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SUBJECT : Theory Of Automata

Mid Term Assignment

Q1) Keeping in view the Kleene's Theorem, prove for any language S .

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

$$S = (a+b)$$

$$S = (ab \quad aa \quad ab \quad bb \quad ba \quad aaa \quad aab \quad aba \\ abb \quad bbb \quad bba \quad bab \quad baa \dots)$$

$$S^+ = (ab \quad aa \quad ab \quad bb \quad ba \quad aaa \quad aab \\ aba \quad abb \quad bbb \quad bba \quad bab \quad baa \dots)$$

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

Here the $(S^+)^+$ gives all those strings which are gained by the concatenation of the strings of S^+

So, it is proved that $S^+ = (S^+)^+$

Q2) 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^*
 $S = \{ab, ba\}$

$S^* \{ \Lambda, ab, ba, abab, abba, baba, baab, ababab, baabba, abbaab, abbbaba, bababa, babaab, baabba, baabab, abababab, \dots, Babababa, \dots \}$

So Total words of length 3 = 0

Total words of length 4 = 4

Total words of length 5 = 0

Q3) 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) Formal language is game of A
- 6) Λ is included in Kleene closure.
- 7) Palindrome is a word whose reverse is equal to itself.
- 8) Concentration is an operation in which symbols are placed side

by side.

a) $\{a\ b\} = \{b\ a\}$ for matrice operation.

10) Two words having some symbols in same order are called same words.