Date Given: 20.11.2020
Due Date: 26.11.2020

QUESTIONS

1. S={ab,bb} and T={ab,bb,bbb} is given.
i) Write the set S*.
ii) Write the set T*.
iii) Is the word **bbbbababbb** an element of S*? Show your answer.
iv) Is the word **bbbaab** an element of T*? Show your answer.
v) Show (by giving examples) that S*≠T*
vi) Show (by giving examples) that S* ⊆ T*

2. Give recursive definitions for the following languages over the alphabet Σ={a,b}

i) Give a recursive definition for the language L_AA of all words containing the substring aa. (The alphabet Σ={a,b} and NULL **is not** an element in L_AA.) Then, prove that **baabb** is a word in the language L_AA.

ii) Give a recursive definition for the language L_NOTAA of all words not containing the substring aa. (The alphabet Σ={a,b} and NULL is an element in L_NOTAA). Then, prove that **babab** is a word in the language L_NOTAA.

3. Construct a regular expression for each of the languages given below (The alphabet Σ={a,b}).

i) All words in which a appears tripled, if at all. This means that every clump of a 's contains 3 or 6 or 9 or 12 . . . a 's.

ii) All words that contain exactly two b 's or exactly three b 's, not more.

iii) All strings in which any b's that occur are found in clumps of an odd number at a time, such as abaabbbab.

iv) Describe in English phrases the language defined by the regular expression
 (a + b)*a(Λ+ bbbb)

v) Describe in English phrases the language defined by the regular expression
 b*ab*(ab*ab*)*

Evaluation : Q1)30 pts   Q2)20 pts   Q3)50 pts