

CSCI 2400 – Models of Computation

Homework 2

Due: Thursday February 5

Problem 1. Draw a nondeterministic finite automata (NFA) that accepts the set of strings over the alphabet $\{0, 1, 2\}$ such that the final digit has appeared before.

Problem 2.

- (a) Show that the following language is regular by drawing a NFA that accepts the language:

$$L = \{a^m b^n : m \geq 1 \text{ and } n \geq 1\}$$

- (b) Using the procedure described in the class, convert the above NFA to an equivalent DFA. (Give the diagram of the resulting DFA.)

Problem 3. Define an operation *first* on strings as

$$\textit{first}(a_1 a_2 a_3 a_4 \dots) = a_1 a_3 a_5 \dots$$

with the appropriate extension of this definition to languages. Prove the closure of the family of regular languages under this *first* operation.