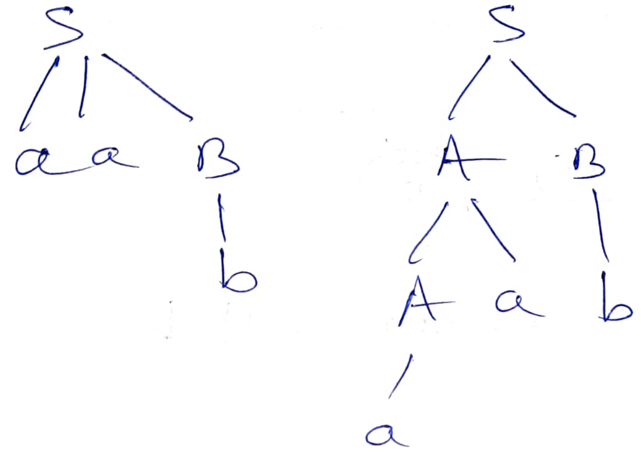
Eliminating Ambiguity from the Grammar

Ex-1 $S \rightarrow AB \mid aaB$

$A \rightarrow a \mid Aa$

$B \rightarrow b$



$W = aab$

If for a string, I will get two or more parse tree or derivation tree, it is called Ambiguous grammar.

Unambiguous grammar will be

$S \rightarrow AB$

$A \rightarrow a \mid Aa$

$B \rightarrow b$

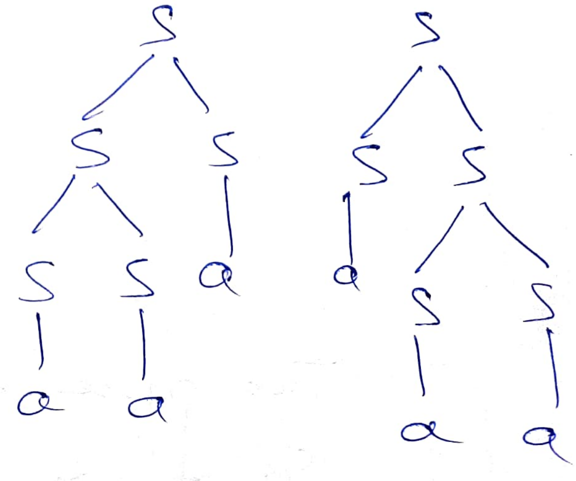
Q-2 $S \rightarrow SS \mid a \mid b$

For the string

$w = aaa$

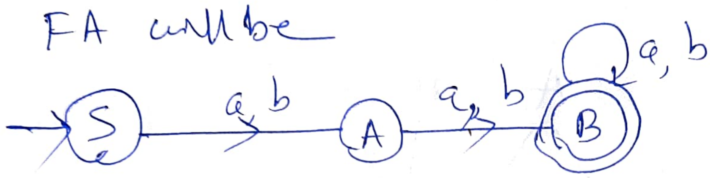
for the string aaa, we have two parse tree.

So this grammar is ambiguous grammar



unambiguous grammar will be
Language generated by this grammar will be
$L(G) = L((a+b)^2 (a+b)^*)$
$L = \{aa, ab, ba, bb, aaa - - - - \}$
two or more

FA will be



Right linear grammar will be

$S \to aA \mid bA$

$A \to aB \mid bB$

$B \to aB \mid bB \mid \lambda$

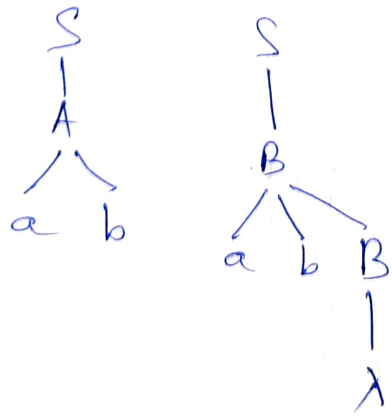
This is the grammar which is unambiguous.

Q-3 $S \to A \mid B$

$A \to aAb \mid ab$

$B \to abB \mid \lambda$

$W = ab$



Two parse trees are generated.

So it is a Ambiguous grammar.

Language generated by grammar.

ababab

$L(G) = \{a^n b^n : n \geq 1\} \cup \{(ab)^m : m \geq 0\}$

$L = \{ab, a^2b^2, a^3b^3 - - - - \} \cup \{\lambda, ab, (ab)^2, (ab)^3\} - -$

$S \rightarrow A \mid B$

$A \rightarrow aAb \mid aabb$

$B \rightarrow abB \mid \lambda$

Q-4 $S \rightarrow S\#S \mid S@S \mid a$

given that # is right associative

@ left associative and

the precedence of # > @

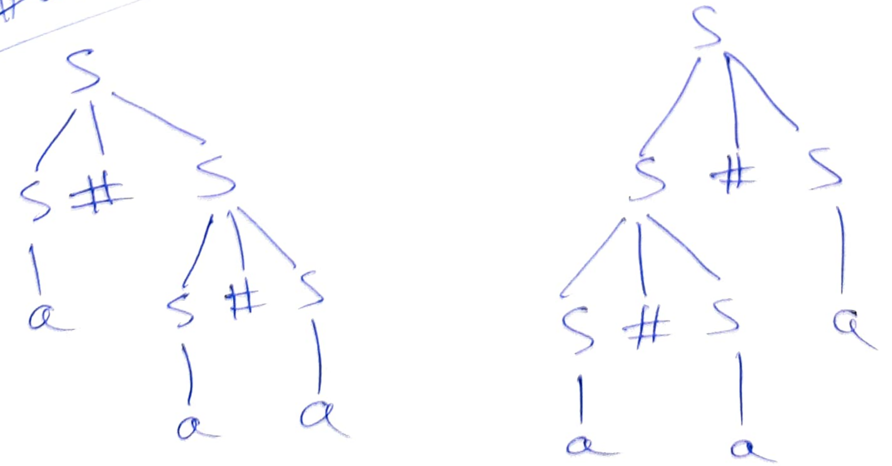
unambiguous grammar

$S \rightarrow S@T \mid T$ — @ is lower precedence and left associative → solved first

$T \rightarrow P\#T \mid P$ → # is higher precedence and right associative

$P \rightarrow a$

string is a#a#a



Ambiguous grammar.

Closure properties of Context Free Language

① The intersection of two context Free languages is not Context Free.

② The Complement of CFL is not closed.

③ The intersection of a CFL and regular language is Context Free.

Ex $L_1 = \{a^n b^m c^m : n \geq 0, m \geq 0\}$

$L_2 = a^m b^n c^n : n \geq 0, m \geq 0\}$

For L_1, the grammar will be

$S \rightarrow AB$

$A \rightarrow aA \mid \lambda$

$B \rightarrow bBc \mid \lambda$