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CS 305 (Autumn 2024-25)

Tutorial 4

1. Consider the set of strings on {0,1} defined by the requirements below, Design RE for each of the given requirement.

(a) Every 00 is followed immediately by a 1. For example, the strings 101, 0010, 0010011001 are in the language, but 0001 and 00100 are not.

(b) all strings containing 00 but not 000.

(c) The leftmost symbol differs from the rightmost one.

(d) Every substring of four symbols has at most two 0's. For example, 001110 and

011001 are in language, but 10010 is not since one of its substrings, 0010 contains

three zeros.

(e) All strings of length five or more in which the fourth symbol from the right end

is different from the leftmost symbol.

(f) All strings in which the leftmost two symbols and the rightmost two symbols are identical.

2. Design Grammar, FA and Regular Expressions for the following over $\Sigma = \{a,b\}$:

(a) Set of all words starting and ending with b.

(b) Set of all words with no two consecutive a's.

(c) Set of all words exactly two b's.

(d) Set of all words having even number of a's followed by odd number of b's.

(e) Set of all words with at least one a and at least one b.