

## 6564 One Move from Towers of Hanoi

For this problem, we are concerned with the classic problem of Towers of Hanoi. In this problem there are three posts and a collection of circular disks. Lets call the number of disks  $n$ . The disks are of different sizes, with no two having the same radius, and the one main rule is to never put a bigger disk on top of a smaller one. We will number the disks from 1 (smallest) to  $n$  (biggest) and name the posts A, B, and C. If all the disks start on post A, and the goal is to move the disks to post C by moving one at a time, again, never putting a bigger one on top of a smaller one, there is a well-known solution that recursively calls for moving  $n-1$  disks from A to B, then directly moves the bottom disk from A to C, then recursively calls for moving the  $n-1$  disks from B to C.

Pseudocode for a recursive solution to classic Towers of Hanoi problem:

```
move(num_disks, from_post, spare_post, to_post)
  if (num_disks == 0)
    return
  move(num_disks - 1, from_post, to_post, spare_post)
  print ("Move disk ", num_disks, " from ",
        from_post, " to ", to_post)
  move(num_disks - 1, spare_post, from_post, to_post)
```

The problem at hand is determining the  $k$ -th move made by the above algorithm for a given  $k$  and  $n$ .

### Input

Input will be two integers per line,  $k$  and  $n$ . End of file will be signified by a line with two zeros. All input will be valid,  $k$  and  $n$  will be positive integers with  $k$  less than  $2^n$  so that there is a  $k$ -th move, and  $n$  will be at most 60 so that the answer will fit in a 64-bit integer type.

### Output

Output the requested  $k$ -th move made by the above algorithm. Follow this format exactly: 'Case', one space, the case number, a colon and one space, and the answer for that case given as the number of the disk, the name of the *from\_post*, and the name of the *to\_post* with one space separating the parts of the answer. Do not print any trailing spaces.

### Sample Input

```
1 3
5 3
8 4
0 0
```

### Sample Output

```
Case 1: 1 A C
Case 2: 1 B A
Case 3: 4 A C
```