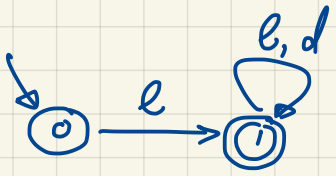
A1 - sol.

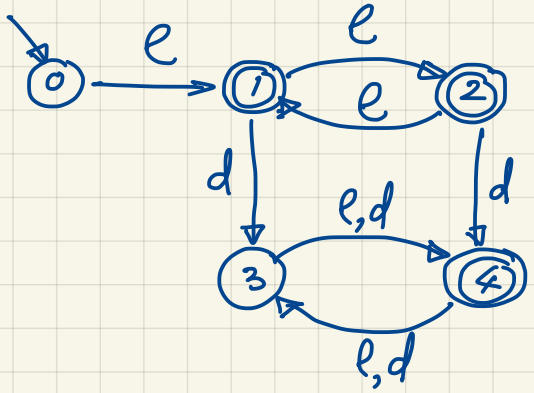
① $\#(non\text{-}\backslash n)^*\backslash n + """((non\text{-}")^* + "(non\text{-}")^+ + ""(non\text{-}")^+)^* """$

② (a)

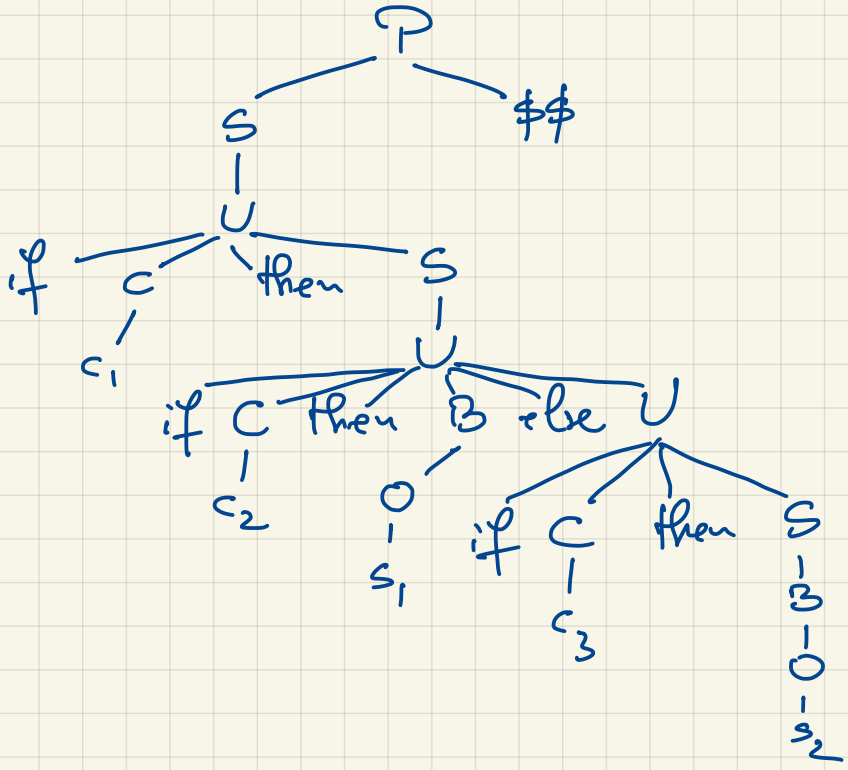


l = letter, d = digit

(b)



③ (a)



(b)

X	FIRST(X)	FOLLOW(X)
P	if, s_i	
S	if, s_i	$$
B	if, s_i	else, $$
U	if	$$
C	c_i	then
O	s_i	else, $$

P	PREDICT(P)
1	if, s_i
2	if, s_i
3	if
4	if
5	s_i
6	if
7	if
8	c_i
9	s_i

(c) G is not LL(1) because productions 2 and 3 have the same LHS and if ∈ PREDICT(2) ∩ PREDICT(3). Productions 6 and 7 also have if ∈ PREDICT(6) ∩ PREDICT(7).

(d) Productions 6 and 7 have a common prefix and we try to solve it by left factoring:

$U \rightarrow$ if C then X

$X \rightarrow S \mid B$ else U

Productions 2 and 3 have no explicit common prefix, but an implicit one: if C then. We try to solve this one:

$S \rightarrow$ if C then Y

$Y \rightarrow B$ else B

$Y \rightarrow X$

(e) Neither attempt above resolves the conflict. The problem is that if ∈ FIRST(S) ∩ FIRST(B) ∩ FIRST(U) ∩ FIRST(X) ∩ FIRST(Y)

As long as we have two productions by the same nonterminal that start with nonterminals from {S, B, U, X, Y}, we'll have the same conflict.