

CSEN 1003 Compiler, Spring Term 2017
Practice Assignment 1

Discussion: 04.02.17 - 09.02.17

Exercise 1-1

Answer the following general questions:

- a) What are the advantages of an interpreter over a testing compiler?
- b) What are the advantages of a compiler over an interpreter?

Exercise 1-2

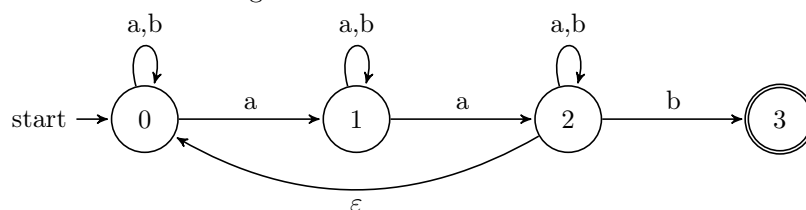
DFA Design

Give state diagrams of DFAs recognizing the following languages. The alphabet is $\{0, 1\}$

- a) $\{w \mid w \text{ begins with a 1 and ends with a 0}\}$
- b) $\{w \mid w \text{ contains the substring 0101}\}$
- c) $\{w \mid \text{every odd position of } w \text{ is a 1}\}$
- d) $\{w \mid w \text{ contains at least two 0s and at most one 1}\}$

Exercise 1-3

Consider the following NFA:



- a) Indicate all the paths labeled: **aabb**
- b) Indicate all the accepting paths labeled: **aabb**

Exercise 1-4

Convert the following regular expression to NFA

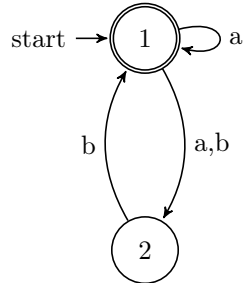
- a) $(0 \cup 1)^*000(0 \cup 1)^*$

⁰The exercises are due to Dr. Carmen Gervet and Sipser textbook

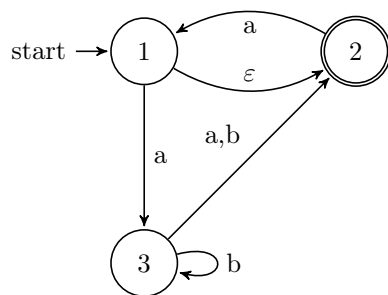
Exercise 1-5

Convert the following NFAs to equivalent DFAs

a)



b)

**Exercise 1-6****Regular expressions**

Give regular expressions generating the languages of Exercise 1-2

Exercise 1-7**Regular expressions**

Describe the set of patterns (ie. The language) denoted by the following regular expressions:

a) $(a|b)^*(a|b)$

b) $a(a|b)^*a$

c) $((\epsilon|a)b^*)^*$