Assignment No: 1

Theory of Automata

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Q No 1)

(b) prove that if x is in palindrome then so is x^n for any n

step 1: x^n is also in palindrom for n= 1

step 2: if x is in palindrome, then so is xk.

step 3: All above are the recursive language.

(c) prove that if 2^n is in palindrome then so is 2.

step 1: if 2^n (n=1) is in palindrome then 2 is in palindrome

step 2 if 2K is in palindrome, then so is 2.

step 3: All above are recursive language.

(d) Prove that palindrome has as many word of length 2n as it does of length 2n-1 How many words is that

step1 2n and 2n-1 words of length is in palindrome

step2 The number of words of length 2n is 2^n, and the number of words of length 2n-1 is also 2^n Therefore palindrome has as many of length 2n as it does of length 2n-1, and there are 2^n words of each length

step3: All above are recursive Language

QNo3)

(a) All string such tha the number of a's is a multiple of 3

A: $b^*(aaa)^* + (aaa)^*b^* + b^*(aaa)^*b^*$

(b) All string such that the number of a's is odd.

A: ~~$a((a+b)(a+b)(a+b))^*$~~

Q No 4) over $\{a, b\}$ of all words that do not have the substring bba and abb.

A: $[a^+ bb^+ + bb^+ a^+]$

Q No 5) over $\{a, b\}$ containing all string that have an even no of a's an odd number of b's

R: $^*[aa + bb + (ab + ba)(aa + bb)^*(ab$

Q No 6) define the same Language over alphabet $\{a, b\}$.

1) $a(ba + a)^+ b$

L: { aab, abab, ab, ababab, aaab, aabab, aababab ... }

2) $aab(aab)^+$

L: { aab, aabaab, aaab, aabaabaab }

Q No 6) Define the language over alphabet $\{a, b\}$ $a(aa)^*(\Lambda + a)\,b + b$ and $a \cdot b$

a).

$L = \{aabb,\ aab,\ aaaabbb,\ abbb \cdots\}$

b) $L = \{ab,\ aab,\ aaab \cdots\}$