

subject: \_\_\_\_\_

Context free Grammar

Explain the following terms

LMD

RMD

Derivation tree

ambiguity

$$A \rightarrow \alpha A$$
$$a \in T, \alpha \in V^{-1}$$

--- -2

(S-grammar) Simple grammar

$$L = \{a^n b^n \mid n \geq 1\}$$

$$S \rightarrow aSb \mid ab$$

$$S \rightarrow aA$$

①

$$A \rightarrow aAB \mid b$$

$$B \rightarrow b$$

$$① S \rightarrow aA$$

$$② \xrightarrow{*} aa^{n-1} AB^{n-1}$$
$$\xrightarrow{*} a^n b B^{n-1}$$

$$③ \xrightarrow{*} a^n b^n$$

Explain the following terms (S-grammar)

LMD

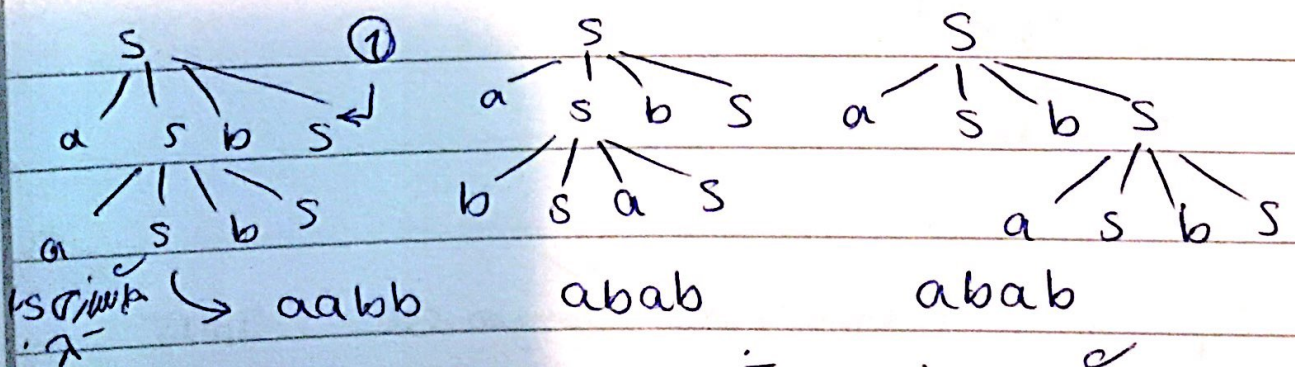
$G = (V, T, P, S)$

$$|P| = |T| \times |V|$$

2,145  $\frac{1}{100}$  = 21.45 (Percent) (Percentage) 21.45

[illegible]

13/145  
 1.  $S \rightarrow aSbS \mid bSaS$   
 $L = \{w \mid w \in \{a, b\}^*, n_a(w) = n_b(w)\}$



$S \rightarrow aSbSa$

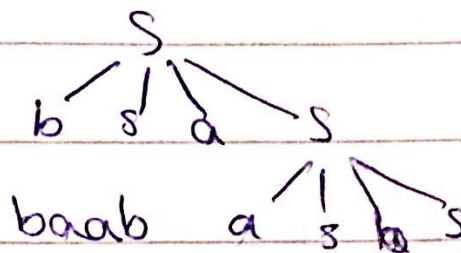
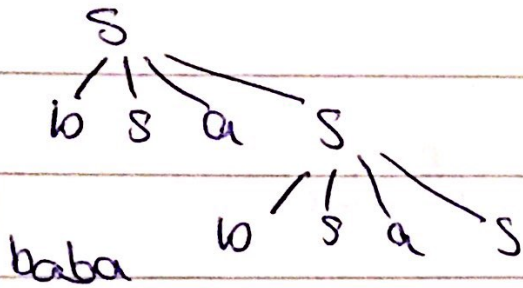
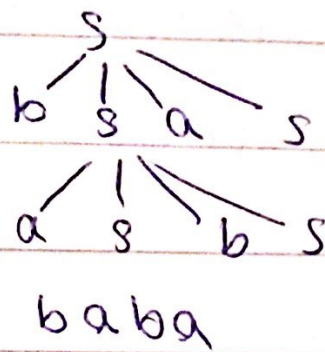
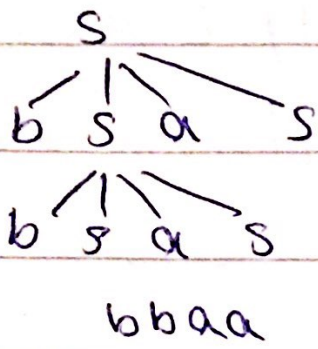
Diagram illustrating the derivation of the string "abba":

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graph TD; S1[S] --- a1[a]; S1 --- S2[S]; S1 --- b[b]; S1 --- S3[S]; S3 --- b2[b]; S3 --- S4[S]; S3 --- a2[a]; S3 --- S5[S]; S5 --- a3[a]
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The final string derived is "abba".

(2)  $\frac{1}{\sqrt{e}} \approx 0.6065$





$$\frac{4!}{2!2!} = 5$$

$$\frac{5!}{3!2!} = 10$$

مکمل 5 = 5

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$$(a+b)^* \equiv a^*(b+a)^*(a^*b^*)(a+b)^*$$

$$15 \leftarrow 4 \quad 8 \leftarrow 3 \quad 2 \leftarrow 1 \quad 1 \leftarrow 0$$

$$0 \rightarrow 0$$

$$1 \rightarrow 1 \quad 2 \rightarrow 2 \quad 3 \rightarrow 4 \quad 4 \rightarrow 8$$

$$\Rightarrow 15$$

$$L_1 = \{w \mid w = ay, ay \in (a,b)^*, |w| = |y|\} \text{ zigzag}$$

$$L_2 = \{w \mid w = ay, ay \in (a,b)^*, n=y\} \text{ zigzag}$$

$$1) (L_2 L_2^*) = L_2 \text{ zig}$$

$$2) L_1 L_1^R = L_1 \text{ zig}$$

$$3) L_1 \cap L_1^R = L_2 \text{ zig}$$

$$L_2^R = L_2$$

$$4) (L_2 \cap L_1)^R = L_2 \text{ zig}$$

$$5) L_2 L_2 = L_2^R \text{ zig}$$

$$6) L_1 \cap L_2^R = L_2 \text{ zig}$$

$$7) L_2 \cap L_1 = L_2^R \text{ zig}$$

$$8) L_2^R L_1^R = (L_1 \cap L_2)^R \text{ zig}$$

a	x	v	v
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$v = a$   
نشان

$$\text{Tail}(L) = \{w \mid yx \in L \text{ for some } y \in \Sigma^*\}$$

$$L_1 = \{0, 1, 01\} \quad L_2 = \{0, 1, 10\}$$

$$\text{Tail}(L_1) = L_1$$

$$\text{Tail}(L_2) = L_2$$

$$\text{Tail}(L_2) = \text{Tail}(\text{Tail}(L_2)) \text{ zig}$$

$$\text{Tail}(L_1) = \text{Tail}(\text{Tail}(L_1)) \text{ zig}$$

$$L_2 \subset \text{tail}(L_2) \text{ zig}$$