1. Suppose we flip two fair coins, with all 4 outcomes equally likely. Let $A$ be the event that the first coin is heads, let $B$ be the event the second coin is heads, and let $C$ be the event both coins match. Show that all pairs of the events are independent, but that the triple $A, B, C$ isn’t independent.

2. A stock is currently priced at $77. Each day it either goes up $1 with probability $0.5$ or down $1$ with probability $0.5$. What is the chance it will hit $100$ before it hits $50$? [Hint: Use result from Lecture 5.]

3. Suppose again we are playing a game with 100 doors behind which there are 2 cars and 98 goats. You randomly pick a door (for simplicity, assume you pick door #1), and then the host opens 96 goat doors (randomly chosen from the goat doors among doors 2-100). You are given the opportunity to keep your current door, or pick one of the 3 other doors.

   (a) Assuming you randomly choose a remaining door that isn’t door 1, what is your chance of winning a car?
   
   (b) What is your chance of winning a car if you stick with your original pick?