CS & IT ENGINEERING



DPP 10 Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion

Q.1

Consider alphabet $\Sigma = \{a, b\}$, the empty string \in and the set of strings S, \bigcup P, Q and R generated by the corresponding non-terminals of a regular grammar. S, P, Q and R related as follows (S is a start symbol): [MCQ]

ap
$$S \rightarrow \widehat{aP} | \underline{bQ} | \in$$
 $AbR \qquad P \rightarrow \widehat{bR} | aS$
 $AbaO \qquad Q \rightarrow aR | \widehat{bS}$
 $AbaO \qquad R \rightarrow \underline{aQ} | \underline{bP}$

- A. $L = \{w: n_a(w) \text{ and } n_b(w) \text{ both are even} \}$
- B. $L = \{w: n_a(w) \text{ and } n_b(w) \text{ both are odd}\}.$
- C. $L = \{w: n_a(w) \text{ or } n_b(w) \text{ are even}\}.$
- D. None of these.

Consider the following language L on alphabet

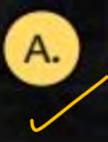


$$\Sigma = \{a, b\}$$

$$\sum = \{a, b\}$$

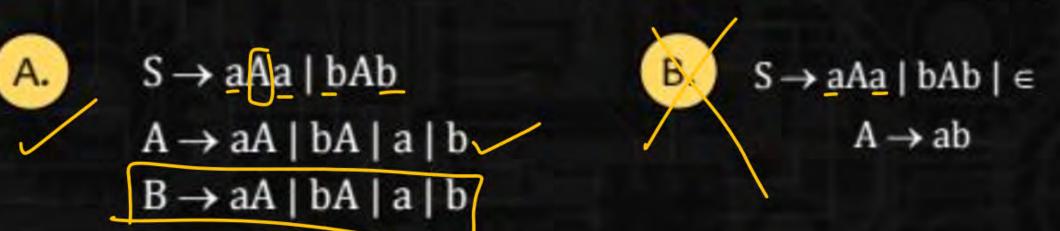
$$L = \{wxw^{R} \mid w, x \in \{a, b\}^{+}\} = \alpha x \alpha + b x b = \alpha (\alpha + b) \alpha + L(\alpha + b) b$$

The correct regular grammar of above language is/are possible?



$$S \rightarrow \underline{aAa} \mid \underline{bAb}$$

 $A \rightarrow aA \mid \underline{bA} \mid \underline{a} \mid \underline{b}$
 $B \rightarrow aA \mid \underline{bA} \mid \underline{a} \mid \underline{b}$

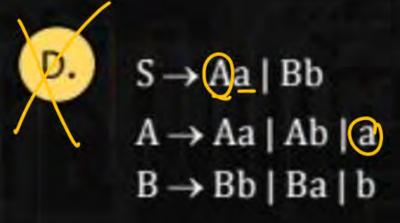


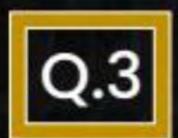


$$S \rightarrow \underline{a}A \mid bB$$

$$A \rightarrow aA \mid bA \mid \underline{a}$$

$$B \rightarrow bB \mid aB \mid b$$





Consider the following statements:



 S_1 : If language is regular then, grammar must be regular

[MCQ]

 S_2 : If grammar is regular then, language can't be regular.

Which of the following is correct?

- A. S_1 is true.
- S_2 is true.
- Both S_1 and S_2 are true.
- D. None of these

Consider the following grammar G:



G:

$$S \rightarrow ABC$$

$$A \rightarrow aA \mid a \qquad \uparrow \qquad L = abc \stackrel{*}{\sim} = abc \stackrel{*}{\sim}$$

The language generated by above grammar is?



For language $= \{b \ a*b\}$ the minimum pumping length will be ___. [NAT]

-0 b - 0 b - 0



Consider some regular expression:



r₁: a*bb*c*(ab)*

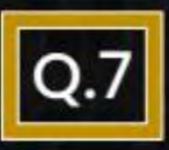
[NAT]



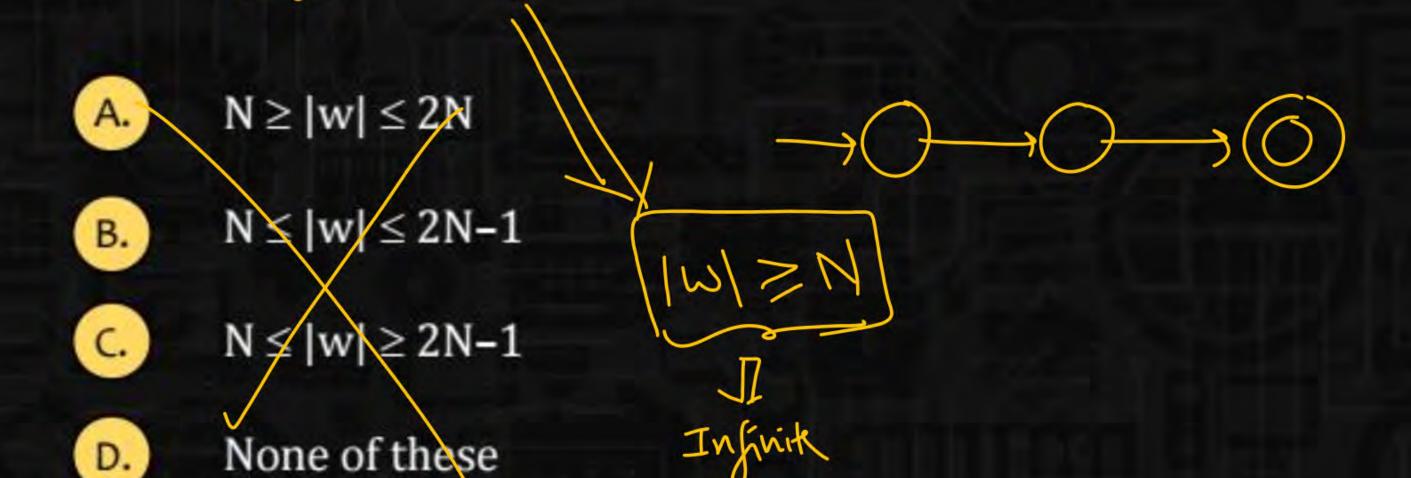
 \mathbf{r}_2 : $\mathbf{a}^*\mathbf{b}^*\mathbf{a}\mathbf{b} \cup (\mathbf{b}\mathbf{b})^*$

If minimum pumping length of r_1 is P_1 and minimum pumping of r_2 is P_2 then the value of $P_1 * P_2$ will be $\frac{6}{2}$.

3



Suppose, a language L has finite automata M with N states. The W language generated by FA is L(M) is an infinite if and only if $\exists_w \in L$ such that



Consider the following grammars G₁ and G₂:



G₁:
$$S \rightarrow aS | S | A$$

 $A \rightarrow aA | abA | \in$

Which of the following grammar is/are regular?

- A. G_1 only
- G_2 only
- C. Both G₁ only G₂
- D. None of these



