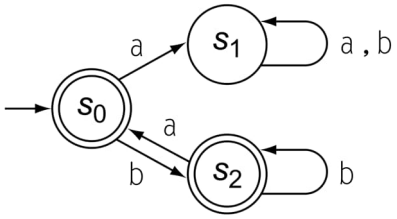
Compiler Designs, Homework Assignment 1

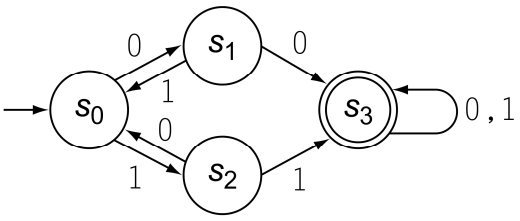
Deadline: 4/6 23:59

1. Describe the languages accepted by the following NFA. (30%)

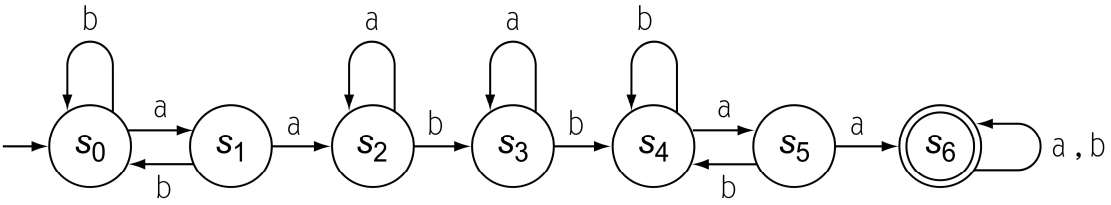
a.



b.

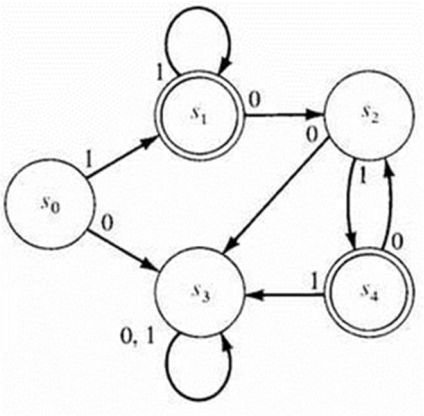


c.



2. Construct a DFA accepting each of the following languages (30%)
   a. {w ∈ {a, b}* | w starts with 'a' and contains "baba" as a substring}
   b. {w ∈ {0, 1}* | w contains "111" as a substring and does not contain "00" as a substring}
   c. {w ∈ {a, b, c}* | in w the number of 'a's modulo 2 is equal to the number of 'b's modulo 3}

3. Give a regular expression for the set recognized by the finite-state machine. (10%)



4. Consider the regular expression: (30%)

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(01 | 10 | 00)* 11
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   a. Use Thompson's construction to construct an NFA for each regex.
   b. Convert the NFAs to DFAs.
   c. Minimize the DFAs.