



DFA Construction - I

Complete Course on Theory of Computation

Alphabet

$$\Sigma = \{a, b\}$$

String:

collection of symbols over the given alphabet Null string (or) empty string

$\Sigma = \{a, b, c\}$ \Rightarrow

a✓	ab✓	aaa	$\epsilon \Rightarrow 0$ (empty string)
b✓	ac✓	:		
c✓	ba✓	:		
	bc✓	:		
	:	ccc		

$$\underset{2}{|ab|} \cdot \underset{2}{|ca|} = \underset{4}{|abca|}$$

$$\underset{0}{|\epsilon|} \cdot \underset{2}{|ab|} = \underset{2}{|ab|}$$

$$\underset{0}{|\epsilon|} \cdot \underset{2}{|ab|} \cdot \underset{0}{|\epsilon|} = \underset{2}{|ab|}$$

$$\underset{2}{|ab|} \cdot \underset{0}{|\epsilon|} = \underset{2}{|ab|}$$

Power of an alphabet

$$\Sigma = \{a, b\}$$

$$\Sigma^0 = \epsilon$$

$$\Sigma^1 = a, b, \quad \Sigma^2 = aa, bb, ab, ba$$

$$\Sigma^3 = aaa, \dots bbb.$$

$$\Sigma^{100} = \text{100 times } \Sigma$$

Set of 100 length string

$$\Sigma^* = \Sigma^0 \cup \Sigma^1 \cup \Sigma^2 \cup \Sigma^3 \cup \dots$$

$$= \{ \epsilon, a, b, aa, \dots bb, aaa, \dots bbb, \dots \}$$

= Set of all strings over the given alphabet

Ravi chandra

$$N = \{1, 2, 3, 4, 5, \dots\}$$

C.I ✓

$$\{1, 2, 3, 4\}$$

C.F ✓

Ravikiran

$$\Sigma^+ = \Sigma^1 \cup \Sigma^2 \cup \Sigma^3 \cup \dots$$

$$= a, b, aa \dots bb, aaa \dots bbb, \dots$$

= set of all strings excluding ϵ

$$\Sigma^+ = \Sigma^1 \cup \Sigma^2 \cup \Sigma^3 \cup \dots$$



Kleenclosure



positive
closure

$$R = \left\{ \begin{array}{cccc} & & 0.5 & \\ 1 & 2 & 3 & 4 \dots \end{array} \right.$$

or
real
number

$$1.5, 2.5, 3.5, \dots$$

$$1.53$$

Uncountable

Language: collection of strings over the given alphabet is known as language.

$$\Sigma = \{a, b\}$$

ex $L_1 = \{ab, aabb, aabbb, \dots\}$ ✓

(or)

$$L_1 = \{a^n b^n \mid n \geq 1\}$$
 ✓

In general

$$L \subseteq \Sigma^*$$

$$L_7 = \Sigma^*$$

$$L_2 = \{a^m b^n \mid m, n \geq 1\}$$

$$L_3 = \{a^m \mid m \geq 1\}$$

$$L_4 = \{aaa, \epsilon, bb\}$$

$$L_5 = \{\epsilon\}$$
 ✓

$$L_6 = \{a\}$$
 ✓
①

Set
(or)
Language

Countable

Uncountable



Set of all real numbers

3

Countable
Finite



Set of all
indian

Countable
Infinite



Set of all
Natural Numbers

2

Dedicate

























