Lec 1/19

Friday, January 19, 2018 12:40

Recall $L(M) = \{ \alpha \in \Sigma^* : M \text{ accepts } \alpha \}$

Language recognition (acceptance) vs Language generation (Enumeration)

a b c d e f g h i j k l m n o p q r s t u v w x y z

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

1 2 3 4 5 6 7 8 9 0

! ? . , ; :

$a + b = c$

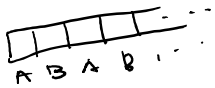
$a^2 + b^2 = c^2$

$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$

$\sum_{n=1}^{\infty} \frac{1}{n^4} = \frac{\pi^4}{90}$

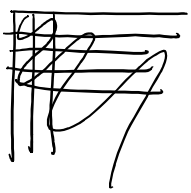
2 tapes (two heads)

intersperse



use hats to save position of two heads

Simulate grid



by dovetailing

Nondeterminism:

$\delta: Q \longrightarrow \mathcal{P}(Q)$ so a state goes to a set of states \Actions

NDTM $\equiv$ DTM

Simulate

branches

maybe

Def Recognizable vs Decidable, R.E.

↳ L is Recognizable or R.E. if $L = L(M)$ for some M.

AKA R.E.

L is Decidable or recursive if L is Recognizable and $\Sigma^* \setminus L$ is recognizable

Let $M_1, M_2, \ldots$ be TMs in Lexicographic order.

Input to Me is an integer x = the xth binary string in Lexicographic ordering.

$\langle (M_1, M_2) \rangle$