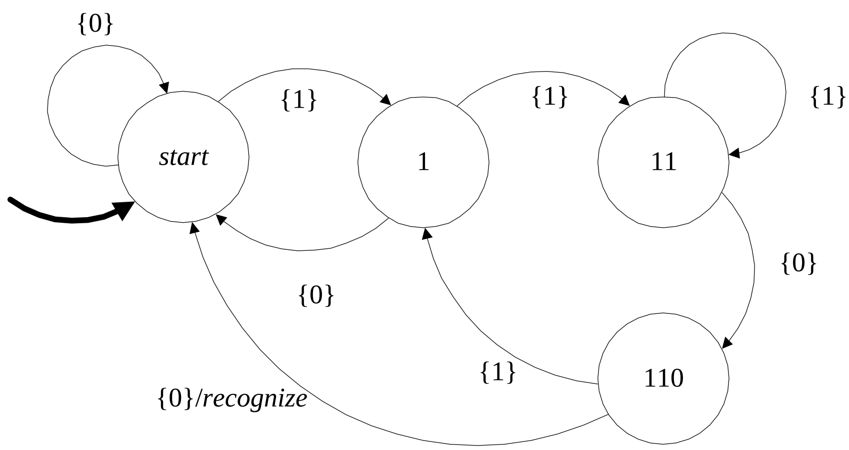


Figure 1: A machine that implements *CodeRecognizer*

**Problem session, week 5**

10. (Chapter 3, new exercise) **E** Consider the state machine in figure 2. It implements *CodeRecognizer*, but has more states than the one in figure 1. Show that it is equivalent by giving a bisimulation relation with the machine in figure 1.

11. (Chapter 3, new exercise) **E** Consider the state machine in figure 3. Suppose that the alphabets are

$$\textit{Inputs} = \{1, a\}$$

$$\textit{Outputs} = \{0, 1, a\},$$

where $a$ (short for *absent*) is the stuttering element. State whether each of the following is in the set *Behaviors* for this machine. In each of the following, the ellipsis "$\cdots$" means that the last element is repeated forever. Also, in each case, the input and output signals are given as sequences.

(a) $((1, 1, 1, 1, 1, \cdots), (0, 1, 1, 0, 0, \cdots))$
(b) $((1, 1, 1, 1, 1, \cdots), (0, 1, 1, 0, a, \cdots))$
(c) $((a, 1, a, 1, a, \cdots), (a, 1, a, 0, a, \cdots))$
(d) $((1, 1, 1, 1, 1, \cdots), (0, 0, a, a, a, \cdots))$
(e) $((1, 1, 1, 1, 1, \cdots), (0, a, 0, a, a, \cdots))$

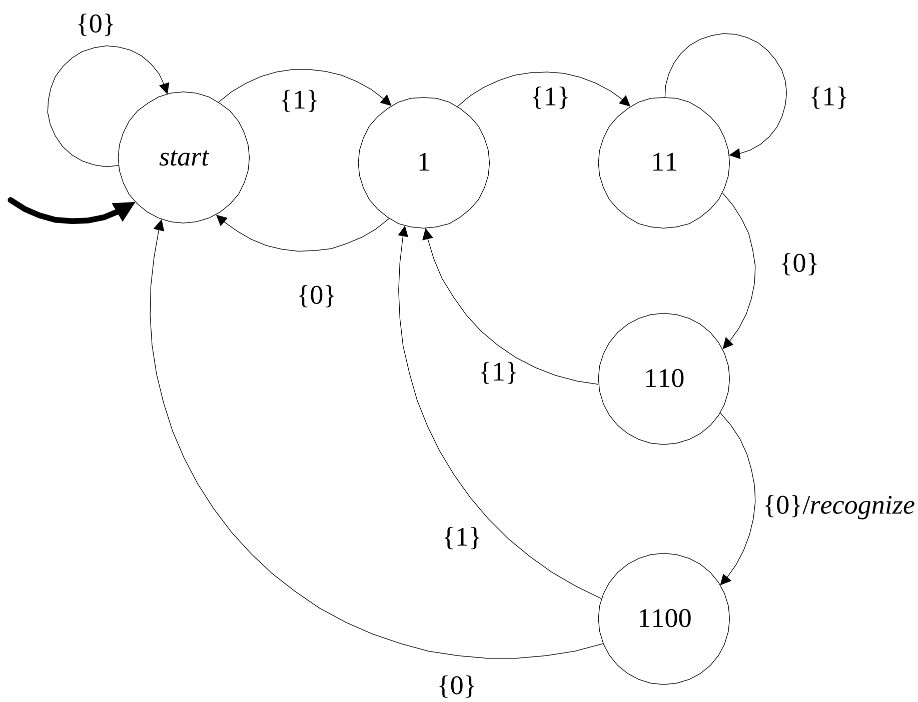


Figure 2: A machine that implements *CodeRecognizer*, but has more states than the one in figure 1.

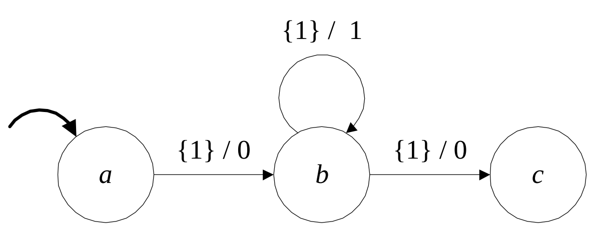


Figure 3: State machine for problem