tutorial 1:

Theory of Computer science

Section 4

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Question 1:

Consider the language $Y=(w+c)(ou+oa)d$.
list all words for language Y

$Y = \{would, wood, could, cood\}$

Question 2:

let $x=\{a,b\}$ and $Y=\{\lambda, ba, ab\}$

(a) list the strings in the set XY

$XY = \{a, b, aba, bba, aab, bab\}$

(b) list the string in the set Y_x

$Y_x = \{a, b, baa, bab, aba, abb\}$

(c) how many strings of length 4 are they in Y^*?

4 strings $= \{baba, baab, abba, abab\}$

(d) list the strings in the set x^* of length 3 or less?

$\{\lambda, ab, ba\}$

(c) list the strings in the set $X^* Y^*$ of length of four of less?

$X^* Y^* = \{a, aa, aaa, aaaa, b, bb, bbb, bbbb, aab, aaab, aaba, aba, bab, bbab, bba, bbba, abab, abba, baba, baab, ba, ab\}$

Question 3.

Consider the language S^*, where $S = \{aa, b\}$

(a) how many words does this language have of length 2?

2 words aa, bb

(b) how many words does this language have of length 3?

2 words aab, bbb

Question 4

For each of the following, write two strings in the language, two strings that Not In the language and give a short description of the language using your own word.

language	2valid string(IN)	2invalidstrings(not in)	Description
ab(a+b)*	aba, abb	aa'b, bab	any Combination of strings that start with ab followed by any number of a's or b's
ab(a+b)*ba	abaa, abbba	aba, abab.	Considering any Combination that start with ab and end with ba and have any numbers of a's and b's
(a+b)(a+b)*	abaa, bba.	aa, aaa	any Combination that start with ab or bb that is followed by any number of a's or b's
(a(a+b)*b) + (b(a+b)*a)	aaab, ab, baaab	aaaa, bbb	any Combination that starts with a or b but end with opposite letter and have any number of a's or b's in between.

Tutorial 2

Theory of Computer Science

Section 04

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Question 5:.

Consider the regular expression $(a+b)^*a(a+b)$

(a) What string is NOT in this language?

λ as there is always ab or aa at the end

(b) write out all the words in this langage with 4 of fewer letters

{aa, ab, aaa, aab, baa, bab, aaaa,

aaab, bbaa, bbab}

Question 6

Generate all possible strings for each the following regular expression (at least for 3 values of Kleena star i.e: 0,1,2)

(a) $a(a+b)^*$ {a, aa, ab, aaa, abb}

(b) a^*b^* {λ, a, b, aa, bb, ab, aabb, abb, aaab}

(c) $(ab)^*$ {λ, ab, abab}

Question 7

for the alphabet $\Sigma = \{a, b\}$, give regular expression for the following languages:

(a) L_1 = All strings. $(a+b)^*$

(b) L_2 = All strings except empty string $(a+b)^*$

(c) L_3 = All strings starting with ab $ab\,(a+b)^*$

(d) L_4 = All strings ending with ab $(a+b)^*ab$

(e) L_5 = All strings that begin And end with ab $ab\,(a+b)^*ab$

(f) L_6 = All strings that begin or end with ab $ab\,(a+b)+(a+b)^*ab$

(g) L_7 = All string that Contain the substring ab $(a+b)^*ab(a+b)^*$

(h) L_8 = " " " " " " ba $(a+b)^*ba(a+b)^*$

(i) L_9 = " " " " " " ab or ba $(a+b)^*(ab+ba)(a+b)^*$

(j) L_{10} = " " " " " " ab and ba $(a+b)^*ab\,ba\,(a+b)^*$

(k) L_{11} = All the strings that Containing exactly two a's $b^*ab^*ab^*$

(l) L_{12} = All string Containing at least two a's $(a+b)^*a(a+b)^*a(a+b)^*$