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Section : BCS-5A
Assignment : Theory of Automata

Descriptive Definition:

1) Descriptive definition of the language for string starting with aa and ending with ba.

defined over $\Sigma = \{a, b\}$ can be defined as

L = {aaba, aaaba, aabba, aaabba, aababa, aaaaba, aabbba, aababa, aaaaba, aabbba, ——}

Recursive definition

a a ba in L
if X in L than
a a X ba also in L.

2) Descriptive definition of the language for string of all consecutive even length of a's

defined over = {a, b} can be defined as

L = { aa, aab, aabaa, aaaab, aabbb, aaaabb, aabbaa, aabbbaa, aaaabaa, aaaabba, aaaaaabba, —— }

Recursive defination

Define $a^n b$, $n = 2, 4, 6, \ldots$ 5)
of starting define over $\Sigma = \{a, b\}$
ab is in $\{a^n b\}$
if x is in $\{a^n b\}$
aa x aa is in $\{a^n b\}$

3) Descriptive defination of the language for ending with b and having zero or multiple sets of aa and bb
defined over $\Sigma = \{a, b\}$ can be defined as

$L = \{ b, aab, bbb, aabbb, aaaab, bbbbb, aaaaaab, aabbbbb, bbbbbbb, \ldots \}$

Recursive defination

$a^n b$ in L $\quad n = 2, 4, 6, \ldots$
if x is in $\{a^n b\}$ than
a x b is in $\{a^n b\}$

4) Descriptive defination of the language of string having single 1 or many 0's.

defined as $\Sigma = \{0, 1\}$ can be defined as

$= \{ 0, 00, 1, 01, 10, 010, 001, 100, 0010, 0100, 1000, 000, 0001, \ldots \}$

Recursive defination :-

0 in L
if X is in L
0 X is also in L

5) Descriptive defination of the language for string having odd number of b between a & b defined over $\Sigma = \{a, b\}$ can be defined as

$L = \{aba, abaa, abbba, aabbba, aabaaa, abbbaa, \text{---}\}$

Recursive defination

$a\,b^n$ in $\{a, b\}$ $n = 1, 3, 5, 7, 9, \text{---}$

if x is in $\{a, b\}$ then

$a x a$ in $\{a, b\}$.

6) Descriptive defination of the language for the string that do not contain b as b string defined over $\Sigma = \{a, b\}$

can be defined as

$L = \{a, aa, aaa, aaaa, aaaaa, aaaaaa, \text{---}\}$

Recursive defination

a in L

if x is in L then

b(x) also in L.

7) Descriptive definition of the language for the strings having multiple no of 01 the string defined over $\Sigma = \{0, 1\}$ can be defined as

$L = \{ 101, 010, 0101, 1011, 01100, 10101, 11011, 01100, 00101, 01000, \text{——} \}$

Recursive definition :-

0, 1 in L
if (x) in L then
(0x1) is also in L

8) Descriptive definition of the language for the string have ab in the string defined over $\Sigma = \{a, b\}$ can be defined as

$L = \{ bab, aba, abab, abaa, baab, babb, bbab, aaaab, abaab, abbab, \text{——} \}$

Recursive definition

ab in L
if (x) in L than axb
is also in L.

(9) Descripitive defination of the language for the string starting with 0 and ending with 1 defined over $\Sigma = \{0, 1\}$

can be defined as

$L = \{01, 011, 001, 0001, 0111, 0011, 0101, 00011, 00111, 01111, 01001, 01101, \text{——}\}$

Recursive defination :-

0 1 in L

if (x) is in L then

0(x)1 also in L

(10) Descripitive defination of the language of string having starting & ending is different defined over $\Sigma = \{a, x, y\}$

can be defined as

$L = \{XY, YX, XXY, YXX, YYX, YYXX, YXXX, YXYX, YYXX, YXXY, \text{——}\}$

Recursive defination

XY in L

if (z) is in L then

X (z) Y is also in L