CS 4820, Spring 2017	**Homework 1, Problem 1**
Name: Yuxiang Peng	
NetID: yp344	
Collaborators:jl3455,zl542	

(1) *(5 points)*
For any positive integer n, let L_n denote an L-shaped region in the plane obtained by starting with a square of side length 2^n and deleting its upper right quadrant. For example, L_1 is the "L-shaped tromino tile" discussed in class on Wednesday.

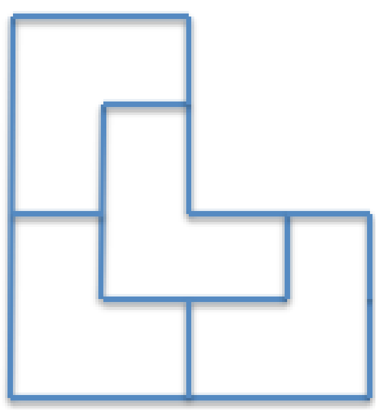
Prove that for every positive integer n, it is possible to tile L_n using copies of L_1. In other words, you should prove that L_n can be partitioned into regions, each congruent to L_1.

Try to make your proof as clear and precise as possible. You do not need to describe an algorithm to compute the tiling, nor to analyze its running time. You only need to prove that such a tiling exists.

Hint: Use mathematical induction.

Basis: Show that the statement holds for n=1.
For n=1,L_1 is tiled by 1 L_1. Thus it has been shown that L_1 holds.

Inductive step: show that if L_n holds, then L_{n+1} also holds.
According to the construction of the L shape, L_{n+1} could always be tiled by 4 L_n in the pattern shown in the figure below.



Since L_n could be tiled by L_1 according to the induction hypothesis. L_{n+1} could therefore also be tiled by L_1.
Since both the basis and the inductive step have been performed, by mathematical induction, we have shown that L_n can be partitioned into regions, each congruent to L_1.