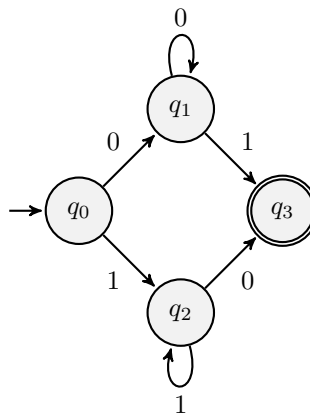


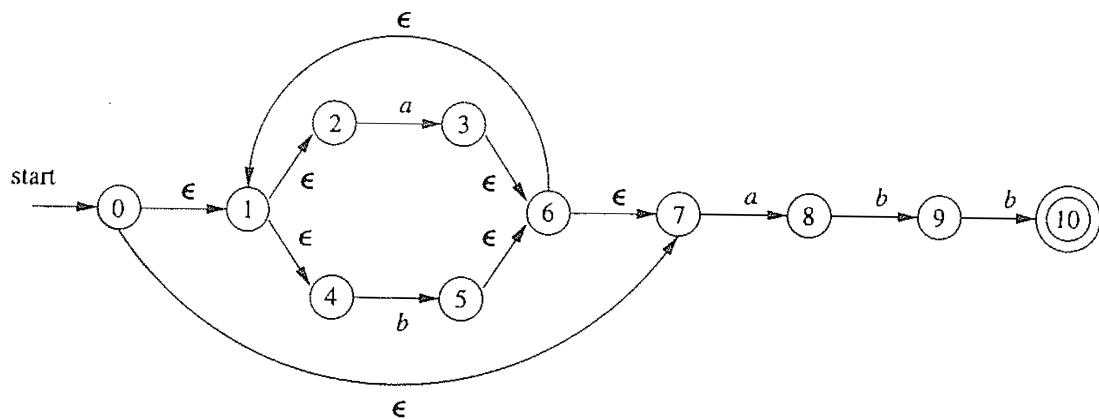
# CSC 330 Principles of Programming Language

## Assignment I

1. (1 point) Give the formal description of the machine below:



2. (2 points) Convert the following NFA to an equivalent DFA:



3. (1 point) Convert the following regular expressions to NFA:

(a)  $(0 \cup 1)^* 000 (0 \cup 1)^*$

(b)  $\left( ((00)^* (11)) \cup 01 \right)^*$

4. (3 points) Give DFAs recognizing the following languages. In all parts, the alphabet  $\Sigma = \{0, 1\}$ .

(a)  $\{w \mid w \text{ doesn't contain the substring } 000\}$

(b)  $\{w \mid w \text{ contains at least three 0s}\}$

5. (1 point) For each of the following languages, give two strings that are members and two strings that are not members. Assume the alphabet  $\Sigma = \{a, b\}$ .

(a)  $a(ba)^*b$

(b)  $\Sigma^* a \Sigma^* b \Sigma^* a \Sigma^*$