Tower of Hanoi

Tower of Hanoi is a mathematical puzzle where we have three rods and n disks. The objective of the puzzle is to move the entire stack to another rod, 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 of the stacks and placing it on top of another stack i.e. a disk can only be moved if it is the uppermost disk on a stack.

3) No disk may be placed on top of a smaller disk.

Approach :

Take an example for 2 disks :

Let rod 1 = 'A', rod 2 = 'B', rod 3 = 'C'.

Step 1 : Shift first disk from 'A' to 'B'.
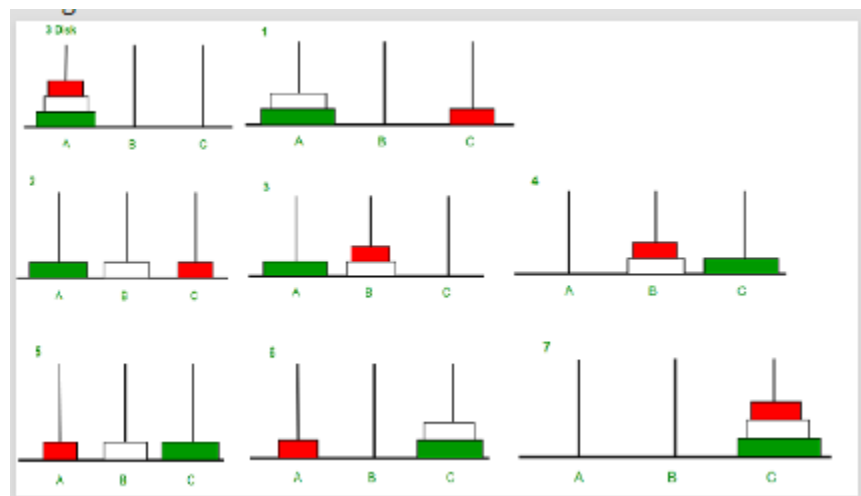
Step 2 : Shift second disk from 'A' to 'C'.

Step 3 : Shift first disk from 'B' to 'C'.

The pattern here is :

Shift 'n-1' disks from 'A' to 'B'.

Shift last disk from 'A' to 'C'.

Shift 'n-1' disks from 'B' to 'C'.

Examples:

Input : 2

Output : Disk 1 moved from A to B

      Disk 2 moved from A to C

      Disk 1 moved from B to C

Input : 3

Output : Disk 1 moved from A to C

      Disk 2 moved from A to B

      Disk 1 moved from C to B

      Disk 3 moved from A to C

      Disk 1 moved from B to A

      Disk 2 moved from B to C

      Disk 1 moved from A to C

```c
#include <stdio.h>
void towers(int, char, char, char);
int main()

{
    int num;
  printf("Enter the number of disks : ");
  scanf("%d", &num);
  printf("The sequence of moves involved in the Tower of Hanoi are :\n");
  towers(num, 'A', 'C', 'B');
  return 0;
}

void towers(int num, char frompeg, char topeg, char auxpeg)
{
    if (num == 1)
    {
        printf("\n Move disk 1 from peg %c to peg %c", frompeg, topeg);
        return;
    }
```

```
    towers(num - 1, frompeg, auxpeg, topeg);
    printf("\n Move disk %d from peg %c to peg %c", num, frompeg, topeg);
    towers(num - 1, auxpeg, topeg, frompeg);
}
```
OUTPUT :

Enter the number of disks : 3
The sequence of moves involved in the Tower of Hanoi are :

Move disk 1 from peg A to peg C
Move disk 2 from peg A to peg B
Move disk 1 from peg C to peg B
Move disk 3 from peg A to peg C
Move disk 1 from peg B to peg A
Move disk 2 from peg B to peg C
Move disk 1 from peg A to peg C