- **Which of the following is a MC?**

  a) X_n where $P\{X_n = 1 | X_{n-1} = 1, X_{n-2} = 0\} = P\{X_n = 1\}$

  b) X_n where $P\{X_n = 1 | X_{n-1} = 1, X_{n-2} = 0\} = P\{X_n = 1 | X_{n-2} = 0\}$

  c) X_n where $P\{X_n = 1 | X_{n-1} = 1, X_{n-2} = 0\} = P\{X_n = 1 | X_{n-1} = 1\}$

  d) X_n where $P\{X_n = ½ | X_{n-1} = 1, X_{n-2} = 0\} = P\{X_n = ½ | X_{n-1} = 1\}$

- **If a MC is periodic and reducible then**

  a) $\mathbf{P}^{(n)} \neq \mathbf{P}^n$

  b) $\mathbf{P}^{(n)} = \mathbf{P}^{n-d}$

  c) $\mathbf{P}^{(n)} = \mathbf{P}^n$

  d) $\mathbf{P}^{(n)}$ rows converge to limiting probabilities for n large

- **If for a MC X_n with N states, $P\{X_k = i\} = \alpha_i$ at some time k,**

  a) $P\{X_{k+1} = j\} = \sum_{i=1}^{N} \alpha_i p_{ij}$

  b) $P\{X_{k+1} = j\} = \alpha_j$

  c) $P\{X_{k+1} = j\} = j^{\text{th}}$ entry of the vector $\pi^k\mathbf{P}$

  d) Depends on the classification of states of X_n

- **The following processes are MCs**

  a) X_n = # of heads appearing by the n^{th} flip of a fair coin

  b) X_n = # of total customers entering a store at end of any day n

  c) X_n = population of Lebanon in year n

  d) X_n = # of arrivals by hour n, if # of arrivals in 1 hr are IID