MARKOV CHAINS

1. Classify the following matrices as
(A) regular transition matrix   (B) not regular transition matrix   (C) not a transition matrix

_____ $\begin{bmatrix} 0 & 0.4 \\ 1 & 0.6 \end{bmatrix}$ _____ $\begin{bmatrix} 0.5 & 0.8 \\ 0.5 & 0.6 \end{bmatrix}$ _____ $\begin{bmatrix} 0.75 & 0 \\ 0.25 & 1 \end{bmatrix}$

2. A study has shown that a family living in the state of Denial typically takes a vacation once per year. A family that takes an out-of-state vacation has a 35% chance of taking an out-of-state vacation the following year and a 65% chance of taking an in-state vacation. A family that has taken an in-state vacation has a 50% chance of taking an out-of-state vacation the next year and 50% chance of taking an in-state vacation.
(a) What is the transition matrix for the vacation decision?
(b) If the initial distribution of vacations is 25% in-state and 75% out-of-state and people, what is the probability that a family will take an out-of-state vacation in two years?
(c) What is the long term distribution of vacation locations?