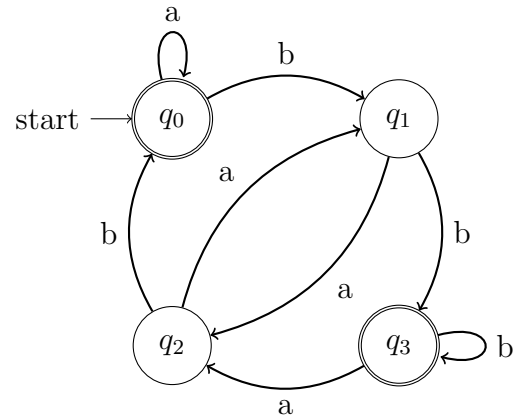


Due Monday, September 11.

1. Consider the DFA shown below.

(a) What are the sets Q , Σ , and F in the formal description $(Q, \Sigma, \delta, q, F)$ of this machine?



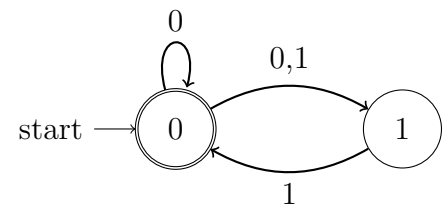
(b) What sequence of states does the machine go through on the input **aabb**aa? Does the machine accept **aabb**aa?

2. Design a DFA that outputs 1 if and only if the input length is divisible by 3. Draw a state diagram for your answer.

3. Design a DFA that outputs 1 if and only if the input begins with 01 and ends with 01. Draw a state diagram for your answer.

4. Construct an NFA with three states that accepts a string in $\{0, 1\}^*$ iff it ends in 00.

5. Find a DFA that is equivalent to the NFA shown below.



6. Consider a DFA with states $Q = \{0, 1, 2\}$, alphabet $\Sigma = \{0, 1\}$, initial state $q_0 = 0$, and accepting states $F = \{0, 1\}$. The transition function is shown in the table below. Write a computer program that takes a string in Σ^* as input and prints each state the DFA enters as it goes through the input string. Your program should also return 1 if the DFA accepts the string, otherwise return 0.

$q \backslash \sigma$	0	1
0	1	1
1	0	2
2	0	0