BITS Pilani, Dubai Campus

Dubai International Academic City, Dubai

I Semester 2012-13

Course	:	**CS C351 Theory of Computation**
Year	:	**III Year Computer Science**
Component	:	**Test – 1**
Date & Duration	:	**11-10-12 & 50 mins**
Weightage (Max. Marks)	:	**25 % (25 Marks)**
Nos. of Pages	:	**2 Pages**
Nature of Component	:	**Closed Book**

Note: Answer All Questions. Construct a neat design and do not overwrite.

1. Design a *Finite State Automaton* for the On-line Airline Reservation system the designer has to consider all possible events / actions / cases in the design and the problem of statement is as follows: "*Mr / Ms XYZ* planning to go attend a conference scheduled in France during the month of November 2012. He / She has to book the air ticket either by entering into the airlines home page of his / her wish or by checking the cheapest Air fare available using the third party agent by entering into their web site. Normally, the web site will provide options to the end user to select their travel type like he / she can select Non-stop flight / one-stop flight. Once the end user pressed search button, the web site start searching for the flight as per the end user requirement (direct / one-stop flight) and after a fraction of time it will give all possible combination of flights and their cheapest fare. Then the end user follow the steps to book the tickets by doing it online activities like selecting the date of travel and return, number of tickets as per the passengers details (adults, children & infants). Once, the passenger's details are entered into the systems the next phase payment phase starts which will be taken care by the Agent domain which acts as a mediator between the end user, bank and the air line system. Before starting the payment process the end user has to check whether the web page is a secured page or not by checking at the URL which start with https://www.purchaseprocess.com, once they confirmed that it is secured site the end user are advised to do the following process like he / she has to select the type of card they are going to use for the payment either Visa card or

Master Card for purchasing their tickets and the next step they will enters their credit card details like card number, four digit security number and the card expiry date and year. Once the payment is done you can notice that you will be directed to airline web site and to print the ticket and a copy of the ticket will be email to the email address provided by the end user. There are some end users who may not know the airlines domain names, they may use Google / AOL / other search engines to locate their web site and start the above process for booking their air tickets. If any other events and actions are missed in the problem description the designer has to use his / her creative ideas to bring them into the design.

(9 Marks)

2. Give the Finite state automaton for the following regular expression:

(5 Marks)

$$((0 + 1)^* 10 + (00)^* (11)^*)^*$$

3. Construct a minimized finite state automaton for the given transition mapping table. Before start minimizing the finite states draw the actual transition diagram and give both machines formal definition. (7 Marks)

States	Inputs	
	a	b
→1*	3	2
2	4	1
3	5	4
4	4	4
5*	3	2

4. Draw Deterministic Finite Automata to accept the following sets of strings over the alphabet {0,1}: (4 Marks)

a) All strings containing exactly 4 "0"s using 6 states.

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Course	:	**CS C351 THEORY OF COMPUTATION**
Year	:	III Year Computer Science
Component	:	QUIZ 2
Date	:	30-10-2012
Weightage	:	7 % (7 Marks)
Duration	:	20 mins
No. of Pages	:	2 Pages

Version : B

Name: _____

Id.No.: _____

Note:-
1. Answer all the Questions and give the proper assumption wherever required .

1. What is the language generated by G = ({a, b, X, T, F, e}, {a, b}, R, X) if R is altered to:
   X → T, X → bXb , T → aT, T → e. (2 Marks)

2. Make a grammar that generates the language L= { $a^m b^{2n}$ | m, n >= 0 }and also give the definition of generated grammar. (2 Marks)

3. Let G = ({ a,b,c, N }, { a, b, c }, P, N,), where P consists of

N → abN | bcN | bbN | a | cb . Check whether the strings are accepted by the given grammar or not?

i) bcbbacbba ii) bcabbbbbcb (3 Marks)

B

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Course: **CS C351 Theory of Computation** Date: **25-09-2012**
Year: **III Year CS** Duration: **20 mins** **Quiz – I** Max. Marks: 8 Marks

Name: _____ **Id. No.:** _____

1. Construct a NFA for the language 0*1*0*0*. (3 states) (2 Marks)

2. Give the formal definition for NDFA and DFA and how do they differ each other? (½ Mark)

3. Draw Deterministic Finite Automata to accept the following sets of strings over the alphabet {0,1}:

(i) All strings that don't contain the substring 110. (4 states) (2 Marks)

(ii) All strings whose binary interpretation is divisible by 5. (5 states). (2 Marks)

(iii) All strings that start with 1 and has odd length or start with 0 and has even length.

(3 states)
(1½ Marks)