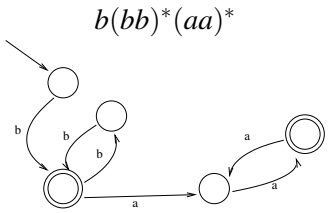
CSci 423 Homework 3

Due: 1:00 pm, Wednesday, 9/26

Eric Shih

1. (8 points) Exercise 1.12 on page 85.



2. (4 points each) Exercise 1.18 (e) (f) (j) on page 86.

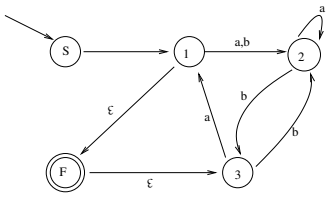
   e. $(0 \cup 1(0 \cup 1))((0 \cup 1)(0 \cup 1))^*$

   f. $(0^*(10^+))1^*$

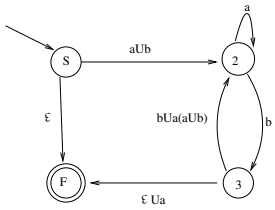
   j. $00^+ \cup 100^+ \cup 0^+10^+ \cup 00^+1$

3. (10 points) Exercise 1.21(b) on page 86. (Remove the states in the order of 1, 2, and 3.)

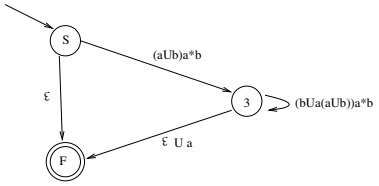
a)



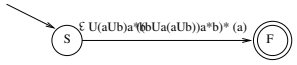
b)



c)



d)



4. (5 points) Problem 1.37 on page 89. *reference attained from Koether of Hampden-Sydney College* A DFA can be designed for C_n by tracking the remainder of $input/n$. If input mod n is 0, we accept the state, otherwise we reject it.

   DFA M = $(Q, 0, 1, \delta, q_0, F)$ where:

   $Q = q_0, q_1, q_2, ..., q_{n-1}$

$\delta(q_i, 0) = q_{(2i \bmod n)}$
$\delta(q_i, 1) = q_{(2i+1 \bmod n)}$
$F = q_0$

5. (5 points) Problem 1.48 on page 90.

Because a DFA can be made, D is a regular language.