CS & IT ENGINEERING



DPP 01 Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion



Consider the following grammar:



 $S \rightarrow abSba|bSb|aba|a|b| \in$

What is the language generated by above grammar?



CFG that generates all palindromes over alphabet (a, b).



CFG that generates all palindromes over alphabet (a, b) that do not contain substring "ab".



CFG that generates all palindromes over alphabet (a, b) that contain substring "aa".



CFG that generates all palindromes over alphabet (a, b) that do not contain substring "aa".

Q.2

Consider the following grammars:



G₁:
$$S \to aSc \mid \$B$$
 G₂: $S \to aaScc \mid \$B$ G₃: $S \to aSc \mid \$B$
 $B \to bBc \mid \$ \to bBc \mid \$ \to bBc \mid \$ \to bbBcc \mid \$$

Which of the following is true regarding G₁, G₂ and G₃?

A.
$$L(G_1) \subset L(G_2), L(G_2) \subseteq L(G_3)$$

B.
$$L(G_2) \subseteq L(G_3), L(G_1) \subseteq L(G_3)$$

$$L(G_1) \subseteq L(G_3), L(G_3) \subseteq L(G_2)$$

L(G₂)
$$\subseteq$$
 L(G₁), L(G₃) \subseteq L(G₁)

Consider the following context free grammar:



$$S \rightarrow aA \mid aBB$$

 $A \rightarrow aaA \mid \in$
 $B \rightarrow bB \mid bbC$
 $C \rightarrow B$

context free grammar:
$$\begin{array}{c|c}
S \rightarrow \alpha A & BB \\
A \rightarrow$$

What will be the equivalent simplified CFG for the given grammar?

A.
$$S \rightarrow aA \mid a$$

 $A \rightarrow aaA \mid aa \mid b$

B.
$$S \rightarrow aA \mid a$$

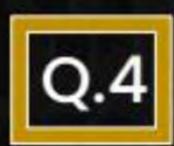
 $A \rightarrow aaA \mid aa$

C.
$$S \rightarrow aAa \mid B$$

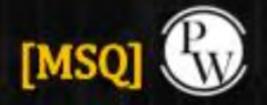
 $A \rightarrow aaA \mid aa$
 $B \rightarrow bB \mid bb$

D.
$$S \rightarrow aAa \mid B$$

 $A \rightarrow aA \mid b$
 $B \rightarrow bB \mid bb \mid a$



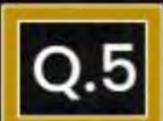
Consider the following grammar:



$$S \rightarrow AB$$
 $A \rightarrow BaB \mid a$
 $B \rightarrow bbA$

Which of the following is true regarding given grammar?

- A. Every string of the above grammar have at least two a's.
- B. Every string have three consecutive a's.
- C. Every string have alternate a and b.
- Every string have b's in multiple of 2.



Consider the following grammar G:



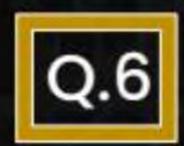
$$S \rightarrow XA \mid BB$$

$$B \rightarrow b \mid SB$$

$$X \rightarrow b$$

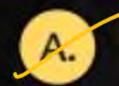
$$A \rightarrow a$$

After converting above grammar into GNF how many productions are there in the grammar?



Which of the following is true





A grammar is called ambiguous if

(No. of parse tree's = No. of left most derivation = Number of Right most derivation) > 1



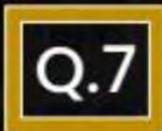
Production of the form $A \rightarrow a$ is known as unit production.



CNF is also known as binary standard form,



In left-most derivation, right most non-terminal is substituted with its production to derive a string.



Given the following two grammars:



$$G_1: S \rightarrow AB \mid aaB$$

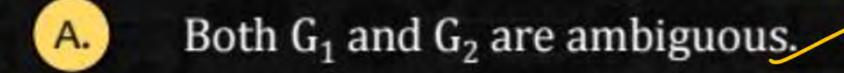
$$A \rightarrow a \mid Aa$$

$$B \rightarrow b$$

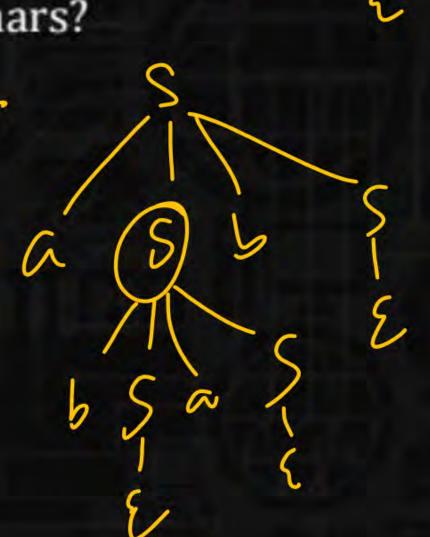
abab

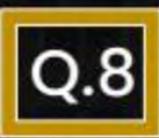
 $G_2: S \rightarrow \underline{aSbS} \mid bSaS \mid \in$

What is true regarding above grammars?



- B. Both G₁ and G₂ are unambiguous.
- Only G₁ is ambiguous.
- Only G₁ is unambiguous.





Consider the following languages



$$\begin{split} L_1 &= \{a^n \, b^{n+m} \, c^m \, | \, n, \, m \geq 0\} \ = \ a^n \, b^m \, c^m + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0\} \ = \ a^n \, b^n \, c^p + q \, | \, p, \, q \geq 0$$

- A. Only L_1 is Regular.
- B. Only L₂ is Regular.
- Both L₁ and L₂ are Regular.
- D. None of these



