**ECE374 Assignment 3**

Due 02/13/2023

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**Problem 4**

文本

中度可信度描述已自动生成

**Solution:**

To prove that all-NFAs recognize the class of regular languages, we turn this statement into two statements:

1. all-NFA can accept all regular languages.
2. if language belongs to all-NFA, then it is regular.

**I. all-NFA can accept regular language.**

These can be proved easily, because for for an all-NFA, we have the following definition:

in which,

is the set of states,

is the set of input symbols in this language,

is the set of all transitions,

is the starting state,

A is the set of accepting states, in all-NFA, A == Q

Therefore, we can simply treat all-NFA as a special form of NFA, where A is same as Q. Then, we could determine that is regular, that is, given a language that is represented with an all-NFA, we could prove that it’s regular, i.e. all-NFA accepts regularity.

**II.**

Reversely thinking, we could also transform an arbitrary regular language, in the form of a DFA, to an with the following method.

Given an arbitrary regular language L in the form of a DFA

We have

is the set of input symbols in this language;

is the set of states;

is the starting state;

is the set of all accepting states;

is the set of all transitions, where:

, which indicates that M takes in a symbol *a* at initial state and transitions to the next final state .

We could construct a based on M that

***Ø*** is the set of states in the all-NFA, P() is a function on Q, Ø is the empty set

is the set of input symbols;

is the starting state;

, marking the set of accepting states, after applying P() on A

=

For

(1) for some

(2)

TODO : Prove the transfer

Therefore, we could determine that is regular, that is, given an arbitrary regular language, we could prove that it could be represented in the form of a *all-NFA*

In a nutshell, we could prove that ***all-NFA*** represents the class of regular languages.