

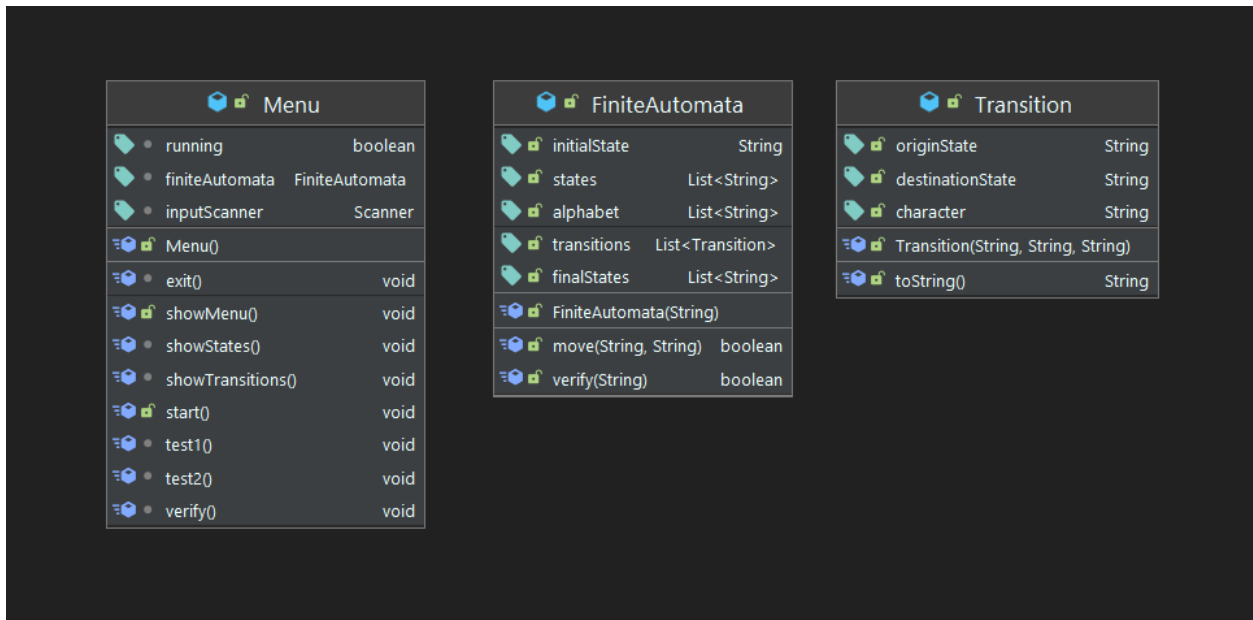
# Lab 4

## Requirements

Write a program that:

1. Reads the elements of a FA (from file)
2. Displays the elements of a finite automata, using a menu: the set of states, the alphabet, all the transitions, the set of final states.
3. For a DFA, verify if a sequence is accepted by the FA.

# Architecture



## Menu class

start()

- Start the main menu loop

showMenu()

- Show the menu options

showStates()

- Prints the FA states to the console

showTransitions()

- Prints the FA transitions to the console

test1()

- Verifies the sequence “aabc”

test2()

- Verifies the sequence “aba”

verify()

- Verifies a custom sequence from the system input

exit()

- Stops the main menu loop

## **FiniteAutomata class**

FiniteAutomata(String filePath)

- Create a finite automata based on the specifications inside an input file
- Throws IOException on invalid input file
  - Duplicate states are not allowed
  - Duplicate alphabet entries are not allowed
  - There cannot be no transitions
  - Transition origin state is not within the defined states
  - Transition destination state is not within the defined states
  - Transition character is not within the alphabet
  - There cannot be no final states
  - Final state is not within the defined states

verify(String sequence)

- Verifies whether a sequence is accepted

move(String state, String sequence)

- Applies all transitions originating from “state” by recursively calling itself
- Returns true when a final state is reached with an empty sequence or when at least one move from the set of recursively called moves returns true

# Design Details

## FA.in specification:

alpha ::= 0 | ... | 9 | a | ... | z | A | ... | Z  
digit ::= 0 | ... | 9

word ::= alpha{alpha}  
number ::= number{number}  
transition ::= word word word

states ::= number {word}  
alphabet ::= number {word}  
transitions ::= number {transitions}  
finalStates ::= number {word}

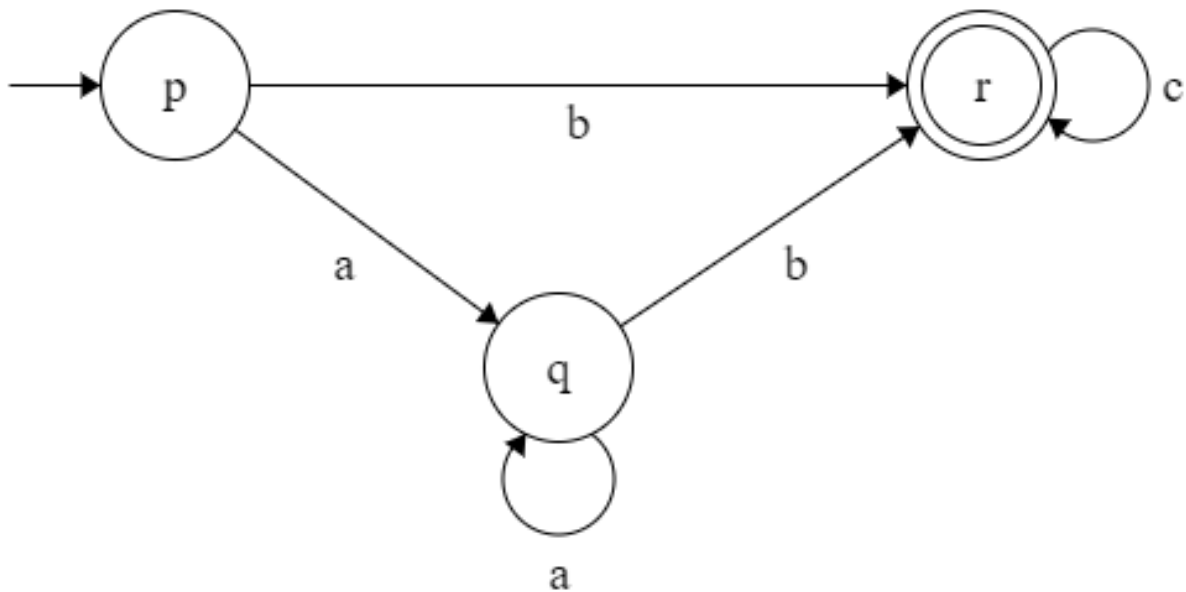
input ::= states alphabet transitions finalStates

# Implementation

Github url: <https://github.com/darius-calugar/flcd-fa-1>

# Tests

Tests were ran on the following finite automata:



## Test 1

Sequence: **“aabc”**

Expected result: **“Accepted”**

## Test 2

Sequence: **“aba”**

Expected result: **“Not accepted”**