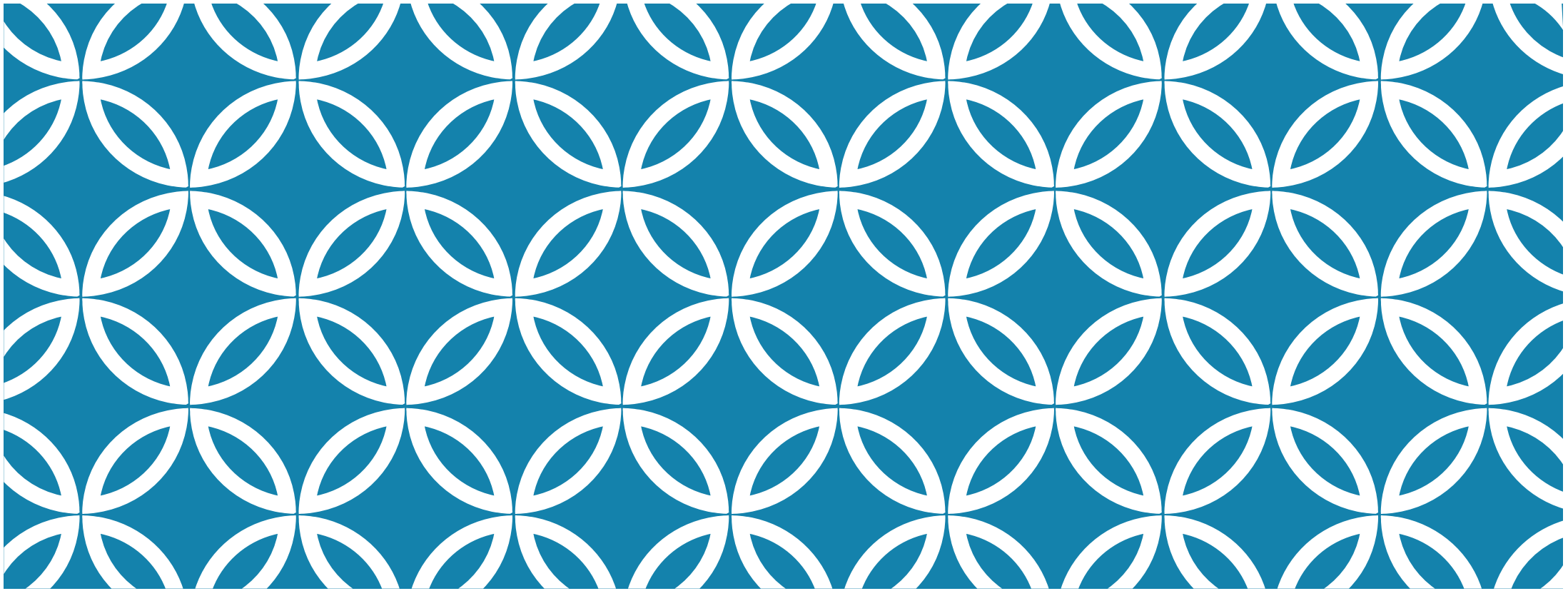
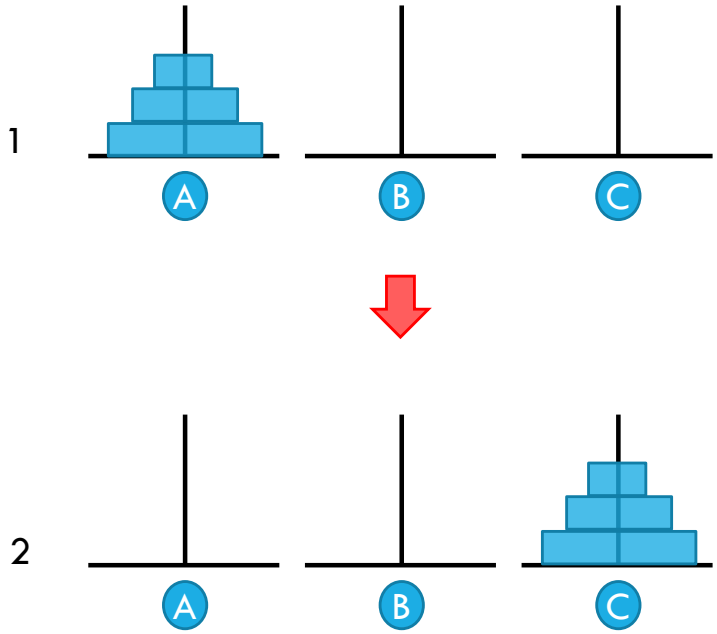


TOWER OF HANOI

Recursion in Python

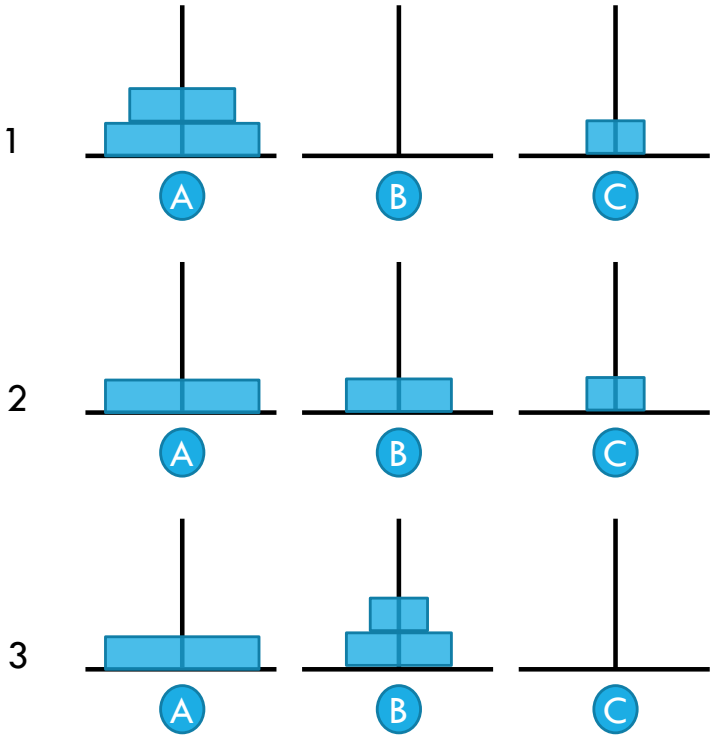
INTRODUCTION TO HANOI GAME

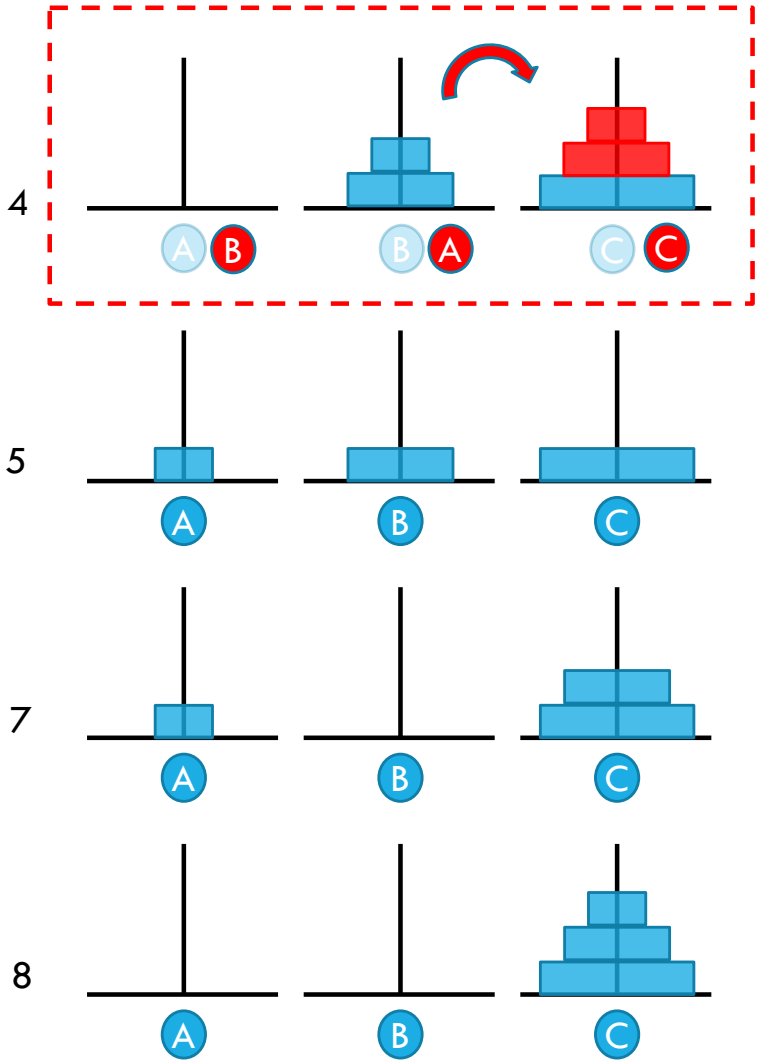


Rules

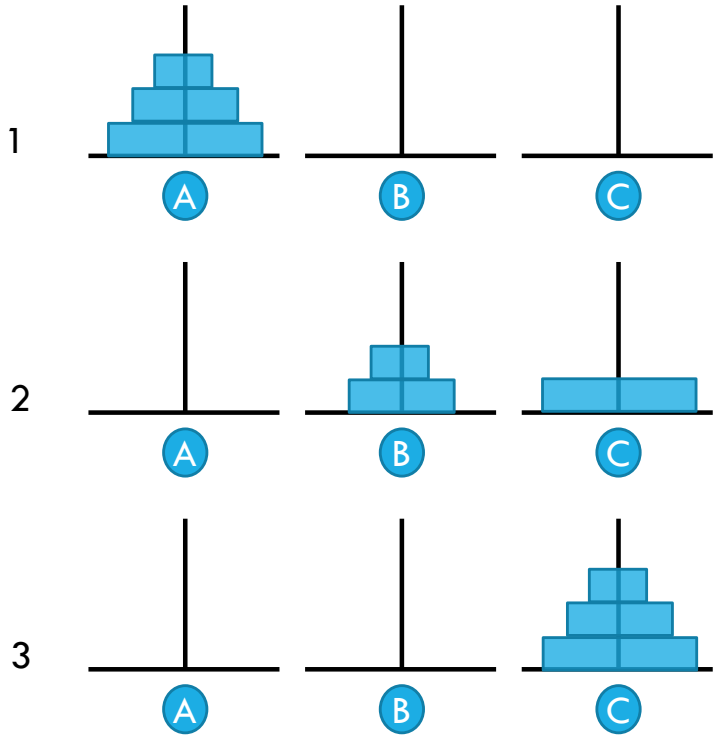
1. Only one disk can be moved at a time.
2. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack or on an empty rod.
3. No larger disk may be placed on top of a smaller disk.

SOLUTION





INTUITION



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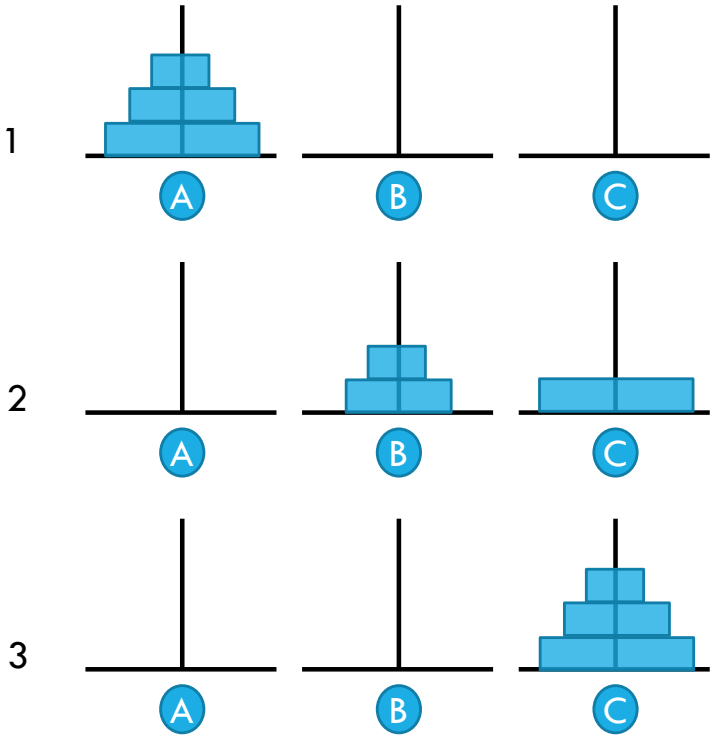

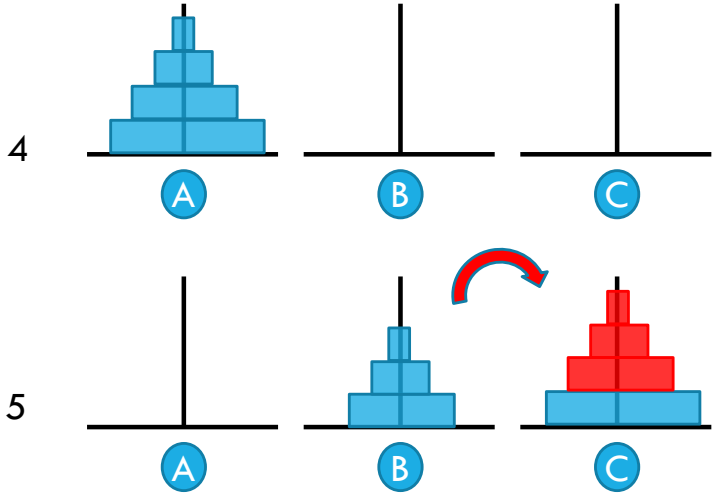

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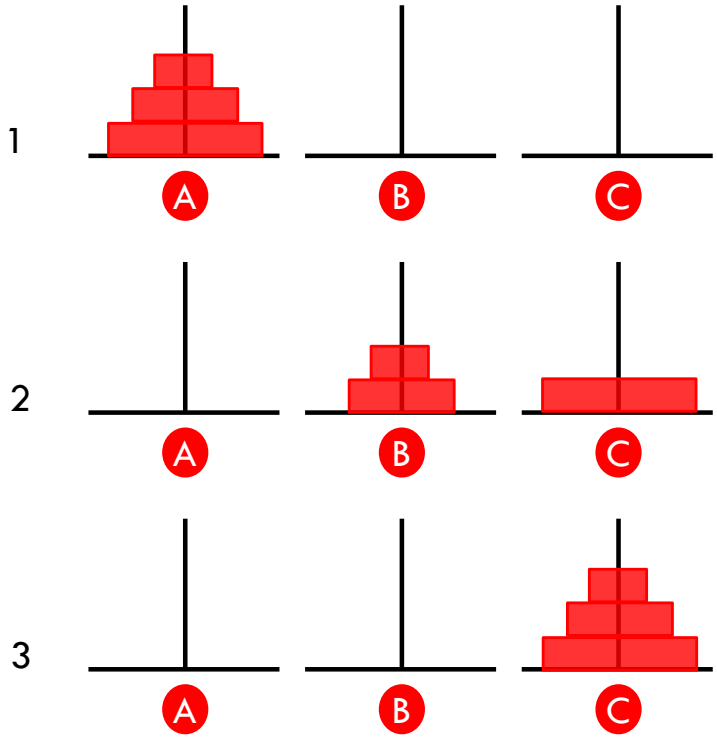
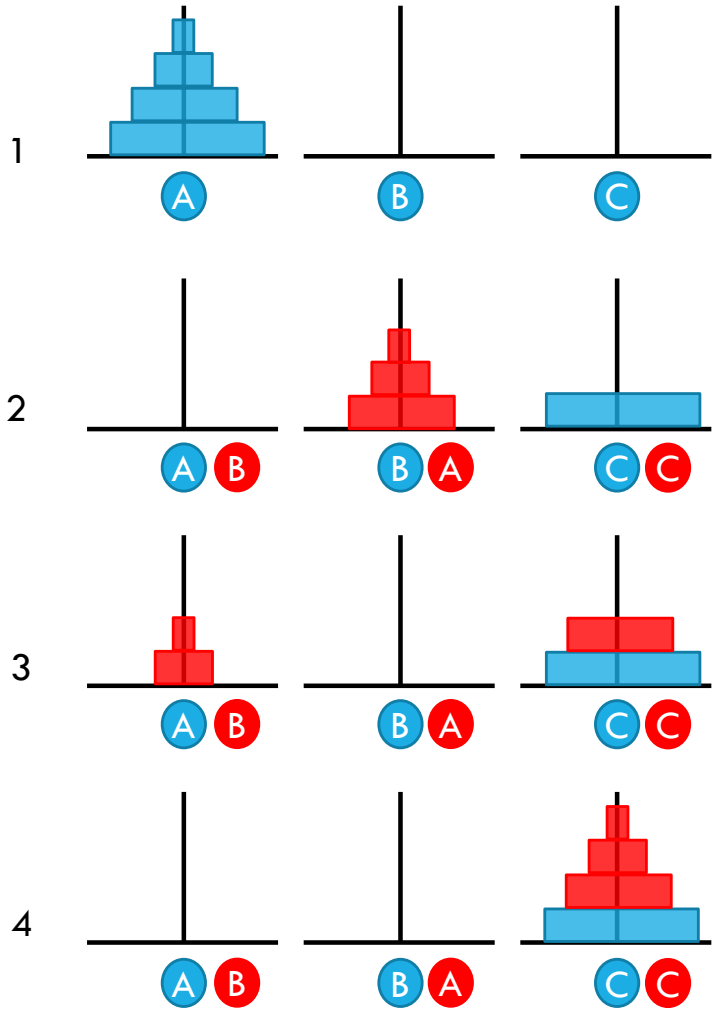
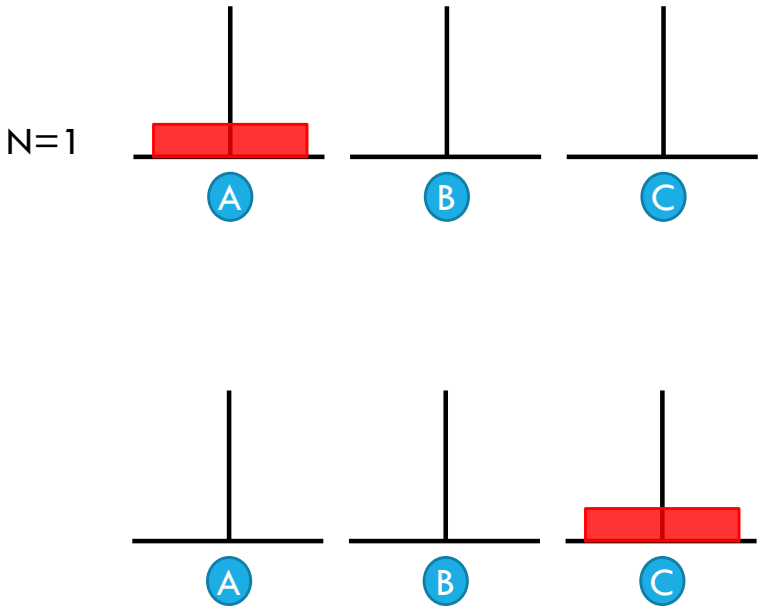
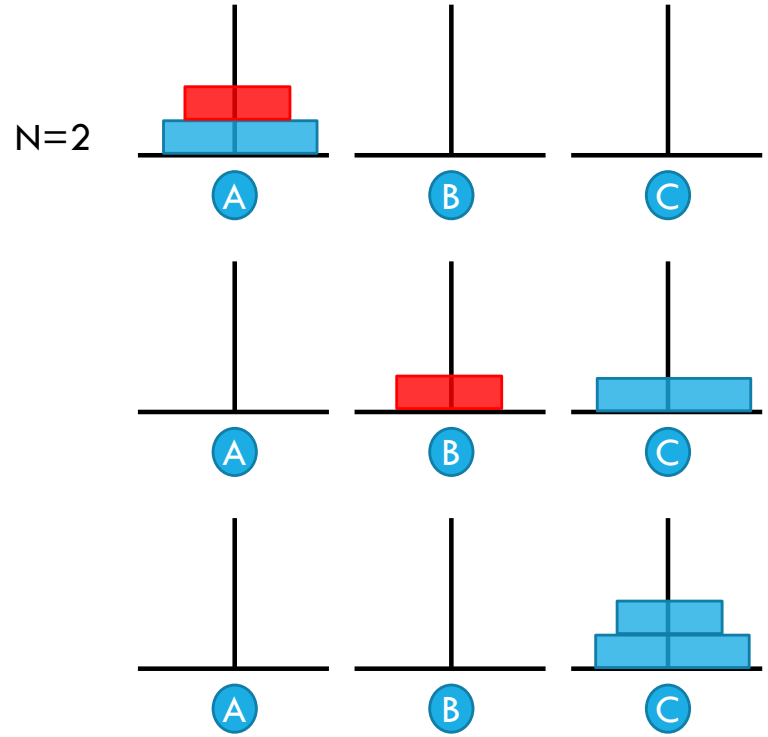


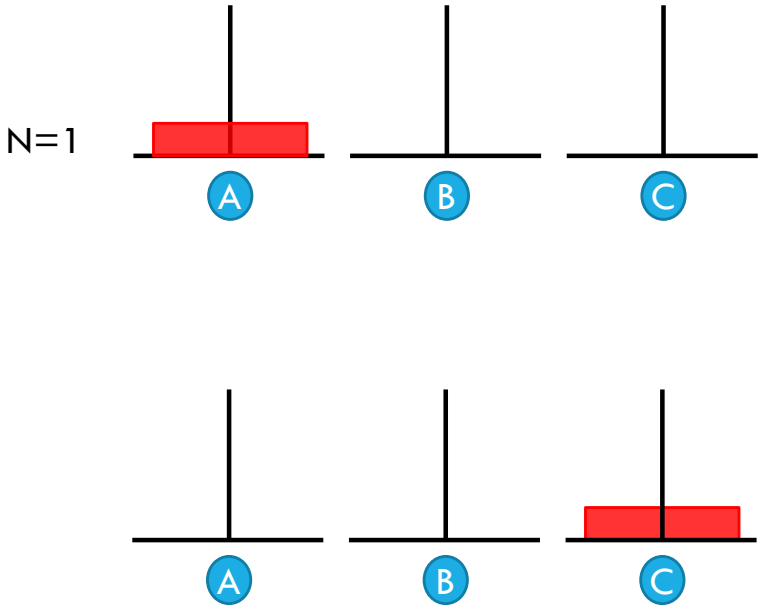


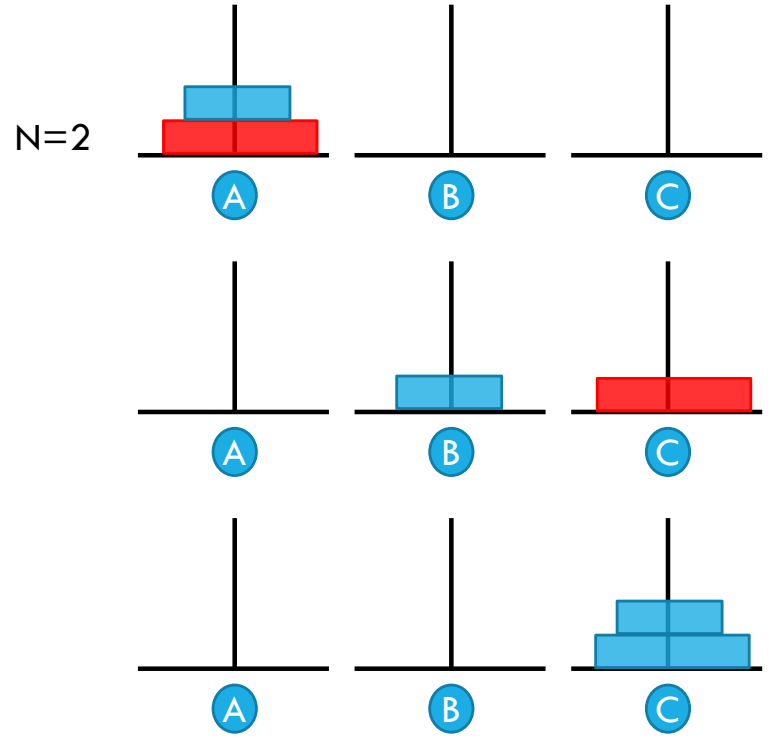
N=2 ← N=1



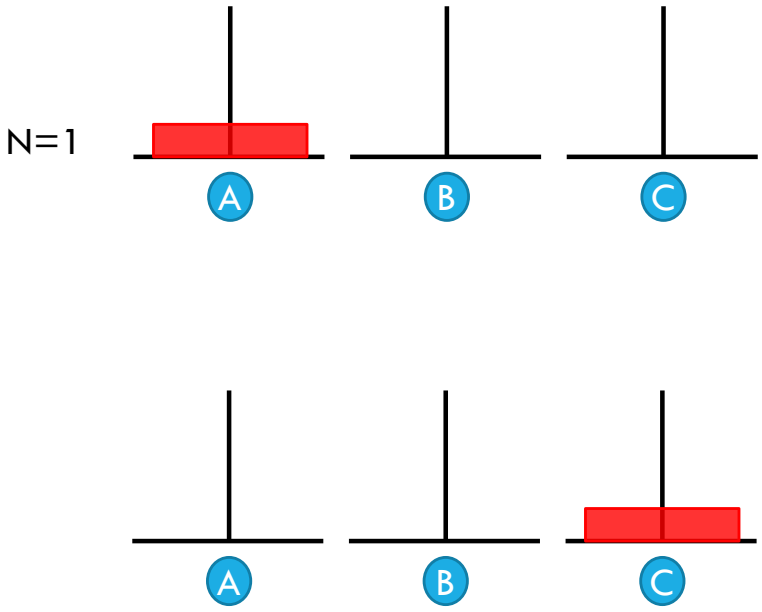


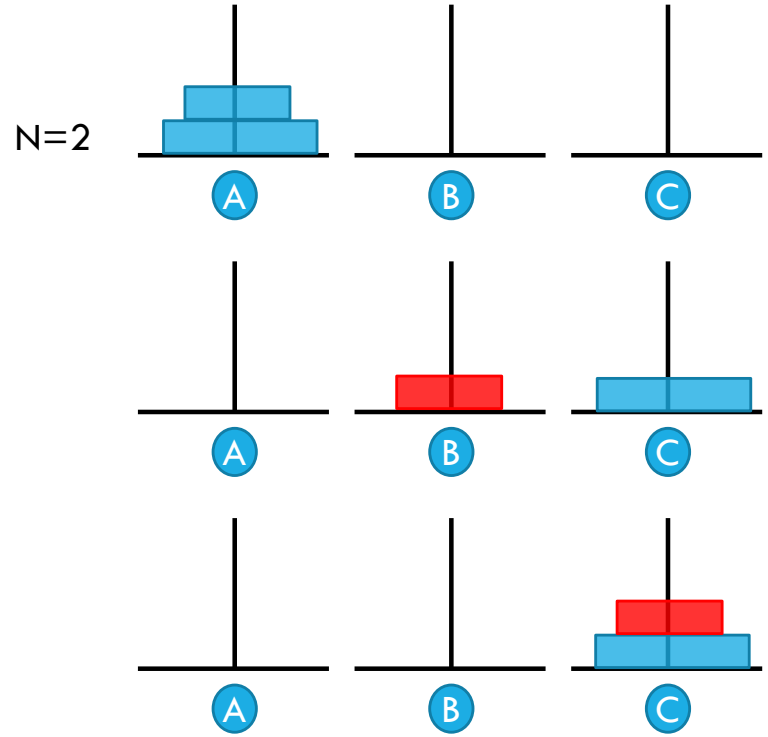
N=2 ← N=1





N=2 ← N=1





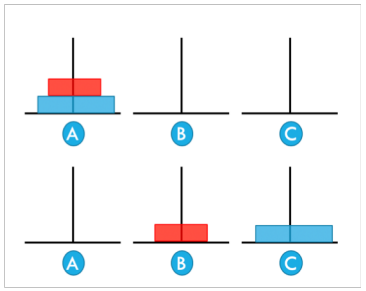
N=2 ← N=1

F(n, a, b, c) =

- n disks
- The start stack
- The useless stack
- The end stack

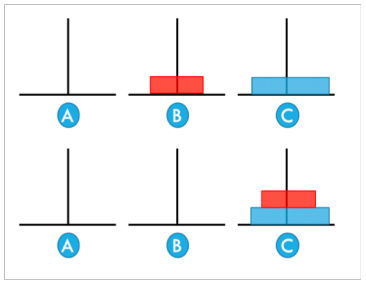
If n = 2

1. F(1, a, c, b)



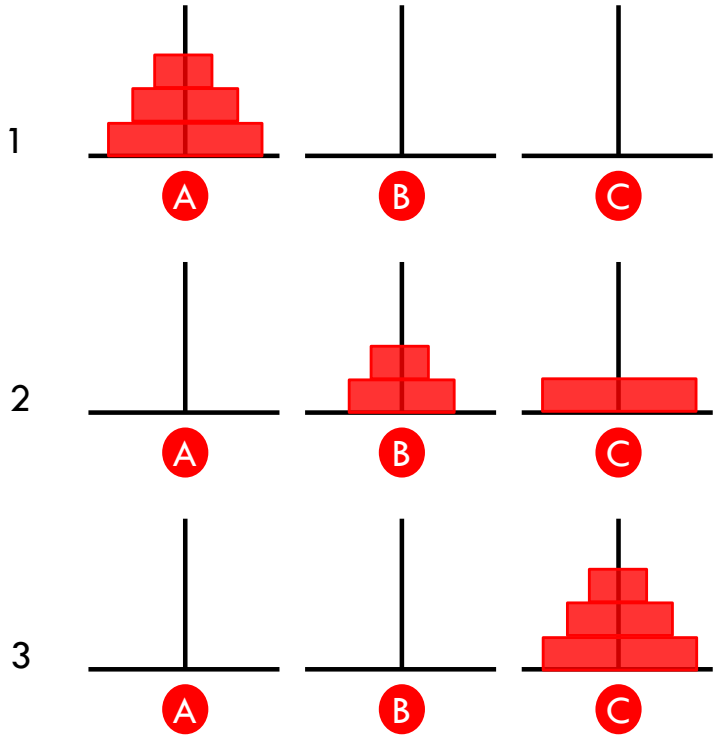
2. Move the 2nd disk from a to c

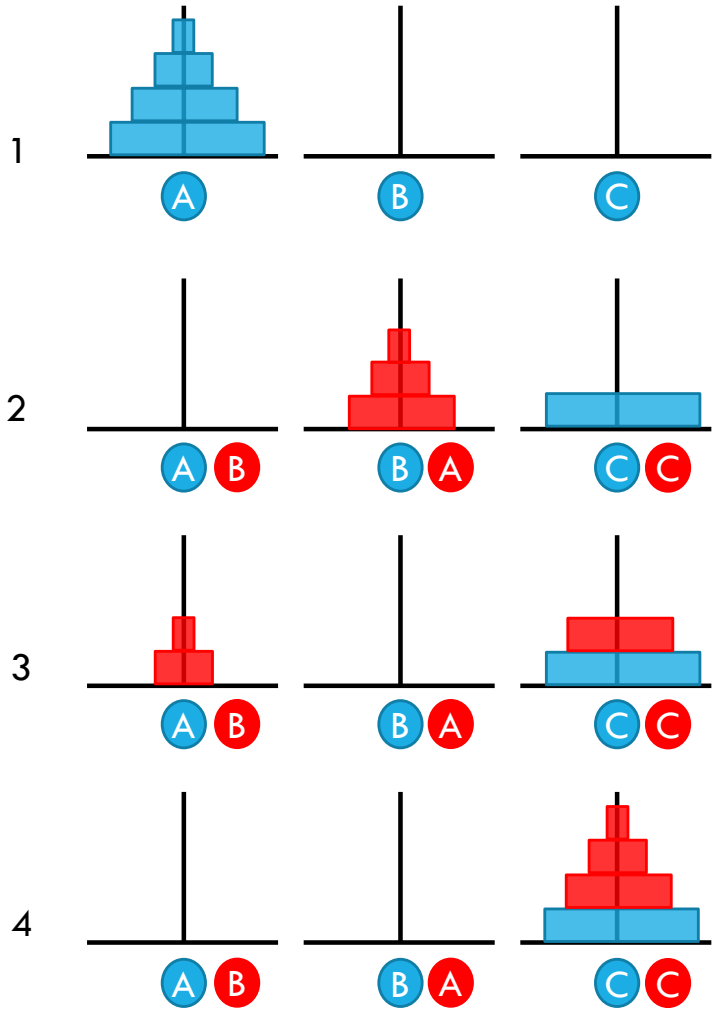
3. F(1, b, a, c)



If n = 1, then move disk from a to c

INTUITION





N=? ← N=1

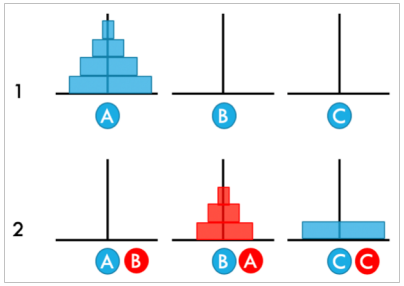
F(n, a, b, c) =

- n disks
- The start stack
- The useless stack
- The end stack

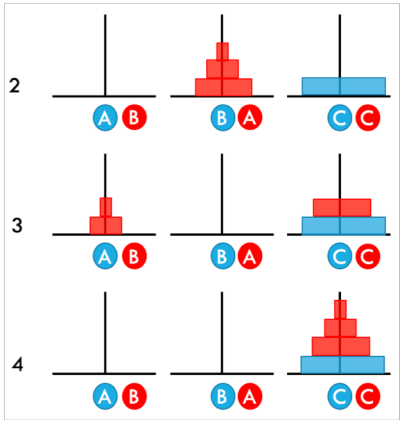
If n > 1

1. F(n - 1, a, c, b)

   Move n – 1 disks from a to b



2. Move the biggest disk from a to c



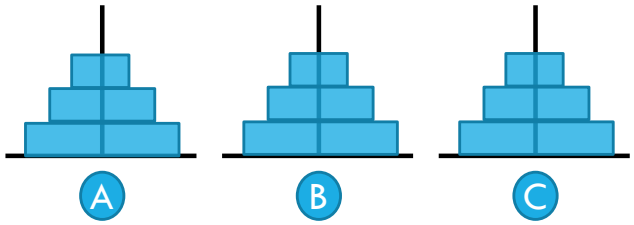
3. F(n - 1, b, a, c)

   Move n – 1 disks from b to c

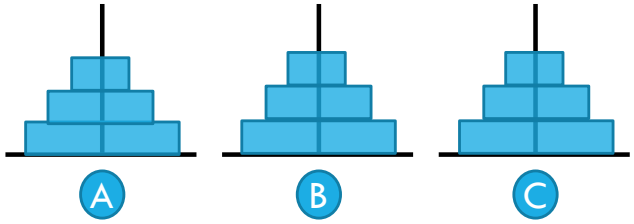
If n = 1, then move disk from a to c

TEMPLATE

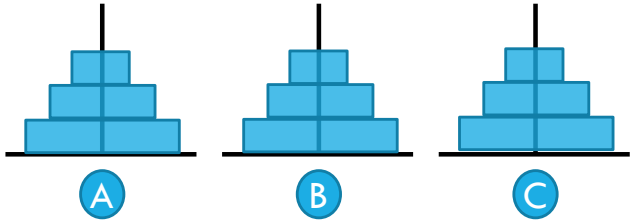
1



2



3



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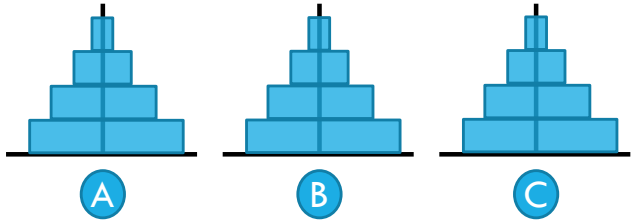

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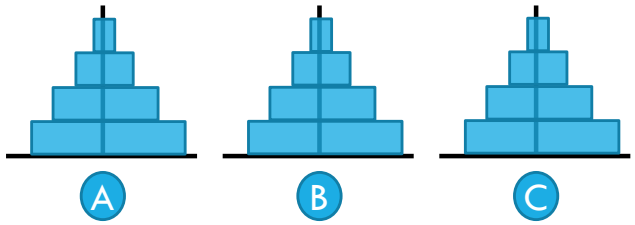

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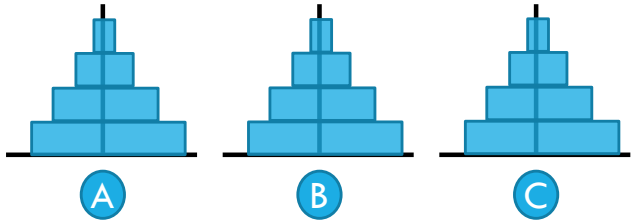

8