Lab 4 Documentation – Finite Automata

GitHub link: https://github.com/Mocanu-Isabela/FLCD/tree/main/Lab4

Class Transition: is a template class for transitions that has 3 fields: source, destination and symbol

Class Run:

Functions:

- get_all_from_file(states_from_FA, alphabet_from_FA, transitions_from_FA, f_states_from_FA, i_state_from_FA) -> function that gets the values for states, alphabet, transitions, final states and initial state and populates the specific fields with them

    states_from_FA: a list containing the states that were written in the FA

    alphabet_from_FA: a list containing the alphabet elements that were written in the FA

    transitions_from_FA: a list containing transitions the that were written in the FA

    f_states_from_FA: a list containing the final states that were written in the FA

    i_state_from_FA: a list containing the initial state that is written in the FA

    Return: function does not return anything

- transition_already_exists (trans) -> function that gets a transition and verifies if it was already added in the transitions list

    trans: a parameter of type Transition representing a transition and having three attributes (source, destination, symbol)

    Return: true if trans is already present in the transitions list, otherwise false

- get_destination (source, symbol) -> function that gets a source and a symbol and returns the destination of the transition that has the respective source and symbol

    source: a parameter of type string representing a transition's source

    symbol: a parameter of type string representing a transition's symbol

    Return: the destination of that transition if the transition exists in the transitions list, otherwise an empty string

- verify_sequence (seq) -> function that gets a sequence and verifies if it is accepted by the FA

    seq: a parameter of type string

Return: true if the sequence's length is 0 and the initial state can be found in the list of final states or if by following the sequence's values and starting from the initial state, you can get to the final state, otherwise false

Other functions:

- print_menu() -> function that creates the menu
  Return: a string containing the menu

- start(states, alphabet, initial_state, final_states, transitions) -> function that handles the running of the program; the main function of this program
  states, alphabet, initial_state, final_states, transitions: parameters representing the states, alphabet, initial state and final states read from the FA file

  Return: function does not return anything

The reading of the FA file happens in __name__ == '__main__'.

The EBNF of the FA file:

non_zero_digit := "1" | "2" | … | "9"

digit := "0" | "1" | … | "9"

nr := non_zero_digit {digit}

letter := "a" | "b" | … | "z" | "A" | "B" | "Z"

first_line := letter {,letter}   //states

second_line := nr {,nr}   //alphabet

third_line := letter   //initial state

fourth_line := letter {,letter}   //final states

transition := letter,letter,digit   //states

enter := \n

fifth_line := {transition} [enter]   //transitions

FA_file := first_line second_line third_line fourth_line fifth_line