University of Nevada, Las Vegas Computer Science 456/656 Fall 2019

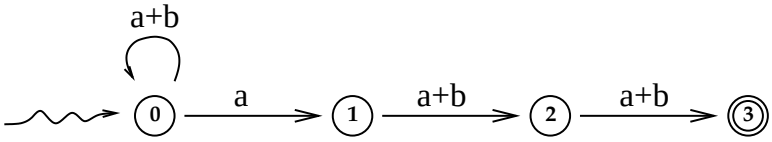
Assignment 3: Due Monday September 30, 2019

Name:_____

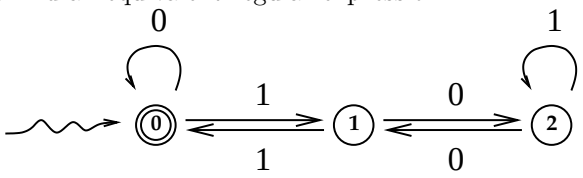
You are permitted to work in groups, get help from others, read books, and use the internet. But the handwriting on this document must be your own. Print out the document, staple, and fill in the answers. You may attach extra sheets. Turn in the pages to the graduate assistant at the beginning of class, September 4. In each case, the identical problem is in both fifth and sixth editions.

1. Write a regular expression for the language consisting of all strings over $\{a, b\}$ which contain the substring aaa.

2. Use the method given on page 86 of the sixth edition of Linz, or on page 89 of the fifth edition, to find a regular expression equivalent to the following NFA.



3. The following DFA accepts the language consisting of all binary numerals for positive multiples of three, where a leading 0 is allowed. Use the method given on page 86 of the sixth edition of Linz, or on page 89 of the fifth edition, to find an equivalent regular expression.



4. (a) State the pumping lemma for regular languages.

(b) Use the pumping lemma to prove that the language $L = \{a^n b^n \ : \ n \geq 0\}$ is not regular.

5. Work problem 9(a) on page 138 of the sixth edition, which is problem 7(a) on page 137 of the fifth edition.

6. Work problem 9(c) on page 138 of the sixth edition, which is problem 7(c) on page 137 of the fifth edition.

7. Work problem 24 on page 140 of the sixth edition, which is problem 22 on page 139 of the fifth edition.

8. Work problem 25 on page 140 of the sixth edition, which is problem 23 on page 139 of the fifth edition.