Finite Automata

FLCD Lab 4

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The Finite Automata is structured as a class with 5 fields: Q, E (Σ), q0, F, S, where each field is equivalent to its theoretical definition.

The transitions S are kept in a Python Dictionary, I.e. HashMap, where each pair (q, a) is mapped to a list of destination states, for example: (q, 1)->[p], meaning q goes to p with value 1.

Checking that the FA is a DFA is done by going through all the dictionary keys, and looking if there's any list with a length greater than 1, as shown in the pseudocode below:

```
def isDfa(self):
 for k in self.S.keys():
  if len(self.S[k])>1:
   return False
 return True
```

The FA class has the following methods:

getLine(line) - String

validate(Q,E,q0,F,S) - boolean

readFromFile(fileName) - FiniteAutomata

isDfa() - boolean

FA.in example for NFA

Q = A B C
E = 0 1
q0 = A
F = A C
S =
  (A, 0) -> A
  (A, 1) -> C
  (B, 0) -> B
  (B, 1) -> A
  (C, 1) -> C
  (C, 1) -> B

FA.in example for DFA

Q = A B C
E = 0 1
q0 = A
F = A C
S =
  (A, 0) -> A
  (A, 1) -> C
  (B, 0) -> B
  (B, 1) -> A
  (C, 0) -> C
  (C, 1) -> B