Regular Exp

$\Downarrow$

$RG \longrightarrow \boxed{RL} \longrightarrow FSM$

Type-3 Grammar

$\downarrow$

$L(G) = \{ \_\_ \}$

$\cup$ - Union

$\cdot$ - Concatenate

$+$

ϵ

ϕ

a → Symbol

a^{*} → All possible Strings with different # of a

$\epsilon, a, a^2, a^3, a^4, \ldots\ldots a^{\infty}$

→ RE

$(\ )^{*}$ → Kleen's Closure

$(\ )^{+}$ → Kleen's Positive Closure

$\cup / +$ → Union

$\cdot$ → Concatination

ϕ → Null / phi

ϵ / λ → Epsilon

20:15

20:19

RE

Primitive

- ↳ ϕ
- ↳ ϵ / λ
- ↳ symbol $\in \Sigma$

Non-Primitive

- ↳ Jo Primitive का combination

$(a+b)^*$

Note:

All RE are said to valid iff it has been derived from Primitive Exp, & Contains basic opr's like

- ↳ Union
- ↳ Conct
- ↳ $*$
- ↳ $+$

20:26

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

$(a+b)^* \longrightarrow \Sigma^* \rightarrow \Sigma^+ + \Sigma^0$

$\Sigma^* \rightarrow \Sigma^0 + \Sigma^1 + \Sigma^2 + \Sigma^3 + \dots + \Sigma^\infty$

या

- $a \rightarrow$ kitni bhi baar lo
- $b \rightarrow$ similarly
- dono ke combinations
- $\varepsilon / \phi / \lambda$

Σ^*

1

0

.

|

∞

2. $\boxed{(a+b)^* \cdot (a+b)}^+$

ϕ ✗

ε ✗

$(a+b)^* \rightarrow \Sigma^*$

$(a+b) \rightarrow a, b, ab$

Σ^+

20:30

Feb 2023

$a/\epsilon \leftarrow a+\epsilon = a/\epsilon$

$a/\phi \leftarrow a+\phi = a$

$\{\ \}$

I

$\times$

$r = a$

$L(r) = \{a \mid a \in \Sigma\}$

$r = \epsilon \rightarrow L(r) = \{\epsilon\}$

$r = \phi \rightarrow L(r) = \{\ \}/\phi$

$\Sigma^* \cdot b$

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

$r \Rightarrow (ab+a)^* \cdot b$

$L(r) \Rightarrow \varepsilon, ab, abb$
$b, abab, ababb$
abb

$\boxed{bbab} \rightarrow \times$

$(ab)^{0/1/2/3}$

$r = a+b$

$L(r)\ \{a, b\}$

$r = \underline{a \cdot b}$

$L(r) = \{ab\}$

$r = (ab+a) \cdot b$

$L(r)$

$\downarrow$ $ab \cdot b$
$a \cdot b$

all string ending with 'b' $\times$

$r = a^*$

$\{a^0, a^1, a^2, a^3 \dots\}$

$r = a^+$

$\{a^1, a^2, a^3 \dots\}$

या

$r = (a+b)^*$

$\Sigma^* \to ab$

$\hookrightarrow ba$

$\hookrightarrow \varepsilon$

$\{\varepsilon, a^*, b^*\}$

$(a+b)^1$

a या b

$r = (a.b)^*$ sequence follow

Ans → order

{ईशा}

ε

ab, abab, ababab

1 2 3

$a\cancel{}$ $b\cancel{}$ $ba\cancel{}$

$\cancel{a}$ b

ab

1

$\Sigma = (a, b)$

$(a+b)^* \longrightarrow \Sigma^* \rightarrow \Sigma^0 + \Sigma^1 + \Sigma^2 + \Sigma^3 \ldots$

$$
\begin{array}{ccccccc}
\Sigma^0 & & \Sigma^1 & & \Sigma^2 & & \Sigma^3 \\
\downarrow & & \downarrow & & \downarrow & & \downarrow \\
\varepsilon & + & a & + & aa & + & aaa \\
 & & b & & bb & & bbb \\
 & & & & ba & & aba \\
 & & & & ab & & bab \\
 & & & & & & bba \\
 & & & & & & aab \\
 & & & & & & \vdots
\end{array}
$$

या

$\varepsilon, a, b, ab, aab, ba, \ldots$

$$(ab)^* \neq (a+b)^*$$

$$(ab)^* \neq (ab)^+$$

ε ×

$$(ab)^* \neq (a+b)^+$$

ε ×

$$(a+ba)^1 \cdot (b+a)^1$$

a	b
ba	a

ab, aa, bab, baa ✓

20:5

20:55

$$(a+\varepsilon).(b+\phi)$$

a — b

ε — b

$ab,\ b$

pro

ε

जयादा दिमाग ना लगाए

Peeleeaseeee

Same $\begin{cases} r_1 = \varepsilon^* \rightarrow (\varepsilon) \\ r_2 = \varepsilon^+ \rightarrow (\varepsilon) \\ r_3 = \phi^* \rightarrow \{\varepsilon\} \end{cases}$

diff $- \{ r_4 = \phi^+ = \{ \quad \}$

1) $r_1^+ \cup r_2^*$

$\downarrow$

r^*

2) $r^* \cap r^+$

r^+

$$\boxed{\begin{aligned} & r^* \cdot r^+ \Rightarrow r^+ \\ & (\varepsilon + r^+) \cdot r^+ \end{aligned}}$$

$$(r^*)^* \rightarrow r^*$$

$$(r^+)^* \rightarrow r^*$$

$$((((r^+)^*)^+)^*)^+ \cdot r^+$$

$$r^* \cdot r^+$$

$$\downarrow$$

$$r^+$$

21:05

$(a+b)^* = \underline{\Sigma^*}$

$\downarrow$

$(a^*+b)^*$

$(a+b^*)^*$

$(a^*+b^*)^*$

$(a+b)^* \neq (ab)^*$

$(a+b)^* \neq (a^*.b)^* \neq (a.b^*)^*$

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

V.IMP

H.P