National University of Computer & Emerging Sciences, Karachi
Spring - 2022
Department of Computer Science
Assignment # 1
Due Date: 25/ Feb/ 2021

Course Code: CS3005	Course Name: Theory of Automata
Instructor Name / Names: Musawar Ali, Bakhtawer Abbasi	
Student Roll No:	Sections: A, B, C, D, E, F

Instructions

- Submit on time, solve by yourself.
- Follow the deadlines.
- Don't cheat and plagiarize.
- Submission method of assignment would be communicated by the course teacher.
- For any query you may contact your course teacher.

Find the regular expression and Deterministic Finite Automata for the following set of languages:

$\boldsymbol{L1} = \{a^n\, b^m : (n+m)\ \ is\ even\}$

$\boldsymbol{L2} = \{a^n\, b^m, n \geq 4, m \leq 3\}$

$\boldsymbol{L3} = \{a^n b^m, n < 4, m \leq 4\}$

$\boldsymbol{L4} = \{a^n b^m : n \geq 1, m \geq 1, nm \geq 3\}$

$\boldsymbol{L5} = \{ab^n\ \ w : n \geq 3\ , w \in \{a,b\}^+\}$

$\boldsymbol{L6} = \{vwv : v, w \in \{a,b\}^*, |v| = 2$

L7 = having exactly one pair of consecutive zeros.

L8 = having exactly one a.

L9 = strings containing no more than 3 a's

L10 = all strings that contain at least one occurrence of each symbol in alphabet

L11 = all strings ending in 0, 1.

L12 = all string not ending in 0, 1

L13 = All strings containing even number of zeros.

L14 = all string having at least two occurrences of substring 00.

L15 = all strings not containing 101.

$\boldsymbol{L16} = \{w : |w| \ mod\ 3 = 0\}$

$\boldsymbol{L17} = \{w : n_a \ \ (w) \ \ mod\ 3 = 0\}$

L18 = The language of all strings containing exactly two a's.

L19 = The language of all strings containing at least two a's.

L20 = The language of all strings that do not end with ab.

L21 = The language of all strings that begin or end with aa or bb.

L22 = The language of all strings not containing the substring aa.

L23 = The language of all strings in which the number of a's is even.

L24 = The language of all strings in which both the number of a's and the number of b's are even.

L25 = The language of all strings containing no more than one occurrence of the string aa. (The aaa string contains two occurrences of aa.)

L26 = The language of all strings in which every a (if there are any) is a followed immediately by bb.

L27 = The language of all strings containing both bb and aa as substrings.

L28 = The language of all strings containing both aba and bab as substring.

Good Luck