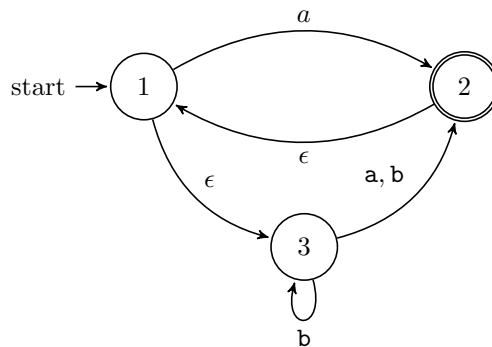


Homework 1–CSC 320 Summer 2018

Due by conneX submission at 11:55pm on Sunday May 20

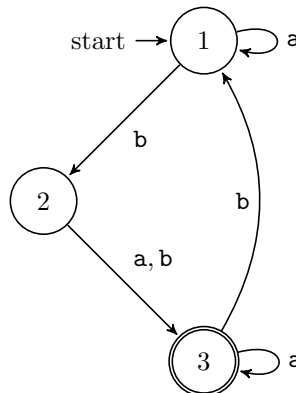
- (20 MARKS) Let L_1 be the set of strings over $\{a, b\}^*$ that contain at least two a 's and L_2 be the set of strings over $\{a, b\}^*$ that contain at most two a 's.
 - Give a DFA for L_1
 - Give a DFA for L_2
 - Using the product construction shown in class, give a DFA for $L_1 \cup L_2$. Show all states, even those that are inaccessible.
- (20 MARKS) Use the construction given in class to convert the following NFA to a DFA. Give a transition table *and* a transition diagram for the resulting DFA.



- (20 MARKS) Use the procedure given in class to convert the following regular expression to an NFA

$$(((00)^*(11)) \cup 01)^*$$

- (20 MARKS) Use the procedure given in class to convert the following DFA to a regular expression



- (20 MARKS) For languages A and B , define the *interleave* of A and B to be the language

$$\{w \mid w = a_1b_1 \dots a_kb_k \text{ where } a_1 \dots a_k \in A, b_1 \dots b_k \in B, \text{ and } a_i, b_i \in \Sigma, 1 \leq i \leq k\}$$

Give a construction that shows that the regular languages are closed under the mix operation.