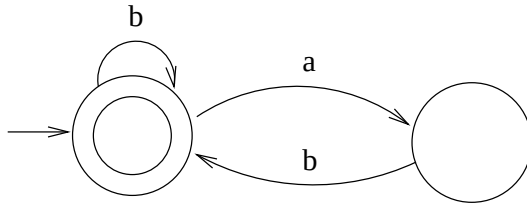


SOLUTIONS
CSE105 Quiz #1 (Yellow Version)
Thursday, Oct. 7, 1999

1. Give the state diagram of an NFA over the alphabet $\{ \mathbf{a} \mathbf{b} \}$ that accepts

$\{w \mid w \text{ has each } \mathbf{a} \text{ immediately followed by } \mathbf{b} \}$

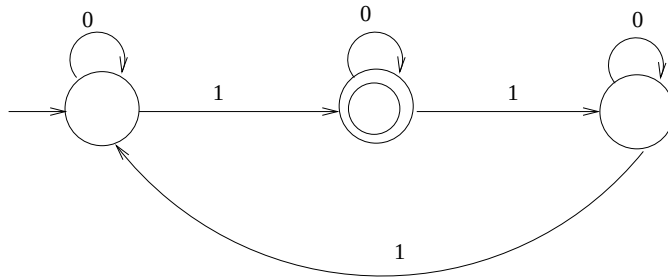
Note that the only restriction in the language is that IF an 'a' is in a particular string, then it must be followed IMMEDIATELY by a 'b'.



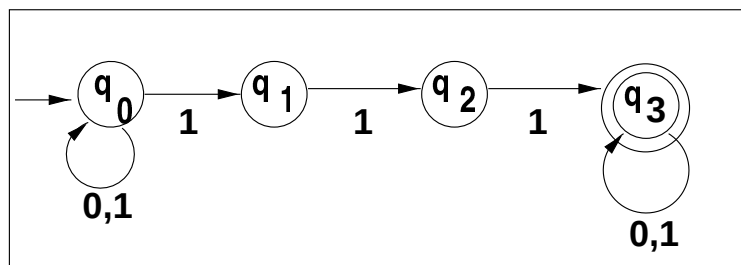
2. Give the state diagram of a DFA over the alphabet $\{ \mathbf{0} \mathbf{1} \}$ that accepts

$\{w \mid w \text{ has } (3m + 1) \text{ 1's for some integer } m \geq 0\}$

Remember that m can be any nonnegative integer (this includes 0!). The FA must accept any string with $(3m+1)$ 1's. Strings with $(3m)$ or $(3m+2)$ 1's should be rejected.



3. Describe $L(M)$ where M is given by the following state diagram.



$L(M) = \{w \mid w \text{ is a string over the alphabet } 0,1 \text{ which contains the substring } 111\}$

4. Define the term alphabet.

An alphabet is defined to be a finite set of symbols.