

THEORY OF AUTOMATA

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QUESTION No : 1

Keeping in view the Kleene's Theorem, proof for any language S.

$$S^+ = (S^+)^+$$

$$S^+ = (S^+)^+$$

$$S = (a b)$$

$S = (a b \ a a \ ab \ bb \ baa \ aa \ aab \ aba \ abb \ bbb \ bba \ bab \ baa \dots)$

$S^+ = (a b \ a a \ ab \ bb \ baa \ aa \ aab \ aba \ abb \ bbb \ bba \ bab \ baa \dots)$

$(S^+)^+ = (a b \ a a \ ab \ bb \ baa \ aa \ aab \ aba \ abb \ bbb \ bba \ bab \ baa \dots)$

This is the string which is generated by concatenation of the string S^+

Proved $S^+ = (S^+)^+$

QUESTION NO: 2

**How many words does S^* will have of length 3, 4 and 5,
If $S = \{ab\ ba\}$ (Design S^* and then write answers on the basis
of words of S^*)**

$S = \{ab\ ba\}$

$S^* = \{\epsilon\ ab\ ba\ abab\ abba\ baba\ baab\ ababab\ ababba\ abbaab\ abbaba\ bababa\ babaab\ baabba\ baabab\ abababab\ \dots\ babababa\ \dots\}$

Total length of words 3=0.

Total length of words 4=4

Total length of words 5=0

QUESTION No : 3

Fill in the blanks.

1. A dictionary is arranged in **alphabetical** order.
2. + is called **positive** instances.
3. * is called **kleene** instances.
4. ? is called **zero/one** instances.
5. A Formal Language is game of **symbols** on paper.
6. ^ is included in **kleene** closure.
7. **palindrome** is a word whose reverse is equal to itself.
8. **concatenation** is an operation in which symbols are placed side by side.
9. $\{a b\} = \{b a\}$ for **matrice** operation.
10. Two words having same symbols in same order are called **same** words.