[4]], [[3] ,[2, 1] ,[4]], [[3, 2, 1] ,[4] ,[]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=30; COUNT = 30
OPEN is now: [[3] ,[2, 1] ,[4]], [[3, 2, 1] ,[4] ,[]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=31; COUNT = 31
OPEN is now: [[] ,[2, 1] ,[4, 3]], [[3, 2, 1] ,[4] ,[]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=32; COUNT = 32
OPEN is now: [[1] ,[2] ,[4, 3]], [[] ,[2] ,[4, 3, 1]], [[3, 2, 1] ,[4] ,[]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=33; COUNT = 33
OPEN is now: [[] ,[2] ,[4, 3, 1]], [[1] ,[] ,[4, 3, 2]], [[3, 2, 1] ,[4] ,[]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=34; COUNT = 34
OPEN is now: [[2] ,[] ,[4, 3, 1]], [[1] ,[] ,[4, 3, 2]], [[3, 2, 1] ,[4] ,[]], [[2, 1] ,[] ,[4, 3]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=35; COUNT = 35
OPEN is now: [[2, 1] ,[] ,[4, 3]], [[2] ,[1] ,[4, 3]], [[1] ,[] ,[4, 3, 2]], [[3, 2, 1] ,[4] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=36; COUNT = 36
OPEN is now: [[2] ,[1] ,[4, 3]], [[1] ,[] ,[4, 3, 2]], [[3, 2, 1] ,[4] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=37; COUNT = 37
OPEN is now: [[] ,[1] ,[4, 3, 2]], [[1] ,[] ,[4, 3, 2]], [[3, 2, 1] ,[4] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=38; COUNT = 38
OPEN is now: [[1] ,[] ,[4, 3, 2]], [[] ,[] ,[4, 3, 2, 1]], [[3, 2, 1] ,[4] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=39; COUNT = 39
OPEN is now: [[] ,[] ,[4, 3, 2, 1]], [[3, 2, 1] ,[4] ,[]], [[4, 2, 1] ,[] ,[3]], [[4, 3, 1] ,[2] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=40; COUNT = 40
The Tower Transport is Triumphant!
Solution path:
[[4, 3, 2, 1] ,[] ,[]]
[[4, 3, 2] ,[1] ,[]]
[[4, 3] ,[1] ,[2]]
[[4, 3, 1] ,[] ,[2]]
[[4, 3] ,[] ,[2, 1]]
[[4] ,[3] ,[2, 1]]
[[4, 1] ,[3] ,[2]]
[[4] ,[3, 1] ,[2]]
[[4, 2] ,[3, 1] ,[]]
[[4, 2, 1] ,[3] ,[]]
[[4, 2] ,[3] ,[1]]
[[4] ,[3, 2] ,[1]]
[[4, 1] ,[3, 2] ,[]]
[[4] ,[3, 2, 1] ,[]]
[[] ,[3, 2, 1] ,[4]]
[[1] ,[3, 2] ,[4]]
[[] ,[3, 2] ,[4, 1]]
[[2] ,[3] ,[4, 1]]
[[2, 1] ,[3] ,[4]]
[[2] ,[3, 1] ,[4]]
[[] ,[3, 1] ,[4, 2]]
[[1] ,[3] ,[4, 2]]
[[] ,[3] ,[4, 2, 1]]
[[3] ,[] ,[4, 2, 1]]
[[3, 1] ,[] ,[4, 2]]
[[3] ,[1] ,[4, 2]]
[[3, 2] ,[1] ,[4]]
[[3, 2, 1] ,[] ,[4]]
[[3, 2] ,[] ,[4, 1]]
[[3] ,[2] ,[4, 1]]
[[3, 1] ,[2] ,[4]]
[[3] ,[2, 1] ,[4]]
[[] ,[2, 1] ,[4, 3]]
[[1] ,[2] ,[4, 3]]
[[] ,[2] ,[4, 3, 1]]
[[2] ,[] ,[4, 3, 1]]
[[2, 1] ,[] ,[4, 3]]
[[2] ,[1] ,[4, 3]]
[[] ,[1] ,[4, 3, 2]]
[[1] ,[] ,[4, 3, 2]]
[[] ,[] ,[4, 3, 2, 1]]

Towers of Hanoi : BFS

Initial State:
[[4, 3, 2, 1] ,[] ,[]]
len(OPEN)=1; len(CLOSED)=0; COUNT = 0
OPEN is now: [[4, 3, 2] ,[1] ,[]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=2; len(CLOSED)=1; COUNT = 1
OPEN is now: [[4, 3] ,[1] ,[2]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=2; len(CLOSED)=2; COUNT = 2
OPEN is now: [[4, 3, 1] ,[] ,[2]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=3; len(CLOSED)=3; COUNT = 3
OPEN is now: [[4, 3, 1] ,[2] ,[]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=3; len(CLOSED)=4; COUNT = 4
OPEN is now: [[4, 3] ,[2, 1] ,[]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=5; COUNT = 5
OPEN is now: [[4] ,[2, 1] ,[3]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=4; len(CLOSED)=6; COUNT = 6
OPEN is now: [[4, 1] ,[2] ,[3]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=7; COUNT = 7
OPEN is now: [[4, 1] ,[] ,[3, 2]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=5; len(CLOSED)=8; COUNT = 8
OPEN is now: [[4] ,[1] ,[3, 2]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=9; COUNT = 9
OPEN is now: [[4, 2] ,[1] ,[3]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=6; len(CLOSED)=10; COUNT = 10
OPEN is now: [[4, 2, 1] ,[] ,[3]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=11; COUNT = 11
OPEN is now: [[4, 2, 1] ,[3] ,[]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=7; len(CLOSED)=12; COUNT = 12
OPEN is now: [[4, 2] ,[3, 1] ,[]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=8; len(CLOSED)=13; COUNT = 13
OPEN is now: [[4] ,[3, 1] ,[2]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[]

,[1]]
len(OPEN)=8; len(CLOSED)=14; COUNT = 14
OPEN is now: [[4, 1] ,[3] ,[2]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=9; len(CLOSED)=15; COUNT = 15
OPEN is now: [[4, 1] ,[3, 2] ,[]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=9; len(CLOSED)=16; COUNT = 16
OPEN is now: [[4] ,[3, 2, 1] ,[]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=10; len(CLOSED)=17; COUNT = 17
OPEN is now: [[] ,[3, 2, 1] ,[4]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=10; len(CLOSED)=18; COUNT = 18
OPEN is now: [[1] ,[3, 2] ,[4]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=11; len(CLOSED)=19; COUNT = 19
OPEN is now: [[1] ,[3] ,[4, 2]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=11; len(CLOSED)=20; COUNT = 20
OPEN is now: [[] ,[3, 1] ,[4, 2]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=12; len(CLOSED)=21; COUNT = 21
OPEN is now: [[2] ,[3, 1] ,[4]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=12; len(CLOSED)=22; COUNT = 22
OPEN is now: [[2, 1] ,[3] ,[4]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=13; len(CLOSED)=23; COUNT = 23
OPEN is now: [[2, 1] ,[] ,[4, 3]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=13; len(CLOSED)=24; COUNT = 24
OPEN is now: [[2] ,[1] ,[4, 3]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=14; len(CLOSED)=25; COUNT = 25
OPEN is now: [[] ,[1] ,[4, 3, 2]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=14; len(CLOSED)=26; COUNT = 26
OPEN is now: [[1] ,[] ,[4, 3, 2]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=15; len(CLOSED)=27; COUNT = 27
OPEN is now: [[1] ,[2] ,[4, 3]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=15; len(CLOSED)=28; COUNT = 28
OPEN is now: [[] ,[2, 1] ,[4, 3]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=16; len(CLOSED)=29; COUNT = 29
OPEN is now: [[3] ,[2, 1] ,[4]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=16; len(CLOSED)=30; COUNT = 30
OPEN is now: [[3, 1] ,[2] ,[4]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[]
,[1]]
len(OPEN)=17; len(CLOSED)=31; COUNT = 31
OPEN is now: [[3, 1] ,[] ,[4, 2]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=17; len(CLOSED)=32; COUNT = 32
OPEN is now: [[3] ,[1] ,[4, 2]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=18; len(CLOSED)=33; COUNT = 33
OPEN is now: [[3, 2] ,[1] ,[4]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=18; len(CLOSED)=34; COUNT = 34
OPEN is now: [[3, 2, 1] ,[] ,[4]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=19; len(CLOSED)=35; COUNT = 35
OPEN is now: [[3, 2, 1] ,[4] ,[]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=19; len(CLOSED)=36; COUNT = 36
OPEN is now: [[3, 2] ,[4, 1] ,[]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=20; len(CLOSED)=37; COUNT = 37
OPEN is now: [[3] ,[4, 1] ,[2]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=20; len(CLOSED)=38; COUNT = 38
OPEN is now: [[3, 1] ,[4] ,[2]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=21; len(CLOSED)=39; COUNT = 39
OPEN is now: [[3, 1] ,[4, 2] ,[]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=22; len(CLOSED)=40; COUNT = 40
OPEN is now: [[3] ,[4, 2, 1] ,[]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=22; len(CLOSED)=41; COUNT = 41
OPEN is now: [[] ,[4, 2, 1] ,[3]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=23; len(CLOSED)=42; COUNT = 42
OPEN is now: [[1] ,[4, 2] ,[3]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]

len(OPEN)=23; len(CLOSED)=43; COUNT = 43
OPEN is now: [[1] ,[4] ,[3, 2]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=23; len(CLOSED)=44; COUNT = 44
OPEN is now: [[] ,[4, 1] ,[3, 2]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=24; len(CLOSED)=45; COUNT = 45
OPEN is now: [[2] ,[4, 1] ,[3]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=24; len(CLOSED)=46; COUNT = 46
OPEN is now: [[2, 1] ,[4] ,[3]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=25; len(CLOSED)=47; COUNT = 47
OPEN is now: [[2, 1] ,[4, 3] ,[]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=25; len(CLOSED)=48; COUNT = 48
OPEN is now: [[2] ,[4, 3, 1] ,[]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=26; len(CLOSED)=49; COUNT = 49
OPEN is now: [[] ,[4, 3, 1] ,[2]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=26; len(CLOSED)=50; COUNT = 50
OPEN is now: [[1] ,[4, 3] ,[2]], [[] ,[4, 3] ,[2, 1]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=27; len(CLOSED)=51; COUNT = 51
OPEN is now: [[1] ,[4, 3, 2] ,[]], [[] ,[4, 3] ,[2, 1]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=27; len(CLOSED)=52; COUNT = 52
OPEN is now: [[] ,[4, 3, 2, 1] ,[]], [[] ,[4, 3, 2] ,[1]], [[] ,[4, 3] ,[2, 1]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=28; len(CLOSED)=53; COUNT = 53
OPEN is now: [[] ,[4, 3, 2] ,[1]], [[] ,[4, 3] ,[2, 1]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=24; len(CLOSED)=54; COUNT = 54
OPEN is now: [[] ,[4, 3] ,[2, 1]], [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=25; len(CLOSED)=55; COUNT = 55
OPEN is now: [[2] ,[4, 3] ,[1]], [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=26; len(CLOSED)=56; COUNT = 56
OPEN is now: [[2] ,[4] ,[3, 1]], [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=24; len(CLOSED)=57; COUNT = 57
OPEN is now: [[] ,[4] ,[3, 2, 1]], [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=23; len(CLOSED)=58; COUNT = 58
OPEN is now: [[] ,[4, 2] ,[3, 1]], [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=22; len(CLOSED)=59; COUNT = 59
OPEN is now: [[3] ,[4, 2] ,[1]], [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=21; len(CLOSED)=60; COUNT = 60
OPEN is now: [[3] ,[4] ,[2, 1]], [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=20; len(CLOSED)=61; COUNT = 61
OPEN is now: [[3, 2] ,[4] ,[1]], [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=19; len(CLOSED)=62; COUNT = 62
OPEN is now: [[3, 2] ,[] ,[4, 1]], [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=18; len(CLOSED)=63; COUNT = 63
OPEN is now: [[3] ,[] ,[4, 2, 1]], [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=17; len(CLOSED)=64; COUNT = 64
OPEN is now: [[3] ,[2] ,[4, 1]], [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=16; len(CLOSED)=65; COUNT = 65

OPEN is now: [[] ,[2] ,[4, 3, 1]], [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=15; len(CLOSED)=66; COUNT = 66
OPEN is now: [[] ,[] ,[4, 3, 2, 1]], [[2] ,[] ,[4, 3, 1]], [[2] ,[3] ,[4, 1]], [[] ,[3] ,[4, 2, 1]], [[] ,[3, 2] ,[4, 1]], [[4] ,[3, 2] ,[1]], [[4] ,[3] ,[2, 1]], [[4, 2] ,[3] ,[1]], [[4, 2] ,[] ,[3, 1]], [[4] ,[] ,[3, 2, 1]], [[4] ,[2] ,[3, 1]], [[4, 3] ,[2] ,[1]], [[4, 3] ,[] ,[2, 1]], [[4, 3, 2] ,[] ,[1]]
len(OPEN)=14; len(CLOSED)=67; COUNT = 67
The Tower Transport is Triumphant!
Solution path:
[[4, 3, 2, 1] ,[] ,[]]
[[4, 3, 2] ,[1] ,[]]
[[4, 3] ,[1] ,[2]]
[[4, 3, 1] ,[] ,[2]]
[[4, 3, 1] ,[2] ,[]]
[[4, 3] ,[2, 1] ,[]]
[[4] ,[2, 1] ,[3]]
[[4, 1] ,[2] ,[3]]
[[4, 1] ,[] ,[3, 2]]
[[4] ,[1] ,[3, 2]]
[[4, 2] ,[1] ,[3]]
[[4, 2, 1] ,[] ,[3]]
[[4, 2, 1] ,[3] ,[]]
[[4, 2] ,[3, 1] ,[]]
[[4] ,[3, 1] ,[2]]
[[4, 1] ,[3] ,[2]]
[[4, 1] ,[3, 2] ,[]]
[[4] ,[3, 2, 1] ,[]]
[[] ,[3, 2, 1] ,[4]]
[[1] ,[3, 2] ,[4]]
[[1] ,[3] ,[4, 2]]
[[] ,[3, 1] ,[4, 2]]
[[2] ,[3, 1] ,[4]]
[[2, 1] ,[3] ,[4]]
[[2, 1] ,[] ,[4, 3]]
[[2] ,[1] ,[4, 3]]
[[] ,[1] ,[4, 3, 2]]
[[1] ,[] ,[4, 3, 2]]
[[] ,[] ,[4, 3, 2, 1]]