CS & IT ENGINEERING

Regular Languages & Non Regular Languages

Theory of Computation



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DPP 05 Discussion Notes



TOPICS TO BE COVERED

01 Question

02 Discussion



Which of the following language is/are regular?





$$L = \{a^mb^n \mid m \not < n \text{ and } m \not > n\}$$



$$L = \{a^nb^nc^n \mid n \ge 100\}$$



$$L = \{a^n b^n c^n \mid n \ge 100\}$$
 $L = \{a^m b^n \mid LCM(m, n) = 100\}$



L = {aaaⁿbⁿbb |
$$n \ge 1$$
}

Consider the following two language L₁ and L₂.



$$L_1 = \{www \mid w \in \{a\}^*\} = \{\varepsilon, a^3, a^6, a^7, \dots\} - (\alpha a a^8)^* - a^n$$

$$L_2 = \{\{a^{n^n}\} * | n \ge 1\} - \alpha^*$$

Which of the following is correct?

- A. $^{\circ n}$ L₁ is regular.
- B. L₂ is regular.
- C. Both L₁ and L₂ are regular.
- D. None of these.

Which of the following language is non-regular?



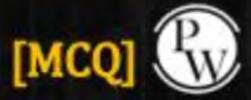
A.
$$L = \{wxw^R \mid x, w \in \{a, b\}^k\}.$$

B.
$$L = \{wxw \mid w, x \in \{a, b\}^{*}\}. \longrightarrow YG$$

L = {
$$wxwx \mid w, x \in \{a, b\}^{\dagger}$$
}. $\rightarrow non yeg$

D. None of these

Consider the following grammar G_1 and G_2 :



$$G_1: S \to aAb$$

$$A \to aB \in A \to Ab \in B$$

$$B \to Ab$$

$$G_2: S \to aABb$$

$$75$$
 $A \rightarrow aA \mid \in \Rightarrow x$

$$B \rightarrow bB \mid \in \implies \Box$$

Which of the following grammar generates a regular language?

G₁ only

G₂ only

Both G₁ and G₂

None of these

Consider the following three languages:



(3)
$$L = \{a^{n^n} | n \ge 1\} \times \{a^{m^n} | m = n^2, n \ge 1\} = \{a , \alpha, \alpha, \alpha^3, \dots \}$$
(3) $L = \{a^{m^n} | n \ge 1, m > n\}$

Total number of regular languages is/are_____.

Consider the following grammar



G:

$$G = S \rightarrow AB \mid CD$$

$$A \rightarrow aaA \mid \in$$

$$B \rightarrow bB \mid \in$$

$$C \rightarrow aaC \mid \in$$

$$D \rightarrow bD \mid \in$$

(aa)*5* + (aa)*5

The language generated by above grammar is:

A. Finite K

B. Infinite but regular

C. Non-regular

D. None of these

Which of the following language is non-regular?



$$L = \{a^{2m} \ b^n \ b^n \ | \ m, n \ge 1\} - \left\{ \begin{matrix} 2m \ b^n \\ 0 \end{matrix} \right\} \begin{matrix} m, n \ge 1 \\ - \end{matrix} \right\} \xrightarrow{gm} \left\{ \begin{matrix} 2n \\ 5 \end{matrix} \right\} \begin{matrix} m, n \ge 1 \end{matrix} \right\} \xrightarrow{gg} gg$$

$$L = \{a^m b^n X \mid m, n \ge 1, X \in \{a,b\}^*\} - \alpha^t b^t (\alpha + b)^t \longrightarrow \gamma eg$$

C.
$$L = \{\{a^{n^2}\}^* | n \ge 0\}$$
 — $(a^{n^2})^* | n \ge 0\}$ — $(a^{n^2})^* | n \ge 0\}$



None of these



