#include <iostream> //console input and output

#include <cmath> //to calculate total # of moves

using namespace std;

void hanoi(int disks, char curr, char temp, char dest) //disks = number of disks

//curr = current position

//temp = open position

//dest = destination position

{

//catch the program when it hits the last disk to avoid going negative

if (disks == 1) cout << "Shift disk " << disks << " from " << curr << " to " << dest << endl;

else

{

//this calls the hanoi function itself (hence recursion) but flips some variables

//first, temporary and destination are flipped to move the disk to the open slot

hanoi(disks - 1, curr, dest, temp);

//the move is outputted to the user

cout << "Shift disk " << disks << " from " << curr << " to " << dest << endl;

//the function is recurred once more when the disk is now moved onto the slot

//where it fits on the disk one size up from it, i.e. disk 3 moving onto disk 4

//these functions repeat over and over until it hits the last disk meaning that,

//on the first call of this function, it is only called once by main as it will

//do the rest and call itself until the last disk is moved onto the correct pillar

hanoi(disks - 1, temp, curr, dest);

}

}

int getInput() //function to get number of disks (and verify it)

{

int x;

do {

cout << "The number of disks: ";

cin >> x;

if (x <= 0) cout << "Not big enough number of disks..." << endl;

} while(x <= 0);

}

void draw(int x)

{

cout << endl << endl;

cout << "Here is your beautiful stack:" << endl << endl;

for (int i = 0; i < x; i++) //one line for each disk

{

cout << " |";

for (int j = i; j < x; j++)

{

cout << " ";

}

cout << "(";

for (int j = 0; j < i; j++)

{

cout << "..";

}

cout << ")";

for (int j = i; j < x; j++)

{

cout << " ";

}

cout << "|";

cout << endl;

}

cout << endl << endl;

}

int main()

{

cout << endl;

cout << "--- H A N O I ---" << endl << endl;

cout << "This is a game of moving disks." << endl;

cout << "Each disk must not be on a disk smaller than itself." << endl;

cout << "I will move all of the disks from pillar A to B." << endl;

cout << "I will also do this in the least moves possible." << endl;

cout << "All you need to do is provide the number of disks." << endl << endl;

int x = getInput();

cout << endl;

hanoi(x, 'A', 'C', 'B');

draw(x);

cout << "Total moves: " << pow(2,x) - 1 << endl;

}

