1. Draw the transition diagram for the following transition matrix and indicate if it: Irreducible or not, regular or not:

\[
\begin{bmatrix}
0.4 & 0 & 0.6 \\
0.2 & 0.8 & 0 \\
0 & 0.7 & 0.3
\end{bmatrix}
\]

2. Suppose that General Motors (GM), Ford (F), and Chrysler (C) each introduce a new SUV vehicle.
   - General Motors keeps 85% of its customers but loses 10% to Ford and 5% to Chrysler.
   - Ford keeps 80% of its customers but loses 10% to General motors and 10% to Chrysler.
   - Chrysler keeps 60% of its customers but loses 25% to General Motors and 15% to Ford.

   If a customer owns a Ford now, find the probability that his third car will be Chrysler (round your answer to 2 decimals)
3. In Indianapolis, it was found that if it is raining today, then there is 60% chance of it raining again the next day. If it is dry today, then there is 90% chance of it being dry again the next day. Use the transition matrix and the steady state vector to find the probability that it will be dry in the long run (find the Steady State Vector).

4. In a well-area with three grocery stores, A, B, and C. A study was made and found that each year:
   • Store A retains 90% of its customers and loses 10% to store B.
   • Store B retains 5% of its customers and loses 85% to store A and 10% to store C.
   • Store C retains 40% of its customers and loses 50% to store A and 10% to store B.

The current share of the market is 25% for A, 33% for B, and 42% for C.

   a) Find the share of the market held by each store after 2 years.
   b) Find the share of the market held by each store in the long run (find the Steady State Vector)