5-5) Suppose we have 3 pints of blood on hand at end of 3-day period. At start, we get another pint making 4 total. During the period we have a demand for 0, 1, 2, or 3 pints of blood with distribution

\[ P(D=0) = 0.4 \]
\[ P(D=1) = 0.3 \]
\[ P(D=2) = 0.2 \]
\[ P(D=3) = 0.1 \]

we can have at most 7 pints on hand at the end of any period.

a) Construct one-step transition matrix

\[
P_{00} = P(X_{t+1} = 0 | X_t = 0) = P(D = 1)
\]
\[= 0.6 \]

\[
P_{01} = P(X_{t+1} = 1 | X_t = 0)
\]
\[= P(D = 0)
\]
\[= 0.4 \]

\[
\Rightarrow P = \begin{bmatrix} 0.6 & 0.4 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}
\]