

Formal Language & Regular Expressions:

(2)

→ It is a set of words, i.e. finite strings of letters symbols or tokens.

Regular Expressions:

→ A sequence of symbols & characters expressing a string or pattern to be searched for within a longer piece of text.

Languages: (L)

Eg1: $\Sigma = \{a, b\}$.

$\Sigma = \{a, b, c, \dots, z\}$.

$\Sigma^* = \{\epsilon, a, b, c, \dots, z, aa, ab, ac, \dots, zz, \dots, aaa, \dots\}$.

Eg2:

$\Sigma = \{a, b\} = \Sigma^* = \{\epsilon, a, b, ab, ba, aa, bb, aaa, \dots\}$

L = Set of all the strings starts with a.

$L = \{a, aa, ab, aaa, abb, aab, \dots\}$.

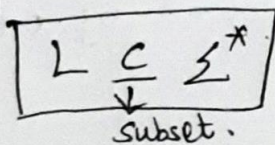
Eg3:

L = Set of all the strings ends with bb.

$L = \{bb, abb, aabb, aaabb, \dots\}$.

Language Definition: (L).

Let Σ be an alphabet and Σ^* be the set of all strings over Σ . Consider a subset of Σ^* , this subset is called language over Σ and denoted by L.



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

$L = \{ \text{starts with } a \text{ and ends with } b \}$

$$= \{ab, aab, aabb, aaabb, abbb, \dots\}$$

$$\boxed{RE = a(a+b)^*b}$$

$$\Sigma = \{0, 1\}$$

$L = \{ \text{ends with } 11 \}$

$$= \{11, 011, 0011, 01011, 1111, 01111, \dots\}$$

$$\boxed{RE = (0+1)^*11}$$

$$R.E = \cancel{(0+1)^*11} \cdot (a+b)^*bb = \{ \epsilon, a, b, aa, ab, ba, bb, \dots \} bb$$
$$= \{ bb, abb, bbb, aabb, abbb, \dots \}$$

$L = \{ \text{ends with } bb \}$

Basic expression:

$$a^* = \{ \epsilon, a, aa, aaa, aaaa, \dots \}$$

$$1^* = \{ \epsilon, 1, 11, 111, 1111, \dots \}$$

$$(0+1)^* = \{ \epsilon, 0, 1, 01, 00, 10, 000, 111, \dots \}$$

$$(00)^* = \{ \epsilon, 00, 000, 0000, \dots \}$$

$$(01)^* = \{ \epsilon, 01, 0101, 010101, \dots \}$$

$$01^* = \{ \epsilon, 1, 11, 111, 1111, 11111, \dots \}$$

$$= \{ 0, 01, 011, 0111, 01111, 011111, \dots \}$$

$L = \{ \text{starts with zero followed by } 0 \text{ to } n, \text{ no. of } 1\text{'s} \}$