Tutorial 6

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Exercise 1

*(**Recursive Exponentiation**)* Write a recursive function power(base, exponent) that, when invoked, returns

base exponent

For example, power(3, 4) = 3 * 3 * 3 * 3. Assume that exponent is an integer greater than or equal to 1. *Hint:* The recursion step would use the relationship

base ^ exponent = *base* · *base* ^ *(*exponent – 1)

and the terminating condition occurs when exponent is equal to 1, because

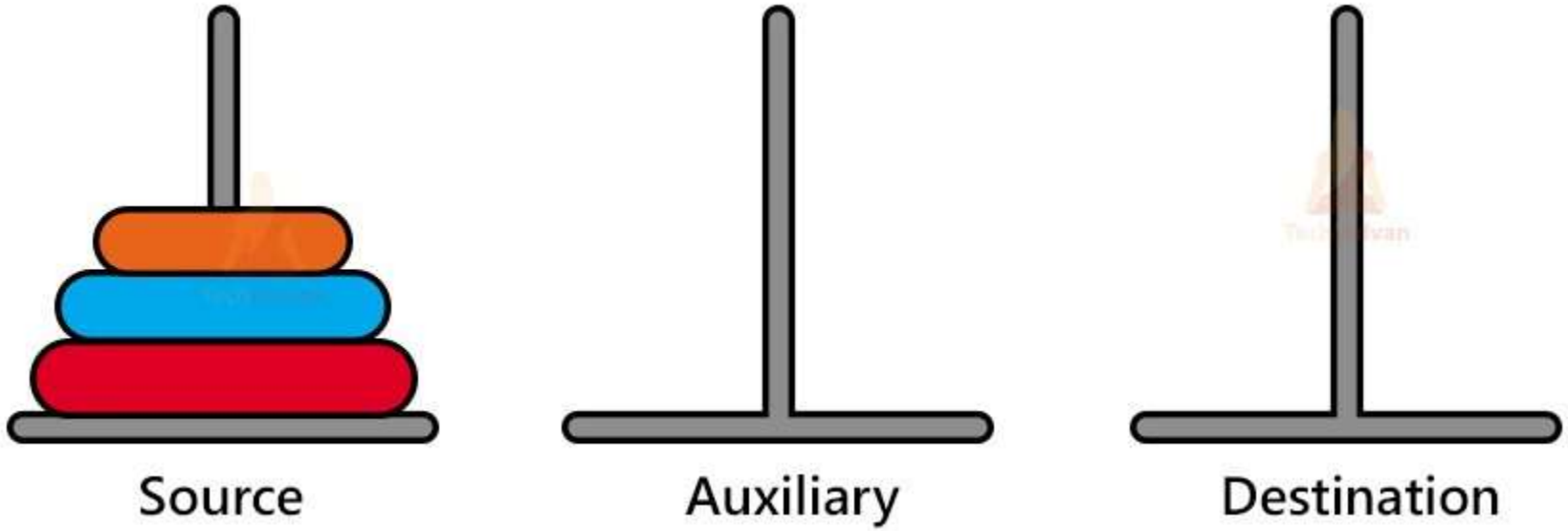
base^1 = *base*

Exercise 2

*(**Towers of Hanoi**)* In this chapter, you studied functions that can be easily implemented

both recursively and iteratively. In this exercise, we present a problem whose recursive solution demonstrates

the elegance of recursion, and whose iterative solution may not be as apparent.



Exercise 3

*(**Visualizing Recursion**)* It's interesting to watch recursion "in action." Modify the factorial function to print its local variable and recursive call parameter. For each recursive call, display the outputs on a separate line and add a level of indentation. Do your utmost to make the outputs clear, interesting and meaningful. Your goal here is to design and implement an output format that helps a person understand recursion better. You may want to add such display capabilities to the many other recursion examples and exercises throughout the text.

Exercise 4

Write a C++ program that prompts the user for the radius of a circle, then calls inline function circleArea to calculate the area of that circle.