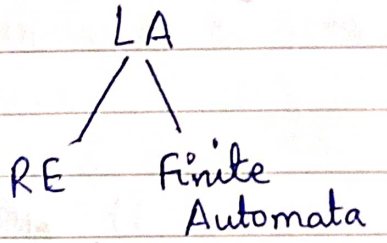
14/08/2022

## Regular Expression:

Tokens are described by regular expression.




Spaces, semicolons are delimeters.

$$id = L(L|D)^*$$

Let r and s be two REs and language generated by those expressions are L(r) and L(s) respectively which is accepted by the finite automata N(r) & N(s) respectively.

r|s → regular expression → L(r|s) → L(r) ∪ L(s)
rs → L(r)L(s)
r* → L(r)*

1. ∈ ⟶ {∈}
2. a ⟶ {a}
3. a|b ⟶ {a, b}
4. ab ⟶ {ab}
5. a* ⟶ {∈, a, aa, ...}
6. a+ ⟶ {a, aa, ...}

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1. The set of all strings of a a's and b's of length 2.
2. The set of all strings of zero and more b's.
3. The set of all strings containing a and consist of zero or more a's followed by ab.
4. For exactly one a
5. Give the RE atleast 2a.

## Answer

1. RE =

$$aa|ab|ba|bb = (a|b)(a|b)$$

2. $RE = (a+b)^*$

3. $RE = a|a^*b$

4. $RE = b^*ab^*$ ✓

5. RE =

↳ $a^*b^*ab^*ab^*a^*$ ✗

↳ $(a+b)^*a(a+b)^*a(a+b)^*$

aabba

abba

## Homework

(1) Define the language r.e. it should contain atleast one double letter.

(2) Write one regular exp over alphabet {0,1} for the set of strings with even no of zeros followed by odd no of 1's.

(3) Write a regular expression for the language in which word ending with either aa or single b.

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4. Write the r.e. for all string with even no. of zeroes followed by an odd no. of 1's. $(00^*)(11^*)1$

5. Write a regular expression for the language that the set of all String that begin or end with 00 or 11.

6. Write a regular expression for the set of all strings in which both the no. of a's and no. of b's are even

$x \in (V \cup T)^+ \quad x \to y$

$y \in (V \cup T)^*$

Answers

(1) $(a+b)^*(aa+bb)(a+b)^*$

(2) $(00)^*(11)^*1$

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

(4) $(00)^*(11)^*1$

(5) $(00+11)(0+1)^*(00+11)$

(6) ~~$(aa+bb)^*$~~

$[((ab+ba)(aa+bb)^*(ab+ba) + (aa+bb))^*]$

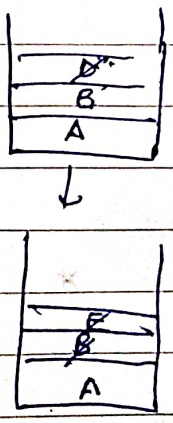
$(aa + bb)^*$

$(ab+ba)(ab+ba)$

abba

baab

abbabaab




baaabbbbaabaaabbaa