Problem 1 (12 points)
Given the sequential network below, fill in the state table with the appropriate values.

\[
\begin{align*}
Y_1 & = y_1 x' + y_0 x' \\
Y_0 & = y_1 x + y_0 y_0
\end{align*}
\]

<table>
<thead>
<tr>
<th>( PS )</th>
<th>Input</th>
<th>( x = 0 )</th>
<th>( x = 1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y_1, y_0 )</td>
<td>00</td>
<td>10</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>01</td>
<td>10</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

\( NS(Y_1, Y_0) \)

Problem 2 (8 points)

How many 8-input decoders are needed to implement a 32-input decoder using tree decoding? 1

\( 1 + 64 + 64^2 + 64^3 \)

How many levels are necessary? 4

How many 8-input decoders are needed for a 32-input decoder using coincident decoding? 4

How many AND gates will be needed? 2^{32}