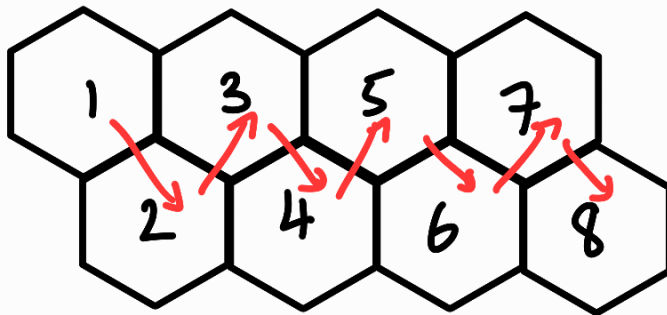


How many different paths are there of starting at 1 and finishing at 8 (through adjacent hexagons only)?

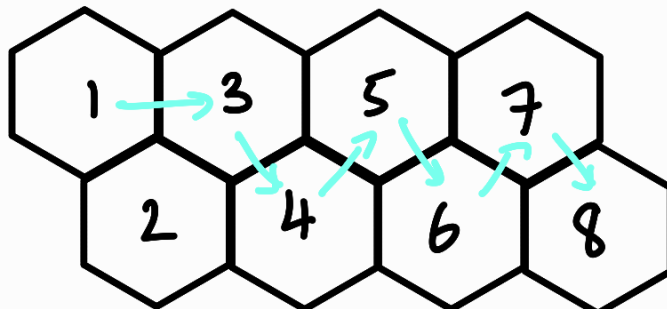
You can only move to a higher number as you go.

e.g.



1, 2, 3, 4, 5, 6, 7, 8.

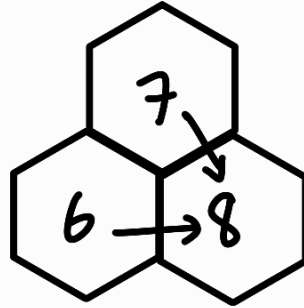
or



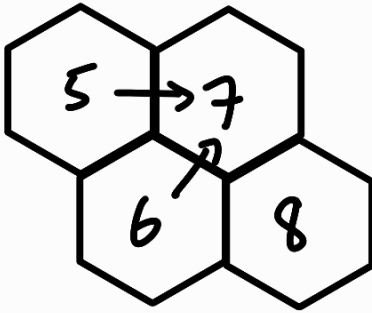
1, 3, 4, 5, 6, 7, 8.

7 → 8

or 6 → 8



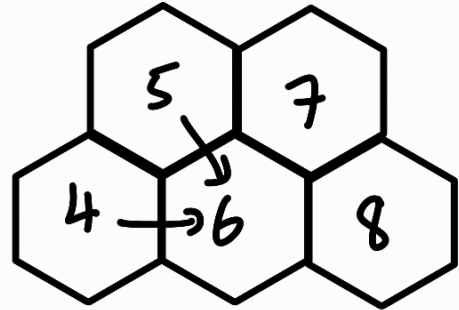
7,8



5,7,8

6,7,8

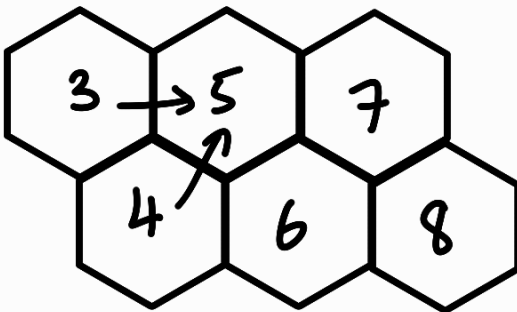
6,8



5,6,8

4,6,8

5,7,8



3,5,7,8

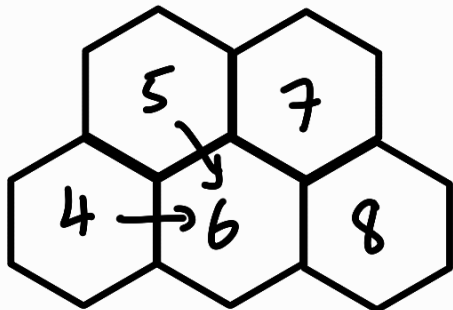
4,5,7,8

5,6,8

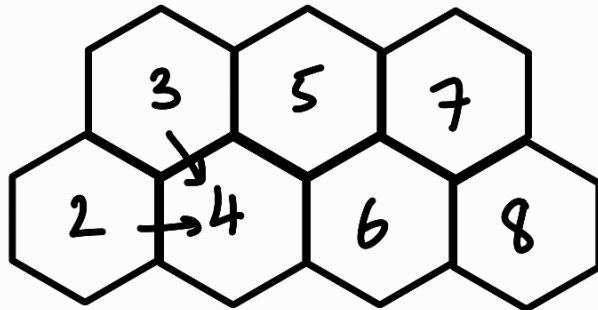
3,6,8

4,6,8

6,7,8



4,6,8



5,6,7,8

4,6,7,8

5 steps

3,4,6,8

2,4,6,8

3,5,7,8

1,3,5,7,8

2,3,5,7,8 ✓

4,5,7,8

3,4,5,7,8 ✓

2,4,5,7,8 ✓

5,6,7,8

4,5,6,7,8 ✓

3,5,6,7,8 ✓

4,6,7,8

3,4,6,7,8 ✓

2,4,6,7,8 ✓

3,6,8

1,3,6,8

2,3,6,8 ✓

4,6,8

3,4,6,8 ✓

2,4,6,8 ✓

3,4,6,8

1,3,4,6,8

2,3,4,6,8 ✓

2,4,6,8

1,2,4,6,8

6 steps

1, 2, 3, 5, 7, 8

1, 3, 4, 5, 7, 8  
2, 3, 4, 5, 7, 8 ✓

1, 2, 4, 5, 7, 8

3, 4, 5, 6, 7, 8 ✓  
2, 4, 5, 6, 7, 8 ✓

1, 3, 5, 6, 7, 8  
2, 3, 5, 6, 7, 8 ✓

1, 3, 4, 6, 7, 8  
2, 3, 4, 6, 7, 8 ✓

1, 2, 4, 6, 7, 8

1, 2, 3, 6, 8

1, 3, 4, 6, 8  
2, 3, 4, 6, 8

1, 2, 4, 6, 8

1, 2, 3, 4, 6, 8

7 steps

1, 2, 3, 4, 5, 7, 8

2, 3, 4, 5, 6, 7, 8  
1, 3, 4, 5, 6, 7, 8

1, 2, 4, 5, 6, 7, 8

1, 2, 3, 5, 6, 7, 8

1, 2, 3, 4, 6, 7, 8

1, 2, 3, 4, 6, 8

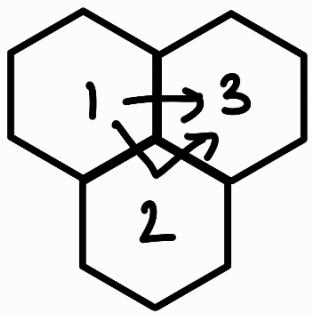
8 steps

1, 2, 3, 4, 5, 6, 7, 8

TOTAL = 21 ways

OR Start. with smaller destination!

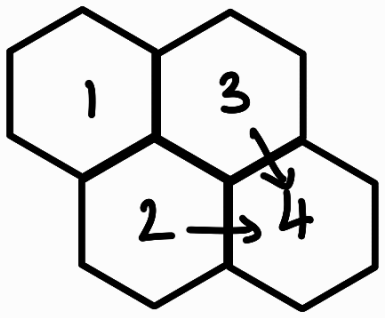
n = 3



1, 3  
1, 2, 3

↳ 2 ways!

n = 4



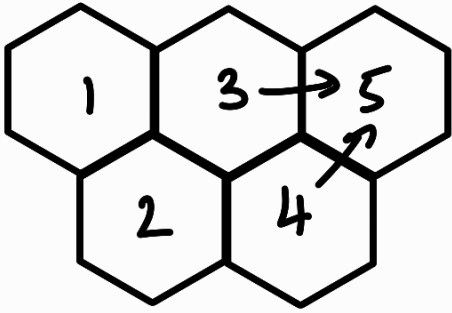
1, 3 → 4  
1, 2, 3 → 4

or

1, 2 → 4

2 + 1 = 3 ways

n=5



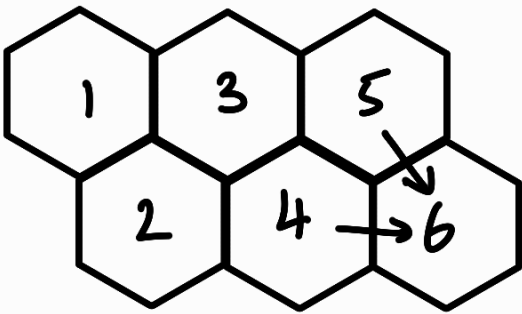
all n=3

all n=4

2+3

= 5 ways

n=6



all n=5

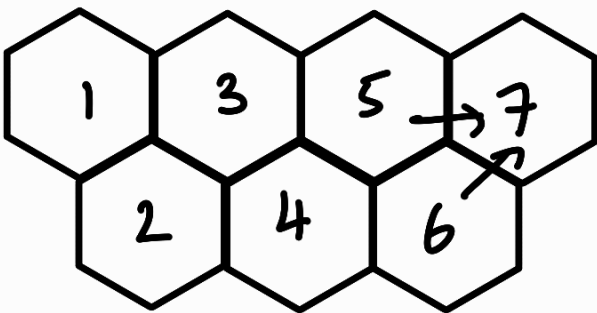
+

5+3

all n=4

= 8 ways

n=7



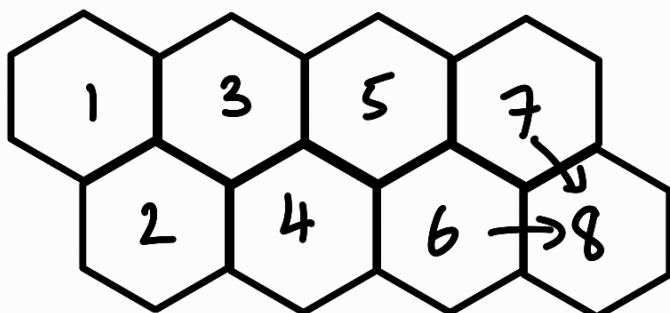
all n=5

all n=6

5+8

= 13 ways

n=8



all n=7

all n=6

8+5

= 21 ways

$$u_{n+2} = u_{n+1} + u_n$$

Recursion!

1 1 2 3 5 8 13 21 ..

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