**ECE 2030 Homework 5 solutions**

![Logic Diagram](image)

<table>
<thead>
<tr>
<th>( SR )</th>
<th>( Q )</th>
<th>( \overline{Q} )</th>
<th>( \text{next } Q )</th>
<th>( \overline{Q} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
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</tbody>
</table>

**Stable Conditions:**

- \( SR = 00 \)
- \( SR = 01 \)
- \( SR = 10 \)
- \( SR = 11 \)

**Transition Rules:**

- If \( SR = 00 \), \( Q = 1 \) and \( \overline{Q} = 1 \)
- If \( SR = 01 \), \( Q = 0 \) and \( \overline{Q} = 1 \)
- If \( SR = 10 \), \( Q = 1 \) and \( \overline{Q} = 0 \)
- If \( SR = 11 \), \( Q = 0 \) and \( \overline{Q} = 0 \)

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**SRQ\overline{Q} Table**

<table>
<thead>
<tr>
<th>( SR )</th>
<th>( Q )</th>
<th>( \overline{Q} )</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>01</td>
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<tr>
<td>11</td>
<td>0</td>
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</tr>
</tbody>
</table>

**Output Transition Rules:**

- If \( S = 1 \) and \( R = 0 \), the first transition is \( SR = 01 \) followed by any transition in the next state.
- If \( S = 0 \) and \( R = 1 \), the output remains \( S = 0 \) and \( R = 1 \).
2. 

\[ C_0 = \begin{cases} 1 & \text{for } A \cdot B \\ 0 & \text{for } A + B \end{cases} \]

\[ A = \overline{FA} \]

\[ A \quad B \quad C_i \quad S \]

IN \quad A \quad OUT

\[ \phi_1 \quad \phi_2 \]

IN

A

OUT