1. Below is a FSM. Determine its state after executing the input sequence 0011. The initial state is A.
2. Consider a Turing Machine with a tape with the symbols 010101, and transition function described in the following table:

<table>
<thead>
<tr>
<th>Tape Symbol</th>
<th>State A</th>
<th>State B</th>
<th>State C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Write</td>
<td>Move</td>
<td>Next</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>R</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>L</td>
<td>C</td>
</tr>
</tbody>
</table>

Determine the state and tape symbols of this Turing Machine after four iterations with an initial state of A, blank symbol of #, and with the tape head like so,

010101
^
3. Draw and fully label the Markov Model represented by the following matrix:

\[
\begin{array}{ccc}
S1 & S2 & S2 \\
S1 & 0.0 & 0.75 & 0.25 \\
S2 & 0.3 & 0.4 & 0.3 \\
S3 & 0.5 & 0.5 & 0.0 \\
\end{array}
\]
4. Below is a Petri Net at time 0. Simulate this Petri Net for time 1, 2, 3, 4 and 5.