

National University of Computer and Emerging Sciences, Lahore Campus



Course: Theory of Automata
Program: BS(Computer Science)
Duration: 1 Hour
Paper Date: 20-09-17
Section: A, B, C, D, E, F
Exam: Mid 1

Course Code: CS-301
Semester: Fall 2017
Total Marks: 30
Weight: 17.5%
Page(s): 6
Reg. No:
Section:

- Instruction/Notes:
- All the questions are to be attempted on this question paper in given space
 - You can use rough sheet but answers and working should be shown on this question paper.
 - Don't attach any extra sheet

Question 1 (10 points):

Given NFA in figure 1, create a state diagram of corresponding DFA. Your state diagram should clearly show all 5 attributes of DFA i.e. $\{Q, \Sigma, q_0, A, \delta\}$

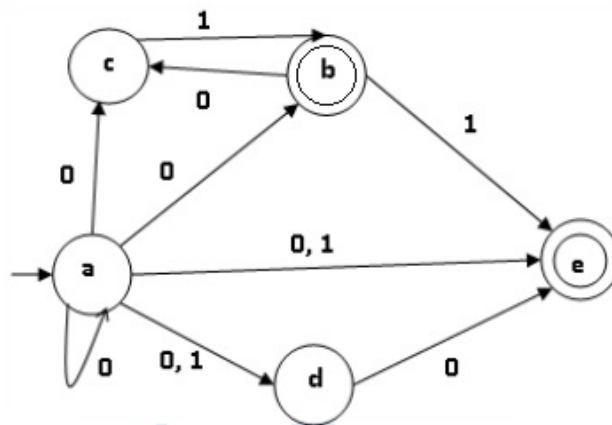


Figure 1 NFA

Question 2: (10 points)

Given a DFA M_1 of language L_1 as $\{Q_1, \Sigma_1, q_1, \delta_1, A_1\}$

Define FA N_1 of L_1^R in terms of M_1 .

Here L^R mean reverse of language L , for example if L is $\{a,b\}^*.b.a$ then L^R is $a.b.\{a,b\}^*$

***Note1:** You have to give generic Definition not an example.*

***Note2:** A_1 is a set of zero or more final states.*

***Hint:** N_1 might be NFA-null.*

Question 3: (10 points)

While writing a paragraph in English language certain rules of grammar are to be followed. Some of these rules are given below

- Each paragraph should contain one or more sentence.
- Each sentence should begin with Capital alphabets.
- Each sentence should contain one or more alphabets.
- Each sentence should end with period (.) or question marks (?) punctuations.
- Each punctuation should be followed by a space (_)
- Space (_) should NOT come before any punctuation.
- Paragraph cannot contain more than one space (_) consecutively.
- No two punctuation will occur consecutively.

Create a DFA of GRAMMAR CHECKER that accepts paragraph if all of the above rules are followed otherwise it rejects the paragraph. Your DFA should clearly show all 5 attributes $\{Q, \Sigma, q_0, A, \delta\}$.

Notes:

1. You don't need to check any rule other than the ones given above
2. The givens rules are just subset of English grammar rules. We are not checking spelling or sentence structures here.
3. You can take any *valid* assumption.
4. There is no restriction on length of paragraph or sentence.

