ASSIGNMENT NO.3
AI LAB

NAME : JANHAVI KOLTE
ROLL NO. : 33141
BATCH : K-9

PROBLEM STATEMENT :

1. Accept N from User
2. Follow all conditions and restrictions as per base problem
3. Print all intermediate movements of Disks/Rings between Rods/Towers.
4. At the end Print N, total no. of movements required for achieving final destination, time required for all movements

CODE :

```
import time
def tower_of_hanoi(count,n,source, dest,aux):
    count[0] +=1
    if n==1:
        print("Disk {} moved from {} to {} position".format(n,source,dest))
        return
    tower_of_hanoi(count,n-1,source,aux,dest)
    print("Disk {} moved from {} to {} position".format(n,source,dest))
    tower_of_hanoi(count,n-1,aux,dest,source)


start_time = time.time()
disks = int(input('Enter number of disks :'))
moves = [0]
print(disks)
tower_of_hanoi(moves,disks,"Source A","Dest C","Aux B")

print("No of moves : ", moves[0])
print("Time required : ",time.time()-start_time)
```

OUTPUT :

1) For n= 3:

```
Enter number of disks :3
3
Disk 1 moved from Source A to Dest C position
Disk 2 moved from Source A to Aux B position
Disk 1 moved from Dest C to Aux B position
Disk 3 moved from Source A to Dest C position
Disk 1 moved from Aux B to Source A position
Disk 2 moved from Aux B to Dest C position
Disk 1 moved from Source A to Dest C position
No of moves :  7
Time required :  2.0823962688446045
>
```

2) For n = 5:

```
Enter number of disks :5
5
Disk 1 moved from Source A to Dest C position
Disk 2 moved from Source A to Aux B position
Disk 1 moved from Dest C to Aux B position
Disk 3 moved from Source A to Dest C position
Disk 1 moved from Aux B to Source A position
Disk 2 moved from Aux B to Dest C position
Disk 1 moved from Source A to Dest C position
Disk 4 moved from Source A to Aux B position
Disk 1 moved from Dest C to Aux B position
Disk 2 moved from Dest C to Source A position
Disk 1 moved from Aux B to Source A position
Disk 3 moved from Dest C to Aux B position
Disk 1 moved from Source A to Dest C position
Disk 2 moved from Source A to Aux B position
Disk 1 moved from Dest C to Aux B position
Disk 5 moved from Source A to Dest C position
Disk 1 moved from Aux B to Source A position
Disk 2 moved from Aux B to Dest C position
Disk 1 moved from Source A to Dest C position
Disk 3 moved from Aux B to Source A position
Disk 1 moved from Dest C to Aux B position
Disk 2 moved from Dest C to Source A position
Disk 1 moved from Aux B to Source A position
Disk 4 moved from Aux B to Dest C position
Disk 1 moved from Source A to Dest C position
Disk 2 moved from Source A to Aux B position
Disk 1 moved from Dest C to Aux B position
Disk 3 moved from Source A to Dest C position
Disk 1 moved from Aux B to Source A position
Disk 2 moved from Aux B to Dest C position
Disk 1 moved from Source A to Dest C position
No of moves :  31
Time required :  1.563880205154419
```

3) For n= 8:

Enter number of disks :8

8
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 4 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 5 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 4 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 6 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 4 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position

Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 5 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 4 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 7 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 4 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 5 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position

Disk 4 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 6 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 4 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 5 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 4 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 8 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position

Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 4 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 5 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 4 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 6 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 4 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position

Disk 5 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 4 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 7 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 4 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 5 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 4 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position

Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 6 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 4 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 3 moved from Dest C to Source A position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 5 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 3 moved from Source A to Aux B position
Disk 1 moved from Dest C to Source A position
Disk 2 moved from Dest C to Aux B position
Disk 1 moved from Source A to Aux B position
Disk 4 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
Disk 2 moved from Aux B to Source A position
Disk 1 moved from Dest C to Source A position
Disk 3 moved from Aux B to Dest C position
Disk 1 moved from Source A to Aux B position
Disk 2 moved from Source A to Dest C position
Disk 1 moved from Aux B to Dest C position
No of moves : 255
Time required : 2.2116262912750244
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