A Turing Machine is a 7-tuple,

$(Q, \Sigma, \Gamma, \delta, q_0, q_{accept}, q_{reject})$

1. Q is the set of states.
2. Σ — input alphabet not containing "␣".
3. Γ — tape alphabet, "␣" $\in \Gamma$ and $\Sigma \subseteq \Gamma$.
4. $\delta: Q \times \Gamma \longrightarrow Q \times \Gamma \times \{L, R\}$ is the transition function
5. $q_0 \in Q$ is the start state
6. $q_{accept} \in Q$ is the accept state
7. $q_{reject} \in Q$ is the reject state, where $q_{accept} \neq q_{reject}$.

- A language is Turing-recognizable if some Turing machine recognizes it.

- 3 outcomes for a TM:
  accept. reject. loop.
- Looping is difficult to be distinguished from taking a long time to compute.

- A TM decides over a language A if it either accepts or rejects A.

- A language is Turing-decidable or decidable if some TM decides it.