1 Review of Relations
List the ordered pairs in the relation $R$ from $A = \{0, 1, 2, 3, 4\}$ to $B = \{0, 1, 2, 3\}$ where $(a, b) \in R$ iff:

a) $a|b$

b) $\gcd(a, b) = 1$

2 Relational Properties
For each of these relations on the set $\{1, 2, 3, 4\}$:
(i) decide whether it is reflexive, whether it is symmetric, whether it is antisymmetric, and whether it is transitive,
(ii) draw the directed graph representing the relation, and
(iii) draw the graph with the type of closure specified.

a) $\{(2, 2), (2, 3), (2, 4), (3, 2), (3, 3), (3, 4)\}$
Draw the reflexive closure.

b) $\{(1, 1), (2, 2), (3, 3), (4, 4)\}$
Draw the transitive closure.

c) $\{(1, 2), (2, 3), (3, 4)\}$
Draw the transitive-reflexive closure.

3 Finite State Machines
Draw the state diagrams for the finite-state machines with the following state tables. Which languages do these generate if we let our final state be $s_1$ and $t_1$, respectively? (Note: start states are $s_0$ and $t_0$.)

a) 

\begin{tabular}{c|cc}
  \hline
  Input & 0 & 1 \\
  \hline
  $s_0$ & $s_1$ & $s_0$ \\
  $s_1$ & $s_0$ & $s_2$ \\
  $s_2$ & $s_1$ & $s_1$ \\
  \hline
\end{tabular}

b) 

\begin{tabular}{c|cc}
  \hline
  Input & 0 & 1 \\
  \hline
  $t_0$ & $t_0$ & $t_1$ \\
  $t_1$ & $t_2$ & $t_1$ \\
  $t_2$ & $t_2$ & $t_2$ \\
  \hline
\end{tabular}

c) Draw the state diagram for the FSM that accepts the intersection of the two languages from part a) and part b).