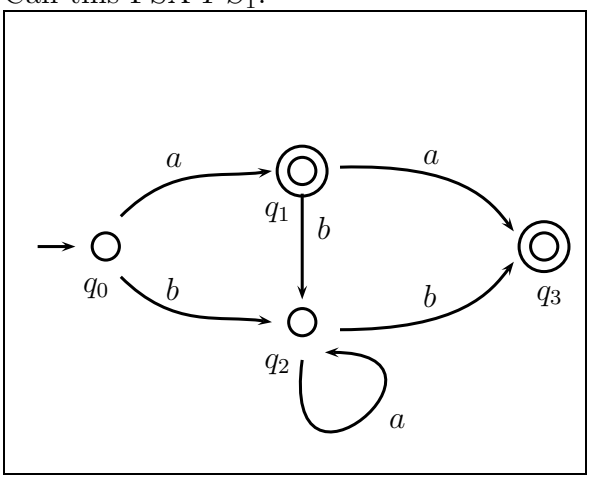
Philosophy 303
Symbolic Logic
Winter, 2009

Homework Assignment 4

Due Friday Feb. 6, 2009 by 3 PM

The problems draw from different parts of the book, but some sections are especially important. Pay special attention to pages 101 - 117 and 132 - 135. Pages 118 - 131 are *optional*: There are a couple of important facts in there that I will mention in class, but the details are too intricate to be required reading in a course at this level.

1. Call this FSA FS_1:



   (a) List out the components of FS_1, as in Example 24 in the text (page 106) and Chapter 3 Exercise 9 (worked out in the example solutions). That is, characterize the alphabet, the set of states, the Initial state, the set of final states, and the transition relation of FS_1.

   (b) Write out computations of the following strings in FS_1, using the format of Computation 34 (page 112): (i) the string *baaa*; (ii) the string *abb*.

   (c) Explain why *aaa* is not accepted by FS_1.

   (d) Characterize the set of strings accepted by FS_1 as a regular language.

2. Write an FSA for the alphabet $\{a, b\}$ that accepts just these strings: *aa*, *ba*, *aab*, *bbb*, *abb* and *bab*.

3. Say that X and Y are sets of strings accepted by FSA's FS_X and FS_Y respectively. Explain how you would design an FSA that will accept exactly the set $X \circ Y$.

4. Devise a deterministic Finite State Automaton over the alphabet $\{a, b\}$ that accepts all and only strings which have an odd number of a's and an even number of b's.