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142

Examen LFA

Exc 1

A Turing machine that ~~fact~~ has two tapes is a 7-tuple $(Q, \Sigma, \Gamma, \delta, q_0, q_{accept}, q_{reject})$ where:

Q is a finite set of states

Σ is a finite set of input alphabet not containing the blank symbol $\sqcup$

Γ is a finite set of tape alphabet, $\sqcup \in \Gamma$, $\Sigma \subseteq \Gamma$

$\delta : Q \times \Gamma \to Q \times (\Gamma \times \{C\})^2 \times \{L, R\}$ is the transition function where C switches the tapes

$q_0 \in Q$ is the start state

$q_{accept} \in Q$ is the accept state

$q_{reject} \in Q$ is the reject state and $q_{accept} \neq q_{reject}$

A two tapes Turing Machine $M=(Q, \Sigma, \Gamma, \delta, q_0, q_{accept}, q_{reject})$ computes as follows:

- M receives its input string ($w \in \Sigma^*$) on the leftmost squares (n = string length) of both tapes, and the rest of the tapes is blanks
- The head starts on the leftmost square of the first tape
- Once M has started, the computation proceeds according to the transition function
- As M computes, changes occur in the current state, ~~both tape~~ current tape contents and the other tape's contents and the current head location
- During each computation, the head moves to the second tape to do the same change it did in ~~the~~ the first. The contents of each tapes should be the same unless any write errors happened on any of the tapes.
- When the Turing machine goes into a final state, it will proceed to check if both tapes are ~~equal~~ equal and then reach a new final state: the head goes back to the beginning of each tape and alternates between each, comparing their contents, and if they're identical it will reach the new final state