Week in Review # 9

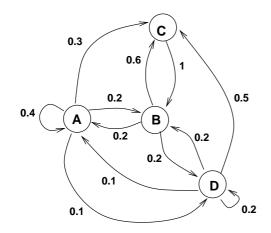1. $T = \begin{array}{c} \\ A \\ B \\ C \end{array} \begin{bmatrix} A & B & C \\ 0.4 & 0.8 & 0.3 \\ 0.5 & 0.1 & 0 \\ 0.1 & 0.1 & 0.7 \end{bmatrix}$

2. (a) not a stochastic matrix. the sum of column 1 is greater than 1.

    (b) no, since the lables of the rows and columns are not the same.

    (c) not a stochastic matrix since it is not square.

    (d) it is a stochastic matrix.

3. (a) If starting in state B, there is an 80% chance that you will stay in state B after 1 interation of the markov process.

    (b) 0.6

    (c) $X_1 = TX_o = \begin{array}{c} A \\ B \end{array} \begin{bmatrix} 0.26 \\ 0.74 \end{bmatrix}$

    After 1 iteration of the markov process, 26% in in state A and 74% is in state B.

    (d) If starting in state B, there is an 75.2% chance that you will stay in state B after 3 interation of the markov process.

    (e) 74.4%

4. (a) State S = stenuous workout
        State M = moderate workout
        State L = light workout

    $T = \begin{array}{c} \\ S \\ M \\ L \end{array} \begin{bmatrix} S & M & L \\ 0.4 & 0.4 & 0.3 \\ 0.6 & 0.25 & 0.2 \\ 0 & 0.35 & 0.5 \end{bmatrix}$

    (b) find X_2,

    $38.05\% + 23.15\% = 61.2\%$

    (c) 37.585%

5. (a) State U = the University Bookstore
        State T = Textbooks for Less
        State A = A-plus Books

    $T = \begin{array}{c} \\ U \\ T \\ A \end{array} \begin{bmatrix} U & T & A \\ 0.8 & 0.05 & 0.05 \\ 0.1 & 0.7 & 0.20 \\ 0.1 & 0.25 & 0.75 \end{bmatrix}$

    (b) $X_3 = T^3 X_0 = \begin{bmatrix} 0.284375 \\ 0.32875 \\ 0.386875 \end{bmatrix}$

    Answer: 32.875

    (c) $X_6 = T^6 X_0 = \begin{bmatrix} 0.235596 \\ 0.346074 \\ 0.418330 \end{bmatrix}$

    Answer:
    23.5596% for the University Bookstore
    34.6074% for Textbooks for Less
    41.8330% for A-plus Books