

**Prompt** (*Problem 4c is assessing ILO 3*):

4. Suppose a car rental place has locations in Northfield and Minneapolis. The manager of the rental place is interested in determining how many vehicles are at each location each day. They notice that:
- If someone picks up a car from Northfield, there is a 50% chance they return it to Northfield. Otherwise, they return it to Minneapolis.
  - If someone picks up a car from Minneapolis, there is a 75% chance they return it to Minneapolis. Otherwise, they return it to Northfield.
- (a) Find the transition matrix for this Markov Chain - you must explain why your matrix is set up the way it is
- (b) In the long run, what proportion of the vehicles are at the Minneapolis location?
- (c) There aren't enough vehicles at the Northfield location. The manager of the rental place decides to have all the vehicles start at the Northfield location tomorrow. This way, more vehicles will end up in Northfield in the long run. Will this work? Justify your answer.