CS 410-Project 1
FALL2022

Ozyegin University

Description

In this project you will implement a program that converts NFAs to DFAs.

Recall that you learned both of these structures are equivalent to each other in representing regular languages. Now you should write a program that gets NFA as an input and gives its equivalent DFA as output. You can use JAVA or C++ for this project.

Implementation

- Your program should read a text file as input. This text file includes all the information needed for representing the NFA.
  - Input file is as below. It always starts by the word ALPHABET and then in each line until the next word, defines the alphabet of the NFA. It follows by STATES, that represents the state of NFA. Then START that represents the initial state of the NFA, then FINAL that represents the final state of the NFA and then TRANSITIONS that represent all the transitions of the NFA (A 1 B means it transits from state A with alphabet 1 to state B), and finally the file finished with END. For example the text below represents the NFA shown in the figure.

ALPHABET
0
1
STATES
A
B
C
START
A
FINAL
C
TRANSITIONS
A 0 A
A 1 A
A 1 B
B 1 C
END
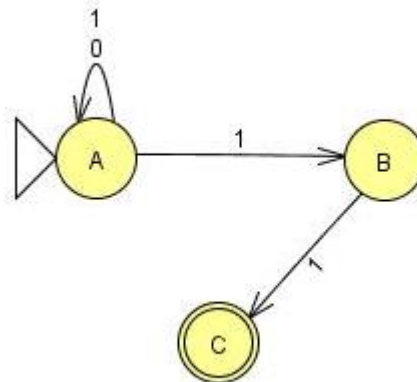
- 2 sample text files for NFA are provided in this assignment. But your code should be able to convert any other NFA given as input (the format of the text file will stay the same but consider that the number of alphabets, states and final states may change).
- By loading the input file your program should form the NFA.

- The next step is to follow the instruction of converting NFA to DFA and represent the formed DFA
- You must print in console the out put DFA with **the same format of the NFA text file**.

Technical Detail
- You can ignore epsilon transition in this assignment
- You are free to name your new DFA states whatever you want
- It is your responsibility to make sure that your code runs without any errors. In the case of any errors will get 0 points.
- **Use of any additional libraries is not permitted in this project.** You must implement everything yourself. Use of additional libraries will result in your code not running and you getting 0 points.

Submission

This assignment has 2 phase of submission.

1st phase:

Deadline : 1st of November until 23:55

In the design report you should write whatever we need to know about your work. In particular, how do you represent the finite automata, what data structure you used, the steps you took, etc.

You must write down the detail of your design and planning and you submit it on LMS as a **pdf file**

1. Submitting file should be your design report named:
        REPORT1_ NAME_SURNAME_StudentNO.pdf

You must use the design that you submit on your first submission to make your second submission. You cannot fully change your design and idea for the next phase. However, you can improve your design and fix your mistakes in the next phase.

2nd phase:

Deadline: 15th of November until 23:55

You must turn in two files in a **zipped folder.** Your code and your final report. In the final report, you can use exactly your design report that you already submitted, or you can submit the improved version.

1. First file should be your code named:
        NAME_SURNAME_StudentNO.java
        Or
        NAME_SURNAME_studentNO.cpp
2. Second file should be your final report named:
        REPORT2_ NAME_SURNAME_StudentNO.pdf

Grading

It is very important to state that each submission must have both the code and the report, submissions that lack any of these two files will not be evaluated and will receive 0 in total.

- Your report (40 pts)
- Your code (60 pts)

Important Notes

- This is an individual assignment, hence sharing your code will be considered cheating
- you can most probably find code online for this program, but it is very likely that code will be more complicated than what you are required to implement for the assignment. While it is OK to look for ideas online, copying code that you find online will be considered cheating.
- Your codes will be compared with codes available online and also with other submissions.

BEST OF LUCK 😊

In case of any questions email me via negin.amirshirzad@ozu.edu.tr