CSE 311 Quiz Section: May 23, 2013

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) $a \mid b$

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)

	f	
	Input	
	0	**1**
s_0	s_1	s_0
s_1	s_0	s_2
s_2	s_1	s_1

b)

	f	
	Input	
	0	**1**
t_0	t_0	t_1
t_1	t_2	t_1
t_2	t_2	t_2

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