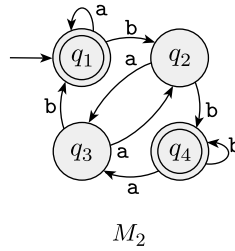
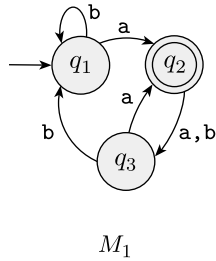


## Homework 1

<sup>A</sup>1.1 The following are the state diagrams of two DFAs,  $M_1$  and  $M_2$ . Answer the following questions about each of these machines.



- a. What is the start state?
  - b. What is the set of accept states?
  - c. What sequence of states does the machine go through on input aabb?
  - d. Does the machine accept the string aabb?
  - e. Does the machine accept the string  $\varepsilon$ ?
- 1.6 Give state diagrams of DFAs recognizing the following languages. In all parts, the alphabet is  $\{0,1\}$ .
- b.  $\{w \mid w \text{ contains at least three } 1\text{s}\}$
  - d.  $\{w \mid w \text{ has length at least 3 and its third symbol is a } 0\}$
  - e.  $\{w \mid w \text{ starts with } 0 \text{ and has odd length, or starts with } 1 \text{ and has even length}\}$
  - f.  $\{w \mid w \text{ doesn't contain the substring } 110\}$
  - h.  $\{w \mid w \text{ is any string except } 11 \text{ and } 111\}$
  - j.  $\{w \mid w \text{ contains at least two } 0\text{s and at most one } 1\}$
  - k.  $\{\varepsilon, 0\}$
  - n. All strings except the empty string