CS 410-Project 3
FALL2022

Ozyegin University

Description

In this assignment you are expected to simulate a Turing Machine. Note that your simulation should work for any situation. Your program should be working exactly as a Turing Machine would do. Given a string the simulated Turing Machine should be able to tell if the string is **accepted**, **rejected** or **looped**.
Your program should output the information about the given string being accepted, rejected or looped as well as which states it visited.

Implementation

In this project you will make your own input file.

An input file should contain the stack alphabet, the starting symbol of the stack, the input alphabet, number of states, the start state and the goal state(s). Once those inputs are given you should express the state diagram that you want to simulate. Finally, the string to detect could be given as an input. **An example file** could be constructed as follows:

1 (number of variables in input alphabet)
0 (the input alphabet)
2 (number of variables in tape alphabet)
0 X (the tape alphabet)
b (blank symbol , it is always a member of tape alphabet, and it does not count in the number of variables in tape alphabet)
7 (number of states)
q1 q2 q3 q4 q5 qA qR (states)
q1 (start state)
qA (accept state)
qR (reject state)
q1 0 b R q2
q1 b b R qR
q1 X X R qR
q2 0 X R q3
q2 X X R q2
q2 b b R qA
q3 X X R q3
q3 0 0 R q4
q3 b b L q5
q4 X X R q4
q4 0 X R q3
q4 b b R qR
q5 0 0 L q5

q5 X X L q5
q5 b b R q2
000 (string to be detected)

This input file is just an example you are free to make it as you wish.

After reading the input file, your program should process like a touring machine and **print on the console** the output with the format as follow: **(make sure you follow this format for your output, any other format is not acceptable)**

- `ROUT:  q1 q2 q3 q4 qR`
- `RESULT: rejected`

Technical Detail

- You can use C++ or java for this project.
- 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

You must turn in 3 files exactly with the asked formats.

Your report must explain every detail of your design. All the classes you used, how you constructed the input file, how you read and processed the input file, how you simulated the touring machine,…

Consider that your report has 40% of your grade, so it needs 40% of your effort. Short, and undetailed reports will get poor points.

1. First file should be your code named:
   NAME_SURNAME_StudentNO.java
   Or
   NAME_SURNAME_studentNO.cpp
2. Second file should be your input file
   Input_NAME_SURNAME_studentNO.txt
3. Third file should be your final report named:
   REPORT_ 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 input file (10 pts)
- Your code (50 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