

## 2AIT608 - Solutions to Tutorial 8 Exercises

### Exercise 3

1.

$$A = a \begin{bmatrix} 0.9 & 0.1 \\ 0.6 & 0.4 \end{bmatrix}$$

$$P(X_0 = 0) = 0.8, P(X_0 = 1) = 0.2$$

2.  $P(X_3 = 0|X_0 = 1) = a_{11}a_{11}a_{10} + a_{10}a_{01}a_{10} + a_{10}a_{00}a_{00} + a_{11}a_{10}a_{00} = 0.834$

3.

$$P(X_1 = 1) = P(X_1 = 1|X_0 = 0)P(X_0 = 0) + P(X_1 = 1|X_0 = 1)P(X_0 = 1) = 0.1 \cdot 0.8 + 0.4 \cdot 0.2 = 0.16$$

$$P(X_1 = 0) = P(X_1 = 0|X_0 = 0)P(X_0 = 0) + P(X_1 = 0|X_0 = 1)P(X_0 = 1) = 0.9 \cdot 0.8 + 0.6 \cdot 0.2 = 0.84$$