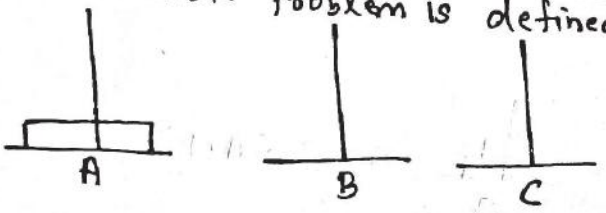
Date: 20/04/2020.

Tower of Hanoi Problem: The objective of the Tower of Hanoi Problem is to move entire stack of disk from start/soure tower to destination tower, obeying the following simple rules:

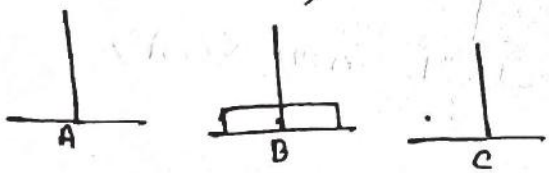
1. only one disk can be moved at a time
2. Each move consists of taking the upper disk from one the stacks and placing it on top of another stack.
3. No disk may be placed on top of a smaller disk.

Case 1: when number of disk is 1, n=1 (called 1-disk Problem)
one disk Problem is defined as: (1, A, B, C)



objective: move one disk from Tower A to Tower B using given above rules.

move <A, B>

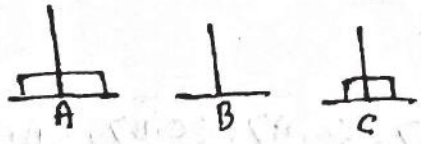


No. of moves required = 1

Solution = { <A, B> }

Case 2: when number of disk is 2, n=2 (called 2-disk Tower of Hanoi Problem)
2-disk Tower of hanoi Problem is defined as: (2, A, B, C)

Step 1:



move <A, C>

Step 2:

move <A, B>

Step 3:

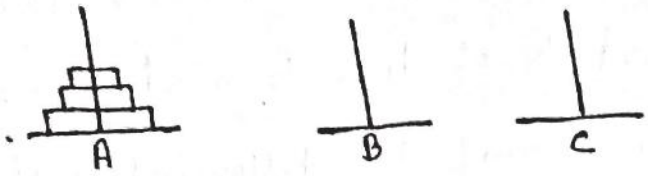
move <C, B>

Solution: sequence of moves
= { <A, C>, <A, B>, <C, B> }

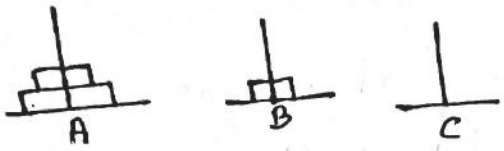
Minimum Number of moves are required = 3

Case 3: when no. of disk is 3, n = 3 (called 3-disk Tower of Hanoi proble

3-disk Tower of Hanoi problem is defined as: (3, A, B, C)

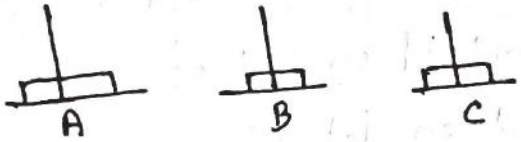


Step 1:



move <A, B>

Step 2:

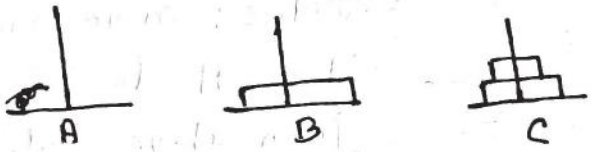


move <A, C>

Step 3:

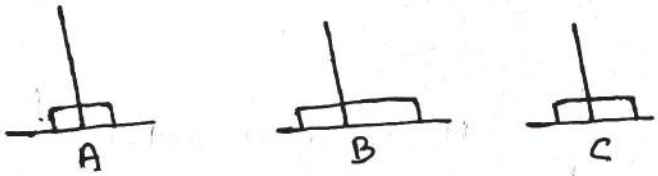
move <B, C>

Step 4:



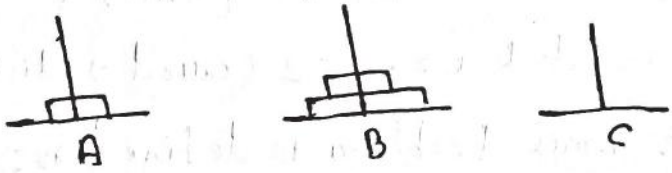
move <A, B>

Step 5:



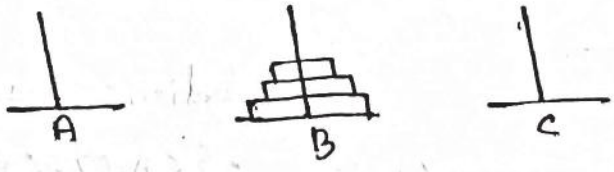
move <C, A>

Step 6:



move <C, B>

Step 7:

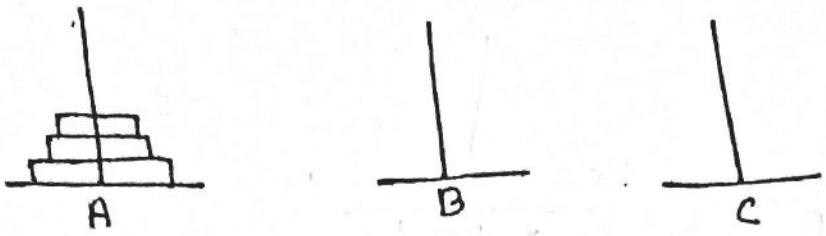


move <A, B>

Solution = {<A, B>, <A, C>, <B, C>, <A, B>, <C, A>, <C, B>, <A, B>}

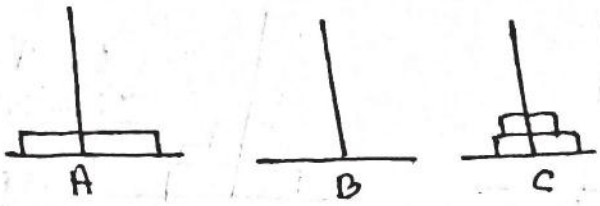
Minimum Number of moves required = 7.

3-disk Towers of Hanoi Problem : (3, A, B, C)



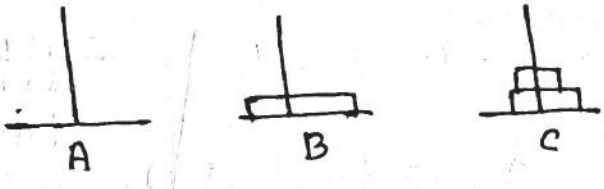
3-disk Tower of Hanoi problem is divided into three steps.

Step 1:



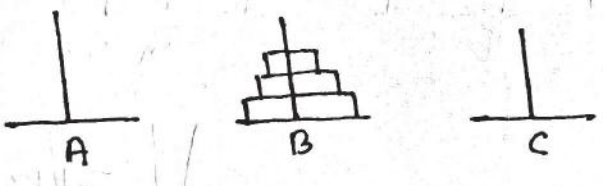
(2, A, C, B)
No. of moves = 3
= {<A,B>, <A,C>, <B,C>}

Step 2:



(1, A, B, C)
No. of moves = 1
= {<A,B>}

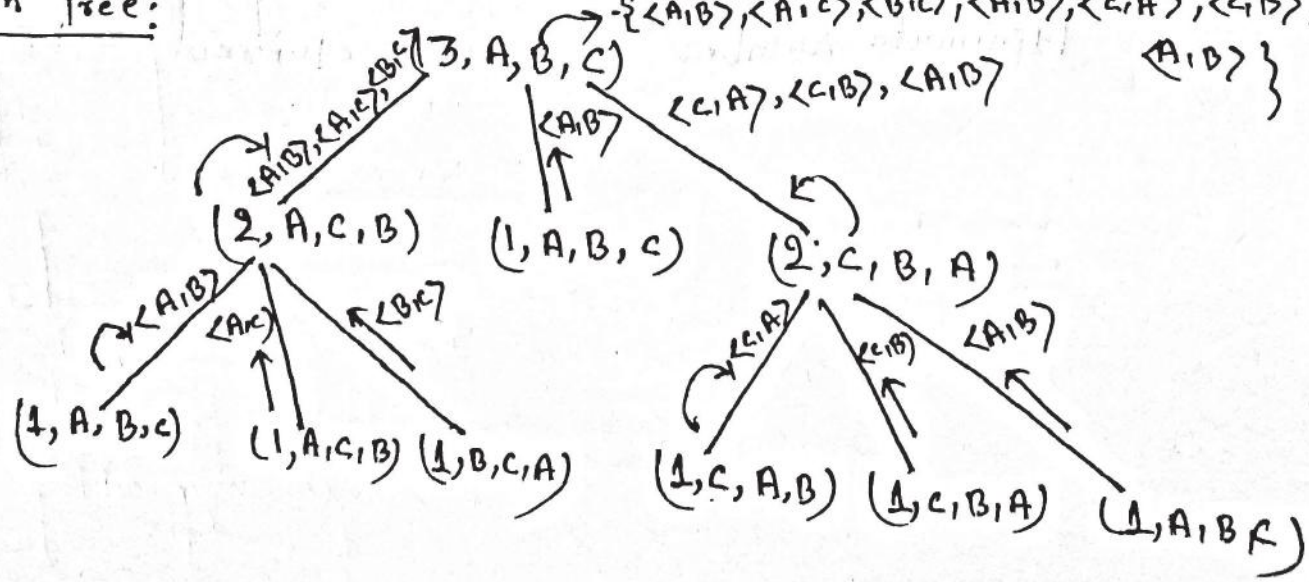
Step 3:



(2, C, B, A)
No. of moves = 3
= {<C,A>, <C,B>, <A,B>}

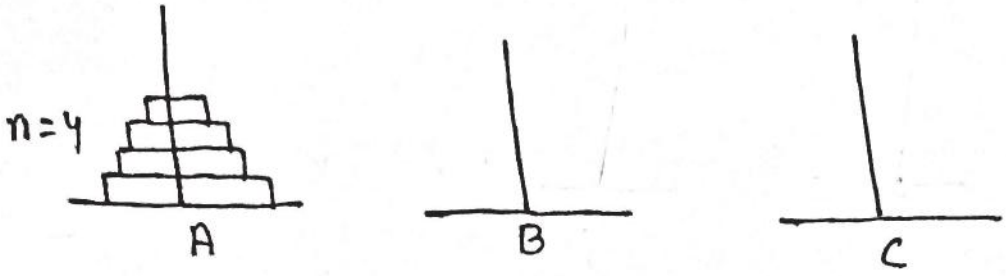
Solution: {<A,B>, <A,C>, <B,C>, <A,B>, <C,A>, <C,B>, <A,B>}
Total No. of moves = 7

Recursion Tree:



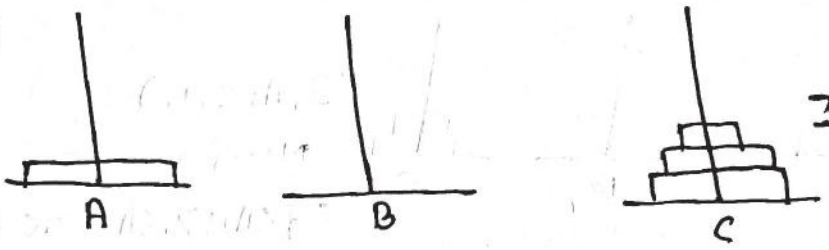
Case 4: when no. of disk is 4, n=4 (called 4-disk Tower of Hanoi Problem)

4-disk Tower of Hanoi Problem is defined as: (4, A, B, C)



4-disk tower of hanoi Problem is divided into three steps/ Parts

Step 1:

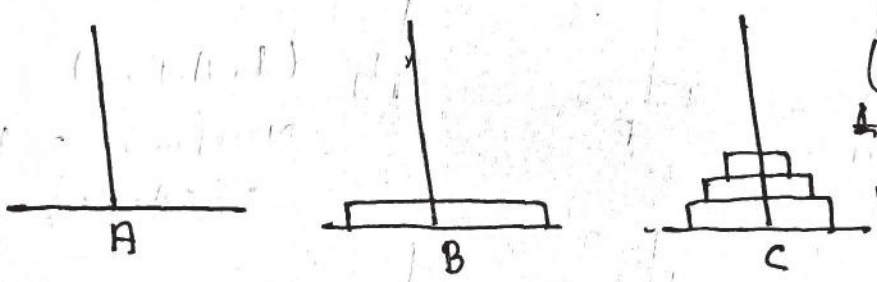


(3, A, C, B)

~~3(A, C, B)~~

No. of moves = 7

Step 2:

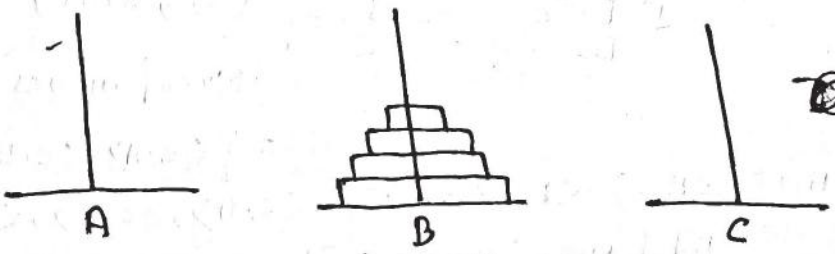


(1, A, B, C)

~~1(A, B, C)~~

No. of moves = 1

Step 3:

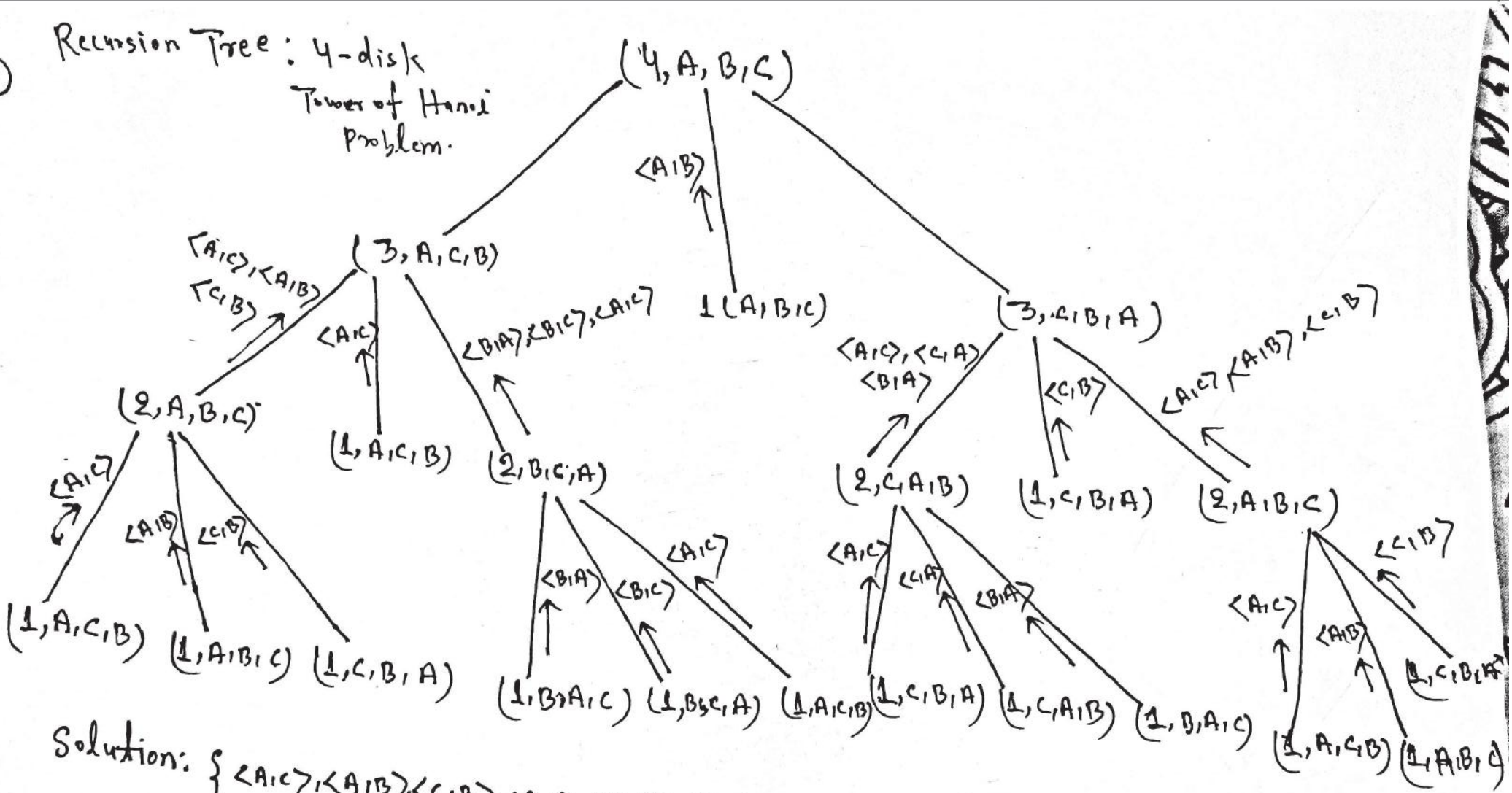


(3, C, B, A)

No. of moves = 7

Minimum number of moves required = 15.

(6) Recursion Tree : 4-disk Tower of Hanoi Problem.



Solution: { <A,C>, <A,B>, <C,B>, <A,C>, <B,A>, <B,C>, <A,C>, <A,B>, <A,C>, <C,A>, <B,A>, <C,B>, <A,C>, <A,B>, <C,B> }

Total Number of moves = 15.