ECE 341 - Homework #11

Markov Chains. Due Monday, June 7th

Problem 1 & 2) Two teams, A and B, are playing a match made up of N games. For each game
- Team A has a 50% chance of winning
- There is a 10% chance of a tie, and
- Team B has a 40% chance of winning

In order to win the match, a team must be up by 2 games.

1) Determine the probabilty that team A wins the match after k games for k = {0 ... 10} using matrix multiplication.

2) Determine the z-transform for the probability that A wins the match after k games
- From the z transforms, determine the explicit function for p(A) wins after game k.

3) Two players are playing a game of tennis. To win a game, a player must win 4 points *and* be up by 2 points.
- If player A reaches 4 points and player B has less than 3 points, the game is over and player A wins.
- If player A reaches 4 points and player B has 3 points, then the game reverts to 'win by 2' rules. Both players keep playing until one of them is up by 2 games.

Supppose:
- Player A has a 70% chance of winning any given point
- Player B has a 30% chance of winning any given point.

What is the probabilty that player A wins the game (first to 4 games, win by 2)?
- Note: This is a combination of a binomial distribution (A has 4 points while B has 0, 1, or 2 points) along with a Markov chain (A and B both have 3 points, at which point it becomes a win-by-2 series)