

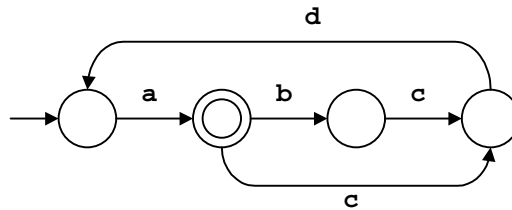
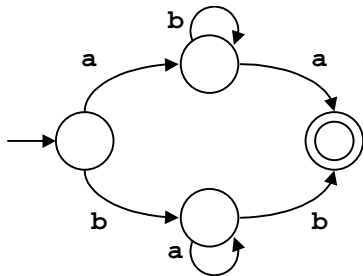
# CSCI 447 – Summer 2002

## Assignment 1: Scanning Theory

**Professor:** Muhammed F. Mudawwar

**Due Date:** Tuesday, June 18, 2002

1. Write regular expressions for the following character sets
  - a. All strings of lowercase letters that begin and end in  $a$ .
  - b. All strings of one or more digits that contain no leading zeros.
  - c. All strings of one or more digits that represent even numbers.
  - d. All strings of  $a$ 's and  $b$ 's that contain no three consecutive  $b$ 's.
2. Draw DFAs that accept the following:
  - a. Four reserved words **case**, **char**, **const**, and **continue**
  - b. All strings of  $a$ 's and  $b$ 's that contain an even number of  $a$ 's and an even number of  $b$ 's
  - c.  $(a | (bc)^*d)^+$
3. Write regular expressions that correspond to the following DFAs:



4. Write a regular expression for a C comment surrounded by  $/*$  and  $*/$ . Individual  $/$  and  $*$  may appear inside the comment, but not  $*/$ .
5.
  - a. Use the variation of Thompson's construction, described in the lecture notes, to convert the regular expression  $(aa | b)^*(a | bb)^*$  into an NFA.
  - b. Convert the NFA of part (a) into a DFA using the subset construction method.
  - c. Minimize the DFA obtained in part (b).