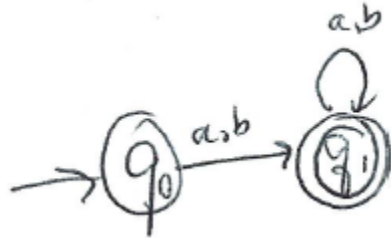


Theory of Computation, CSCI 438 spring 2022
Quiz 1, Jan. 21

1. Using the alphabet $\Sigma = \{a, b\}$ create a DFA that accepts all strings except the empty string. (5 pts.)

Sample answer:



2. Write the definition of the above machine using the linear format.

$M = (\dots\dots)$ (5 pts.)

$M = (\{q_0, q_1\},$ // set of states
 $\{a, b\},$ // alphabet
 $\{((q_0, a), q_1), ((q_0, b), q_1), ((q_1, a), q_1), ((q_1, b), q_1)\},$ // set of transitions
 $q_0,$ // start state
 $\{q_1\})$ // set of final states

3. Give the signature of each of the following using the typical format:
Set of possible input values \rightarrow set of possible output values

Transitive function in a DFA δ (5 pts.)
 $Q \times \Sigma \rightarrow Q$

Kleene closure of a transitive function, written δ^* , in a DFA (5 pts.)
 $Q \times \Sigma^* \rightarrow Q$

4. Give the definition of a regular language which is given in the text and which we have been using in class. (5 pts.)
A language is regular iff some finite automaton recognizes it.
(Definition 1.6, page 40)