Week 2 Homework:

1. You have 18 red marbles and 11 blue marbles. There are two actions you may perform:
a) Throw 1 blue marble at the neighbor's dog.
b) Trade 3 blue marbles for 3 red marbles.
c) Trade 6 red marbles for 7 blue marbles.

How do you end up with only 1 red marble and 1 blue marble? Or prove that it is impossible.

2. Problem copyright 6.042J
Students are sitting in a n x n grid, when some are infected by BeaverFlu. Infected students are labeled with a X. The disease spreads in time steps. At each time step, a student is infected if he/she was already infected or he/she is adjacent (shares an edge) to at least two infected students.

For example:

Day 1

		X	X
X			
	X		

Day 2

		X	X
X	X		
X	X		

Day 3

	X	X	X
X	X	X	
X	X		

etc...

Prove this theorem: If fewer than n students in class are initially infected, the whole class will never be completely infected.