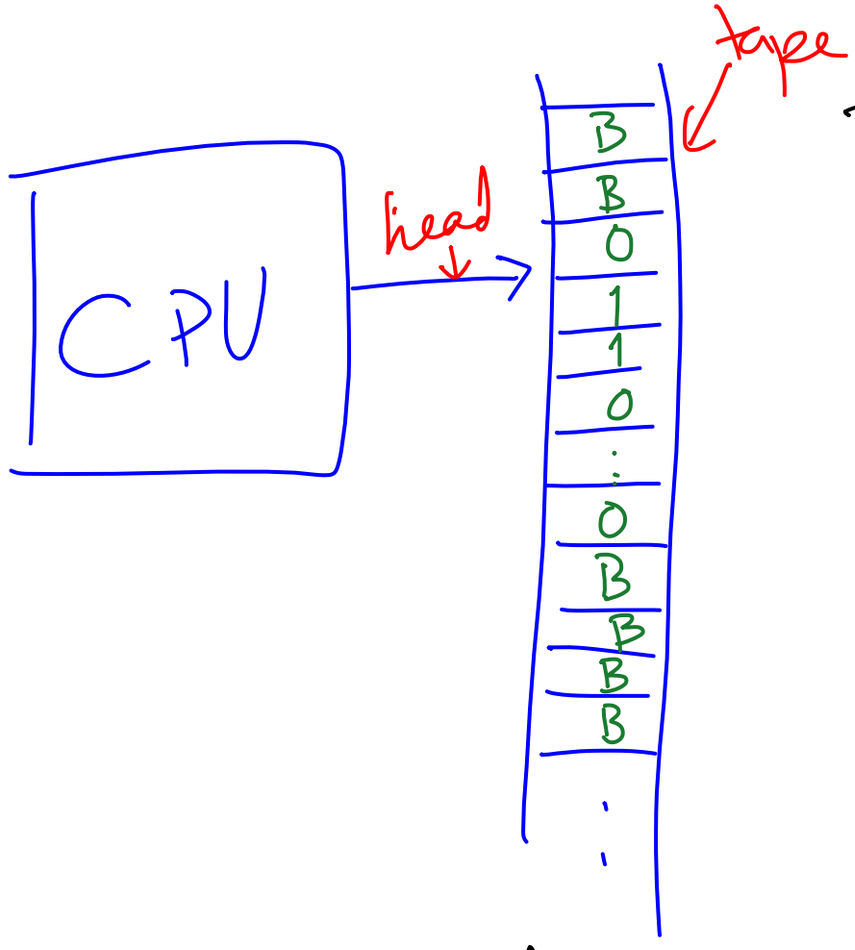
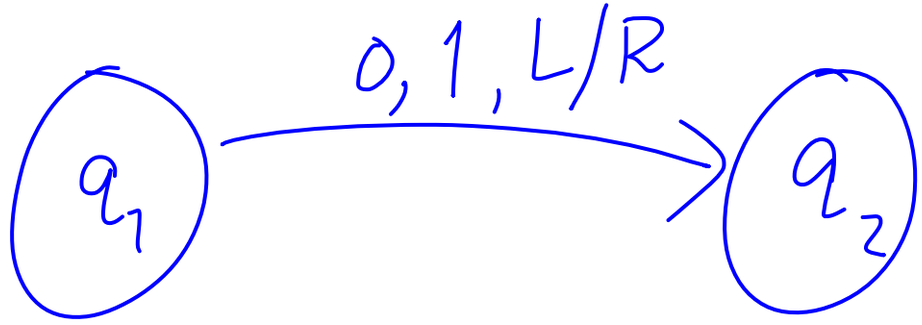


Transition from one state to another



Two types of terminating states: accepting & rejecting

At the beginning of computation, input is written on a contiguous finite segment of memory, and head points to leftmost input cell. Plus, the state is start state.

This computation model is called a Turing machine.

A Turing machine is 7-tuple

$(Q, q_0, \Sigma, B, \delta, F_{accept}, F_{reject})$ such that:

i) Q is a finite set of states

ii) q_0 is start state

iii) Σ is input alphabet (typically $\Sigma = \{0,1\}$)

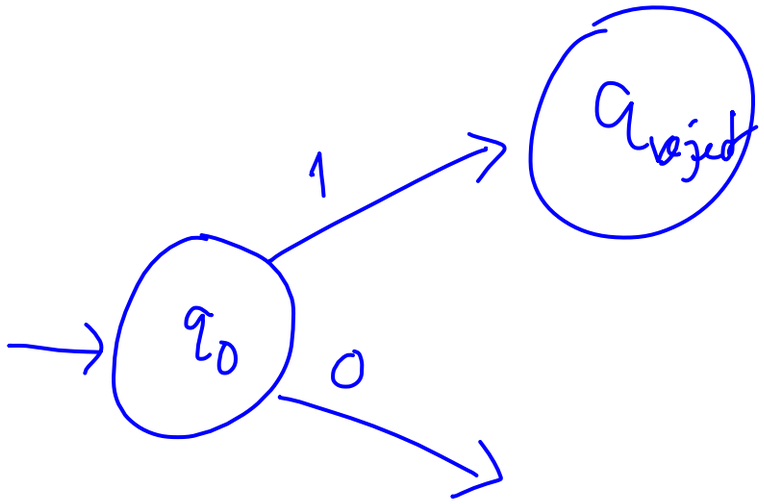
iv) B is a special symbol written in memory cells initially except input cells

v) $\delta : Q \times \Sigma \cup \{B\} \rightarrow Q \times \Sigma \cup \{B\} \times \{L, R\}$

vi) F_{accept} is set of accepting states

vii) F_{reject} is set of rejecting states

Example: $\{0^n 1^n 0^n \mid n \geq 1\}$.



Change the model to have 2 tapes, one for input and second for storage.

Read initial sequence of 0's and write same on second tape.

Read next sequence of 1's and move left on second tape replacing each 0 by 1. If the number of 0's & 1's do not match, reject.

Then read next sequence of 0's and move right on second tape replacing each 1 by 0. If number of 0's & 1's do not match, reject. Else, accept.