Green University of Bangladesh

Department of Computer Science and Engineering(CSE)

Semester: (Summer, Year:2021), B.Sc. in CSE (Day)

Midterm Assessment (Assignment) with rubrics, Fall 2021

Course Title: Compiler
Course Code: CSE 305 Section:193D

Student Details

Name	ID
Jakirul Islam	193002101

Submission Date : 18.11.2021
Course Teacher's Name : Atik Ahamed

Status
Marks: ..... Signature:.....
Comments:..... Date:.....
...

Ans to the Q.no: 1 (A)

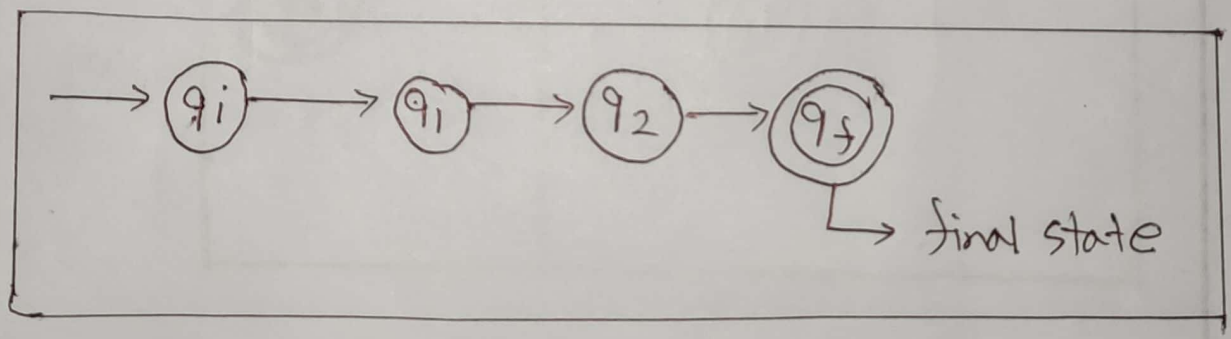
Regular expression = $(a+b).(a+b).(a+b)$

I have written $(a+b)$ three times because length of string is exactly three.

$L = \{aaa, aba, baa, bba, aab, abb, bab, bbb\} = (a+b)(a+b)(a+b)$

Ans to the Q.no: 1 (B)

NFA for regular expression = $(a+b)(a+b)(a+b)$



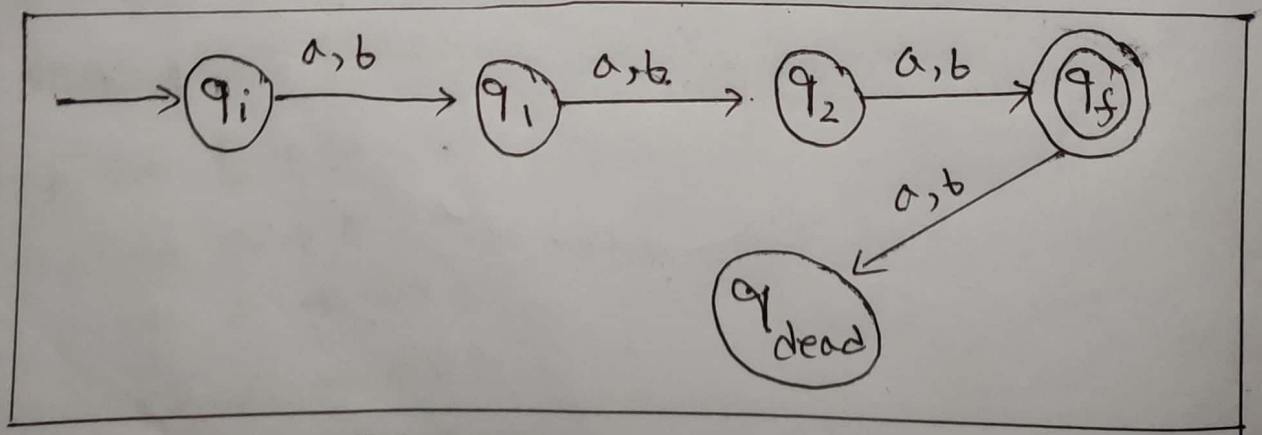
NFA Diagram

This diagram is NFA because no set of Alphabets mentioned at (q_f) state. If at (q_f) it gets any input.

Ans to the Q.no: 1 (c)

Transform NFA to DFA

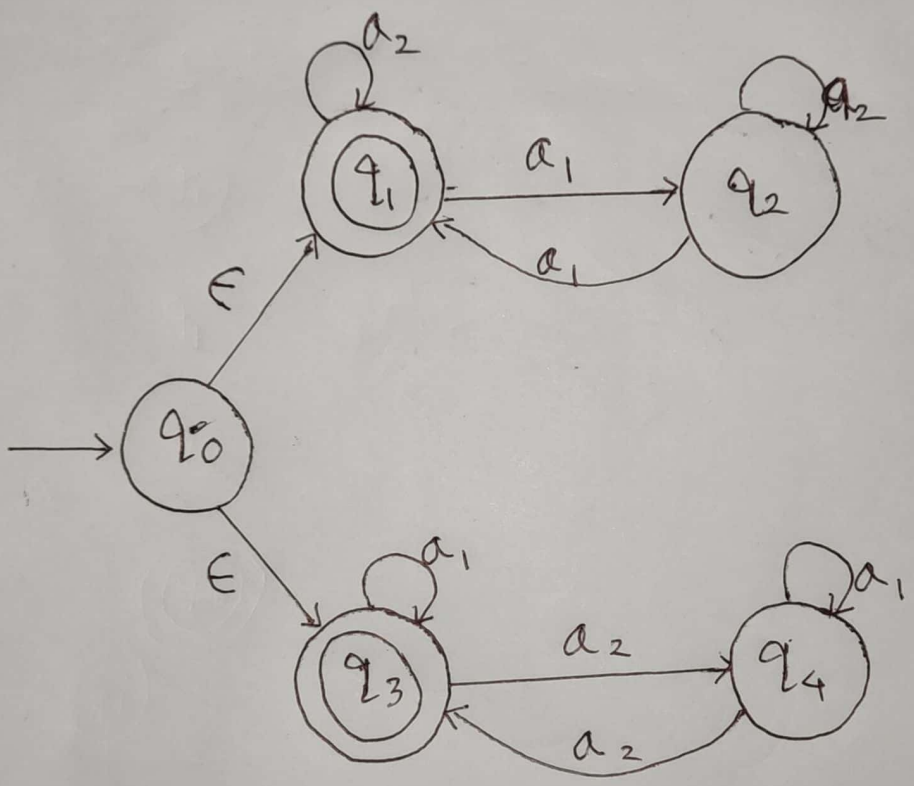
State	Inputs	
	a	b
→ (q_i)	q_1	q_1
q_1	q_2	q_2
q_2	q_f	q_f
(q_f)	q_{dead}	q_{dead} ↑ dead state



DFA Diagram

Ans to the Q.no: 2(A)

Given the NFA diagram, we convert it to DFA



The state table of given NFA-ϵ is:

	a_1	a_2
$\rightarrow q_0$	—	—
q_1^*	q_2	q_1
q_2	q_1	q_2
q_3^*	q_3	q_4
q_4	q_4	q_3

Identify the initial state. Here it is q_0

Take epsilon closure i.e. from that state see the ϵ moves of initial state, $\epsilon(q_0) = \{q_0, q_1, q_3\}$

now (q_0, q_1, q_3) will be initial state in the DFA

now find epsilon closure of all states:-

$\epsilon(q0) = \{q0, q1, q3\}$

$\epsilon(q1) = \{q1\}$

$\epsilon(q2) = \{q2\}$

$\epsilon(q3) = \{q3\}$

$\epsilon(q4) = \{q4\}$

To make state table of DFA, start with initial state $q0q1q3$ and find transition state for all inputs: $\{q0q1q3, a1\} = \{q0, a1\} \cup \{a1, a1\} \cup \{q3, a1\}$

$= q2q3$

now find $\epsilon\{q2q3\} = \{q2q3\}$

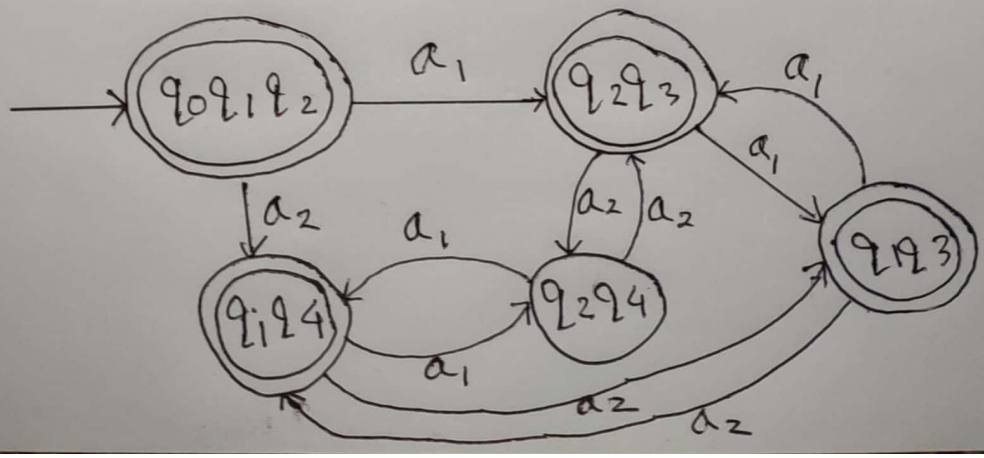
Hence in DFA table, $\{q0q1q3, a1\}$ will be $q2q3$

Likewise we will find transition state for all and the table will be as follow:

	a_1	a_2
$q_0q_1q_3^*$	q_2q_3	q_1q_4
$q_2q_3^*$	q_1q_3	q_2q_4
$q_1q_4^*$	q_2q_4	q_1q_3
$q_1q_3^*$	q_2q_3	q_1q_4
q_2q_4	q_1q_4	q_2q_3

the find states of NFA $-\epsilon$ will be final states in the DFA.

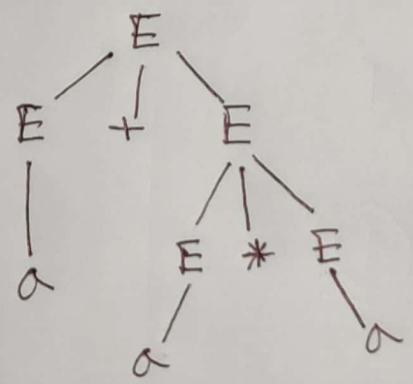
the DFA will be as follow:



Ans to the Q.no: 2(B)

i) A grammar is said to be ambiguous, if more than one derivation is possible for a string, with the given grammar.

ii)



$E \rightarrow E + E$
$\rightarrow a + E$
$\rightarrow a + E * E$
$\rightarrow a + a * E$
$\rightarrow a + a * a$

Given grammar is ambiguous, because more than one derivation possible.

$E \rightarrow E + E$
$\rightarrow a + E$
$\rightarrow a + E * E$
$\rightarrow a + a * E$
$\rightarrow a + a * a$

$E \rightarrow E * E$
$\rightarrow E + E * E$
$\rightarrow a + E * E$
$\rightarrow a + a * E$
$\rightarrow a + a * a$