Birla Institute of Technology and Science, Pilani

CS F351 (Theory of Computation)

Quiz-1

September 07, 2020 **Time: 10 Mins** **MM: 5**

Q1. Over Σ = {a, b}, let L = {w | w contains at least two adjacent a's and atleast two adjacent b's}. Which of the following regular expression(s) accept L?

(a+b)*aabb(a+b)* + (a+b)*bbaa(a+b)* [cannot accept aababb]

(a+b)*aa(a+b)* + (a+b)*bb(a+b)* [accepts string aa, which should not be in the language]

(a+b)* (aa(a+b)*bb + bb(a+b)*aa) (a+b)* [Correct answer]

aa(a+b)*bb + bb(a+b)*aa [cannot accept abaabb]

Q2. Over Σ = {0, 1}, the length of the smallest string not present in the language for the regular expression **0*1*(10)*0*** is

a) 2

b) 3

c) 4

d) 5

[Ans: Smallest string not present is 101, which makes length =3]

Q3. Over Σ = {0, 1}, let L = {w | w has even number of 1's}. Which of the following regular expression(s) accept L?

a) (0*10*1)* [Cannot accept the string 110]
b) 0*(10*10*)* [correct answer]
c) (0 + 10*10*)* **[correct answer]**
d) 0*1(10*1)*10* [Cannot accept empty string]

Q4 Consider the following two regular languages over Σ = {a, b}: L1=(ba)*ab and L2=ba*b*.

How many states would be there in the DFA for the language L = L1∩L2

a) 4

b) 5

c) 6 [Correct answer; because L = {baab} and we require 6 states for the DFA, including trap]

d) None of the options given here.

Q5. If M = (Q, Σ, □, q_0, F) is an NFA and F = Q then L(M) = Σ*. This statement is

a) True

b) False [Correct answer]