

ID: 13794

Name: M. Zarak Khan

Subject: Theory of Automata

MID TERM ASSIGNMENT

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

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

$$S = (a b)$$

$$S = (a b \ a a \ ab \ bb \ ba \ a a a \ a a b \ a b a \ a b b \ b b b \\ b b a \ b a b \ b a a \dots)$$

$$S^+ = (a b \ a a \ ab \ bb \ ba \ a a a \ a a b \ a b a \ a b b \ b b b \\ b b a \ b a b \ b a a \dots)$$

$$(S^+)^+ = (a b \ a a \ ab \ bb \ ba \ a a a \ a a b \ a b a \ a b b \ b b b \\ b b a \ b a b \ b a a \dots)$$

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

$$S = \{ab \quad ba\}$$

(Design S^* and then write answers on the basis of words of S^*)

$$S = \{ab \quad ba\}$$

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

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 symbols

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.

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

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