

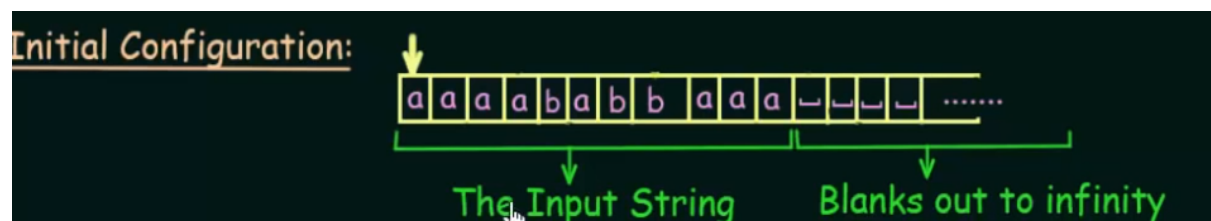
Turning Machines

- A turing machine is a finite automata with an infinite tape that is used as memory
- it differs from other finite automata because it is read and write as oppose to read only
- turning machine tape is infinite
- final state are immediately final
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How it works

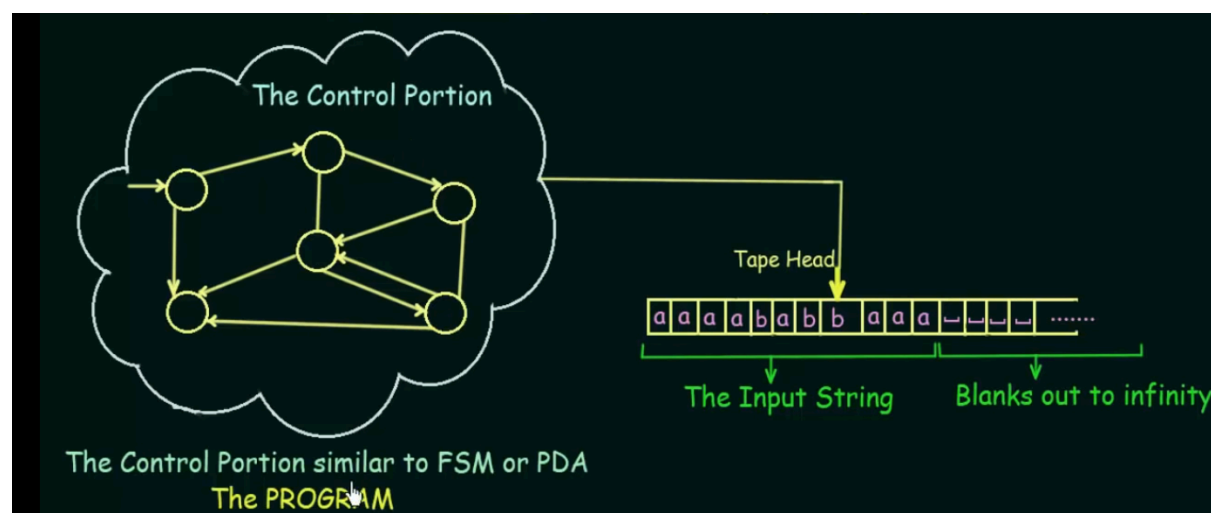
The Tape Part

Consists of the input string then an infinite number of blanks, there is also a head pointer like on a linked list in order to traverse the tape. if you are the leftmost part of the tape and receive the instruction to move left it just stays at the same position.

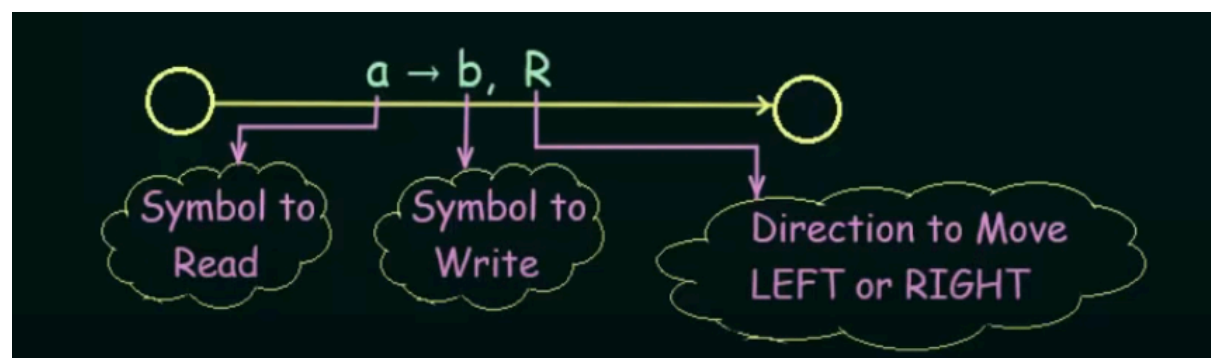


Read Symbol under Head, choose to update the symbol under the head, move the head left or right

The Control Portion



Operations between each node in the Control portion are syntaxed similarly to the PDA (push down automata)



The control portion has two special final states the accept state and the reject state. This just means that the computation can either HALT and accept, HALT and reject, or LOOP infinitely (meaning the machine fails to HALT)

Example 1

Example

- $B = \{w\#w \mid w \in \{1,0\}^*\}$

So we want to ensure that the the accepted string is replicated and seperated by a # symbol. The turing machine does this by

Algorithms and the Church-Turing Thesis

Decidability

Undecidability & Reducibility (Reduction)

Reducibility (Reduction) cont.

Complexity P and NP

NP Reduction and NP-Completeness

The Cook-Levin Theorem

Additional NP-Complete Problems Course Wrap Up

Final Exam Review