

1. A charitable organization estimates that in a certain community 80% of the people who make a donation this year will make a donation next year. It also estimates that 30% of the people who do not make a donation this year will make a donation next year.
 - (a) Find the transition matrix corresponding to this situation.
 - (b) Suppose that this year 75% of the people made a donation. What is the initial distribution matrix?
 - (c) What percentage of the people is expected to donate next year? (Show the equation you will use.)
 - (d) What will the percentage be in 2 years? (Show the equation you will use.)

2. A survey of retirees in Arizona who golf or fish every day found that 60% of those who played golf one day switched to fishing the next and that 90% of those who went fishing switched to golf the next day.
 - (a) Construct the transition (stochastic) matrix for this Markov chain.
 - (b) Suppose that 30% of these retirees are golfing today. Give the initial distribution matrix.
 - (c) **Showing the matrices to be multiplied**, answer the following question. What percentage of these retirees will be fishing the day after tomorrow?

3. At the end of June in a presidential election year, 40% of the voters were registered as liberal, 45% as conservative, and 15% as independent. Over a one-month period, the liberals retained 80% of their constituency, while 15% switched to conservative and 5% to independent. The conservatives retained 70%, and lost 20% to the liberals. The independents retained 60% and lost 20% each to the conservatives and liberals. Assume these trends continue.
 - (a) What is the transition matrix for this problem?
 - (b) Write the initial distribution matrix.
 - (c) **Showing the matrices to be multiplied**, answer the following questions. What will be the percentage of each type of voter at the end of July? At the end of August?