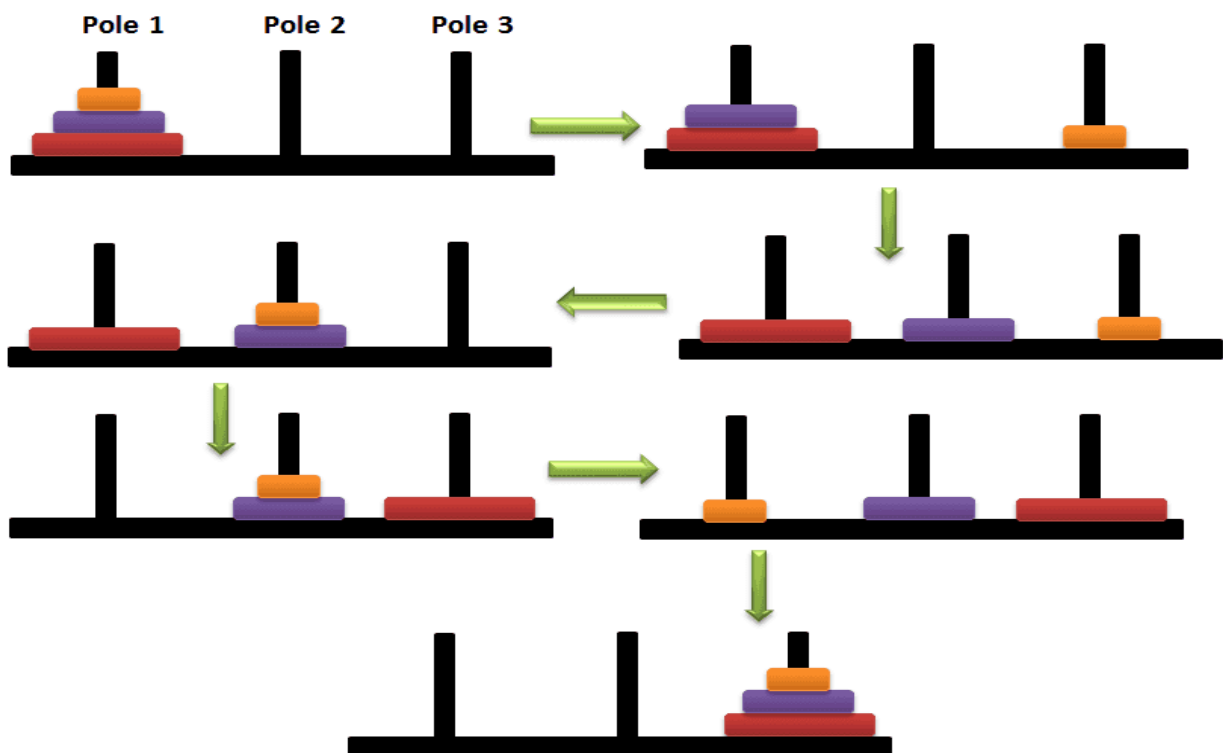


Tower of Hanoi in Java Using Recursion

What is Tower of Hanoi?

Tower of Hanoi is also called as **Tower of Brahma** or **Lucas Tower**. It is one of the most popular problem which makes you understand the power of recursion. **Tower of Hanoi** is a mathematical puzzle which consist of **3 poles** and number of **discs** of different sizes. Initially all the discs will be places in the single pole with the largest disc at the bottom and smallest on the top. We need to move all the disc from the first pole to the third pole with the smallest disc at the top and the largest at the bottom under the below conditions.

1. Only one disc can be moved at a time.
2. Larger disc cannot be placed on a smaller disc.



Tower of Hanoi algorithm

We will be using **Java** Recursion to solve this problem and the below step will be performed. Let's assume there are 'n' discs and 3 poles (**pole1**, **pole2**, **pole3**)

Step 1: Move (n-1) discs from **pole1** to **pole2**

Step 2: Move the **nth** disc (**last disc**) from **pole1** to **pole3**.

Step 3: Now move the n-1 discs which is present in **pole2** to **pole3**.

Algorithm notation in java

```
void towers(int noofdskis,String start,String aux,String end)
{
    If(noofdskis==0)
        Move the disk from start to end
    else
    {
        towers(noofdskis-1,start,end,aux);
        Move the disk from start to end
        towers(noofdskis-1,aux,start,end)
    }
}
```

```
/* Write a java program to implement Tower of Hanoi Problem */
import java.util.Scanner;
public class RTowers
{
    public static void towers(int n, String start, String aux, String end)
    {
        if (n == 0)
        {
            return;
        }
        towers(n - 1, start, end, aux);
        System.out.println("Move \"Disk\" + n + \"\" from \" + start + \" --> \" + end);
        towers(n - 1, aux, start, end);
    }
    public static void main(String[] args)
    {
        System.out.print("Enter number of discs: ");
        Scanner scanner = new Scanner(System.in);
        int numberOfDiscs = scanner.nextInt();
        towers(numberOfDiscs, "Pole1", "Pole2", "Pole3");
    }
}
```

OUTPUT

Command Prompt

```
D:\21batchecea>java RTowers
Enter number of discs: 1
Move "Disk1" from Pole1 --> Pole3

D:\21batchecea>java RTowers
Enter number of discs: 2
Move "Disk1" from Pole1 --> Pole2
Move "Disk2" from Pole1 --> Pole3
Move "Disk1" from Pole2 --> Pole3

D:\21batchecea>java RTowers
Enter number of discs: 3
Move "Disk1" from Pole1 --> Pole3
Move "Disk2" from Pole1 --> Pole2
Move "Disk1" from Pole3 --> Pole2
Move "Disk3" from Pole1 --> Pole3
Move "Disk1" from Pole2 --> Pole1
Move "Disk2" from Pole2 --> Pole3
Move "Disk1" from Pole1 --> Pole3

D:\21batchecea>
```