Automata and Language Theory

Chapter 2(Languages)

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Chapter 2- Languages

Give the regular expression for the set of strings over {*a, b*} :

- With even length.

Solution

$$(aa \cup ba \cup ab \cup bb)^*$$

Give the regular expression for the set of strings over {*a, b*} :

- With odd length.

Solution

$$(a \cup b)^* - \{aa \cup ba \cup ab \cup bb\}^*$$

OR

$$(a \cup b)\,(aa \cup ba \cup ab \cup bb)^*$$

Give the regular expression for the set of strings over {*a, b*} :

- Every string that begin with a and end with a and contain at least one b.

Solution

$$a\,(a \cup b)^*\; b\;\; (a \cup b)^*\, a$$

Give the regular expression for the set of strings over {*a, b*} :
- even number of b's

Solution

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

Exercise 12

Give the regular expression for the set of strings over {*a, b, c* } which all the a's precede the b's, which in turn precede the c's. It is possible that there are no a's , b's, or c's.

Solution

$a^* b^* c^*$

Exercise 13

Give the regular expression for the set of strings over {*a, b, c* } which all the a's precede the b's, which in turn precede the c's. without the null string .

Solution

$$a^+ b^+ c^+$$

Exercise 26

Give the regular expression for the set of strings over {*a, b, c* } with length three.

Solution

$$(a \cup b \cup c)(a \cup b \cup c)(a \cup b \cup c)$$

Exercise 27

Give the regular expression for the set of strings over {*a, b, c* } with length less than three.

Solution

$\lambda \cup (a \cup b \cup c) \cup (a \cup b \cup c)(a \cup b \cup c)$

Exercise 28

Give the regular expression for the set of strings over {*a, b, c* } with length greater than three.

Solution

$$(a \cup b \cup c)(a \cup b \cup c)(a \cup b \cup c)(a \cup b \cup c)^{+}$$

Exercise 30

Give the regular expression for the set of strings over {*a, b, c* } which the total number of of b's and c's is three.

Solution

$a^* (b \cup c) a^* (b \cup c) a^* (b \cup c) a^*$