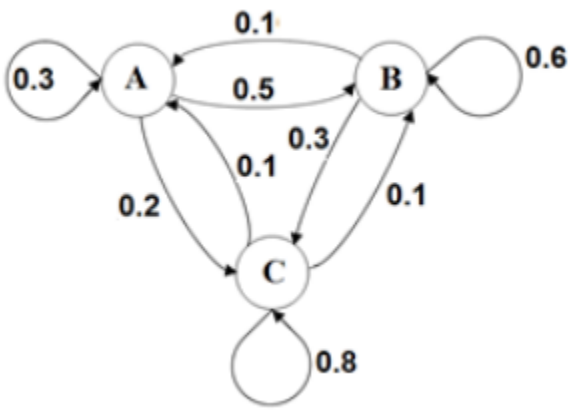
Car rental company has 3 branches A, B, C.



$$T = \begin{array}{c} \\ A \\ B \\ C \end{array} \begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 0.3 & 0.5 & 0.2 \\ 0.1 & 0.6 & 0.3 \\ 0.1 & 0.1 & 0.8 \end{bmatrix} \end{array}$$

Suppose (30% of the cars are at place A), (45% of the cars are at place B), and (25% are at place C).

The initial state vector (initial distribution, before any transitions occur) is:

$$V_0 = \begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 0.30 & 0.45 & 0.25 \end{bmatrix} \end{array}$$

If we want to determine the distribution after one transition (V1), which indicates the distribution after 1 transition has occurred.

We find V1 by multiplying V0 by the transition matrix T, as follows:

$$T = \begin{array}{c} \\ A \\ B \\ C \end{array} \begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 0.3 & 0.5 & 0.2 \\ 0.1 & 0.6 & 0.3 \\ 0.1 & 0.1 & 0.8 \end{bmatrix} \end{array}$$

$$V_0 = \begin{array}{c} \begin{array}{ccc} A & B & C \end{array} \\ \begin{bmatrix} 0.30 & 0.45 & 0.25 \end{bmatrix} \end{array}$$

=[0.30(0.3) + 0.45(0.1) + 0.25(0.1)], [0.30(0.5) + 0.45(0.6) + 0.25(0.1)], [0.30(0.2) + 0.45(0.3) + 0.25(0.8)]

V1=V0T= **[0.16 0.445 0.395]**

After 1 day (1 transition) V1= [V0 * T]:

16 % of the cars are at place A

44.5 % are at place B

39.5% are at place C.

After 2 days (2 transitions) V2= [V1 * T] or [V0 * T] *T= or [V0 * T]^2