

Exercise 1

(Formal Definition - lecture)

1. A Turing Machine is a 7-tuple $(Q, \Sigma, \Gamma, \delta, q_0, q_{acc}, q_{rej})$ where Q, Σ, Γ are all finite sets and:

- Q is the set of states
- Σ is the input alphabet not containing the blank symbol (" ").
- Γ is the tape alphabet, where " \square " $\in \Gamma$ and

$$\Sigma \subseteq \Gamma$$

$$\delta: Q \times \Gamma^2 \rightarrow Q \times \Gamma^2 \times \{L, R, S\}^2$$

$$\delta(q_i, a_1, a_2) = (q_j, b_1, b_2, L, R)$$

- $q_0 \in Q$ is the start state
- $q_{acc} \in Q$ is the accept state
- $q_{rej} \in Q$ is the reject state and $q_{acc} \neq q_{rej}$

2. The implemented ~~turing~~ turing machine (TM) has two ~~same~~ tapes instead of one.

The head goes both at the same time, but goes through them with the exact same index (because the two inputs are identical, so we don't need two different indexes).

In the input file we add a parameter in transitions to a single-tape turing machine (that's the most ^{important} ~~relevant~~ change) ~~set~~ and we add one more input.