# Problem 1

In the lecture, I described the cycle and empty network as the only *strict* Nash equilibria, meaning that any player who deviated would do strictly worse by deviating. There are other, non-strict Nash equilibria for some values of $c$ and $n$. Find one.

# Problem 2

Is there *any* value of $c$ for which the empty network is a non-strict Nash equilibrium? If so, is there more than one value of $c$ for which this is true?

# Problem 3

Prove that when it is a strict Nash equilibrium, that the cycle is the unique socially optimal state (i.e. it maximizes the sum of all players' utilities).

# Problem 4

Consider the network formation game we discussed this afternoon with four players. However, make one change. Now suppose that there is some chance, $\delta$ that as a piece of information is misreported. So, I receive a payoff of 1 for those to whom I am directly connected, $\delta$ for those who are connected to my connections, $\delta^2$ for those who are three people away, etc.

Suppose a game with four players. For what values of $\delta$ and $c$ is the cycle still a strict Nash equilibrium?

Describe a value for $\delta$ and $c$ where there is a strict Nash equilibrium that is neither the cycle nor the empty network. What is this Nash?