



BITS Pilani
Pilani Campus

Theory of Computation

CS F351

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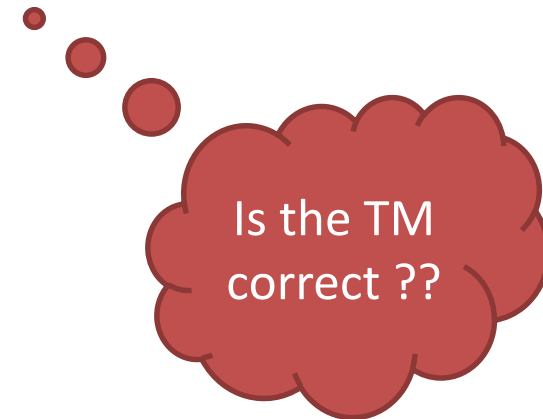


Lecture: 31

Question



Make a Single Tape TM for $L = \{a^n b^n c^n \mid n \geq 0\}$.



Multi-Tape TM



- Let $k \geq 1$ be an integer. A k -tape TM is a quintuple $(K, \Sigma, \delta, s, H)$. δ is defined as follows:

$$(K-H) \times \Sigma^k \text{ to } K \times (\Sigma \cup \{\rightarrow, \leftarrow\})^k$$

- Configuration of a k -tape TM:

$$(q, (w_1 \underline{a}_1 u_1, w_2 \underline{a}_2 u_2, \dots, w_k \underline{a}_k u_k))$$

Multi-Tape TM

innovate

achieve

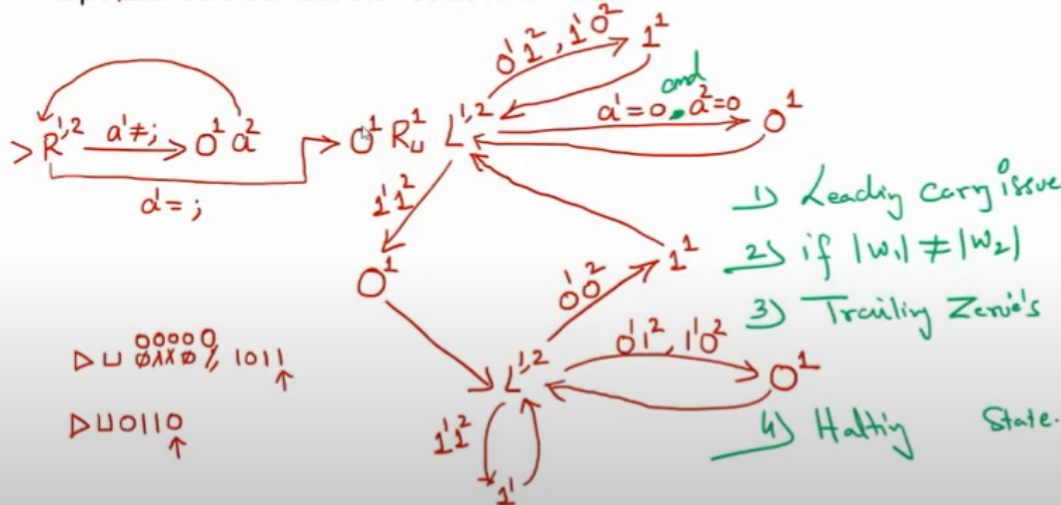
lead

Design a 2-tape TM for adding two binary numbers. The initial

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Multi-Tape TM

Design a 2-tape TM for adding two binary numbers. The initial configuration of Tape-1 is $\triangleright \underline{\quad} w_1; w_2$ and that of tape-2 is $\triangleright \underline{\quad}$. Finally, tape-1 should contain the result of $w_1 + w_2$.



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Proof:

innovate

achieve

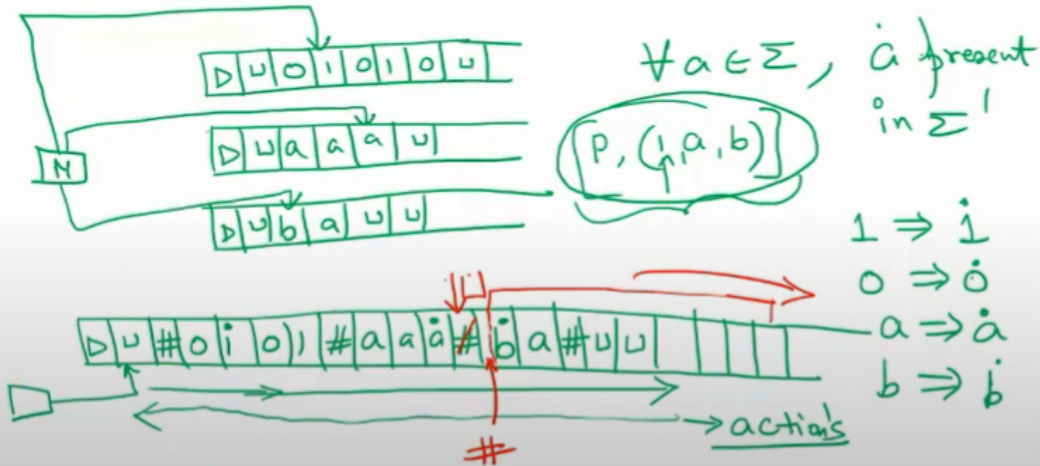
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Proof:

$M = (K, \Sigma, S, A, H) \rightarrow K\text{-tape TM}$

$M' = (K', \Sigma', S', A', H') \rightarrow \text{Single Tape TM.}$



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