AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH
Faculty of Science & Information Technology
Department of Computer Science SET C
CSC 3220 Compiler Design

Assignment-Final Summer 2020-2021

Total Marks: 20 Faculty: Nazia Hossain

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1	Construct DFA for following languages where alphabet is {0, 1}. i. {w| w starts with a 11 and ends with 1}	10
	Steps to answer the question: Step-1: based on the language description prepare the regular expression. Step-2: based on the regular expression construct the corresponding NFA using Thompson's construction method. Step-3: Using Subset Construction method draw the respective DFA	
2	Using the following context free grammar check this input string **a*b+** whether it is syntactically correct or not and why? S → TS' S' → *TS' | +TS'| ∈ T → a | b	10

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Assignment → Compiler
Sec(H)

Answer to the Qs no: 1

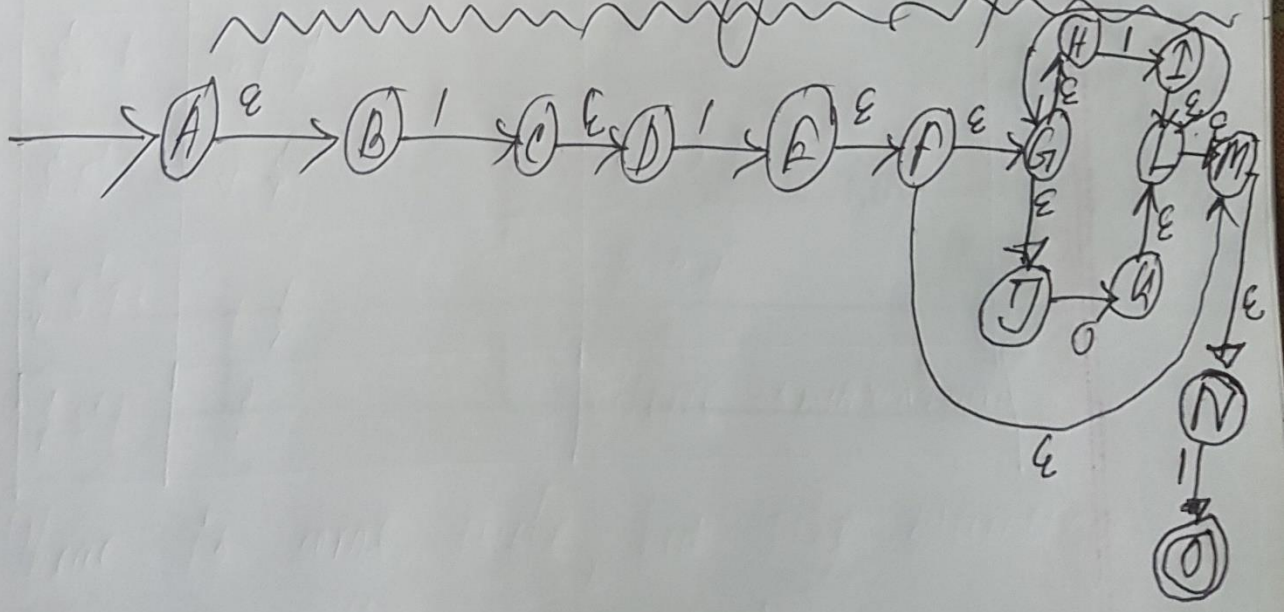
(Step:1)

Language = {w | w starts with 1 and ends with 1}

Regular expression = 1(0+1)*1

(Step:2)

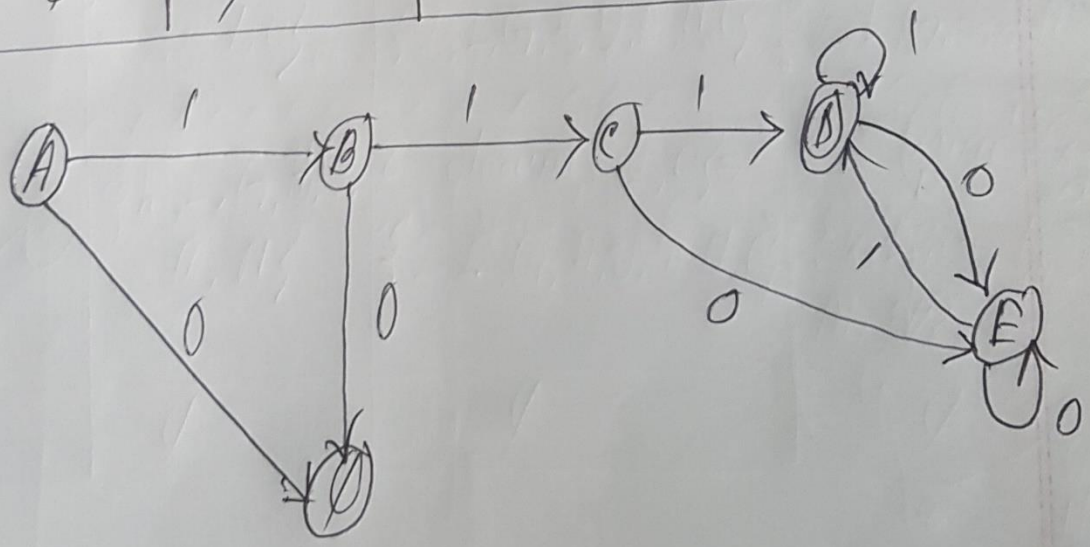
NFA using Thompson Construction Method based on regular expression



Step-3

DFA states	NFA states	1	0
→ A	→ {A, B}	ε closure {C} = {C, D}	ε closure {∅} = ∅
B	{D, C}	ε closure {E} = {E, F, G, H, I, J, M, N}	ε closure {∅} = ∅
C	{E, F, G, H, I, J, M, N}	ε closure {I, O} = {I, L, G, H, I, J, M, N, O}	ε closure {K} = {K, L, G, H, I, J, M, N}
(D)	{I, L, G, H, I, J, M, N, O}	ε closure {I, O} = {I, L, G, H, I, J, M, N, O}	ε closure {K} = {K, L, G, H, I, J, M, N}
F	{K, L, G, H, I, J, M, N}	ε closure {I, O} = {I, L, G, H, I, J, M, N, O}	ε closure {K} = {K, L, G, H, I, J, M, N}
∅	∅	∅	∅

State	1	0
→ A	B	∅
B	C	∅
C	D	E
(D)	D	E
E	D	E
∅	∅	∅



Ans: to the question no: 2

First Follow

Rules	First	Follow
$S \rightarrow TS'$	{a, b}	{$}
$S' \rightarrow *TS' / +TS' / \epsilon$	{*, +, E}	{$}
$T \rightarrow a / b$	{a, b}	{*, +, $}

LL(1) Parsing Table :-

	Terminal				
	a	b	*	+	$
S	$S \rightarrow TS'$	$S \rightarrow TS'$			
S'			$S' \rightarrow *TS'$	$S' \rightarrow +TS'$	$S' \rightarrow E$
T	$T \rightarrow a$	$T \rightarrow b$			

Input = a * b +

Stack	Input Buffer	Rule
$S	a*b+$	S → TS'
$S'T	a*b+$	T → a
$S'a	a*b+$	Pop a
$S'	*b+$	S' → *TS'
$S'T*	*b+$	pop b+
$S'T	b+$	T → b
$S'b	b+$	pop b
$S'	+$	S' → +TS'
$S'T+	+$	pop +
$S'T	$	Here is syntax error

There is some rule, but the starting is empty. So the starting is syntactically error.