CS & IT ENGINEERING

Push Down Automata
Context Free Grammar



CFL & DCFL

DPP 04 Discussion Notes



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TOPICS TO BE COVERED

01 Question

02 Discussion



Suppose L_1 is a finite language and L_2 is non-regular language then $L_1 \cap L_2$ will be:





Regular but infinite



Non-regular



Finite and regular



None of these

Consider a languages L:



L = $\{a^{29n+9} \mid n \ge 9\}$ then total number of minimum states in DFA will be ____.

will be
$$\frac{29\times9+9}{270}$$

$$a = a$$

$$coim$$

$$L = \begin{cases} 270 & 299 \\ 271 & 5 \end{cases}$$

$$271 & 5 \end{cases}$$

$$271 & 5 \end{cases}$$



Consider the languages $L = \{ab, aa, baa\}$ which of the following strings is/are in L^* .





<u>abaabaaabaa</u> €





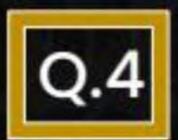
aaaabaaaa E



baaaaabaaaab 🗲 🔭



baaaaabaa E



Consider the following statements:



- All finite language are context free language (i)
- All regular language are finite.
- (iii) All DCFL are finite.
- (iv) All regular language are DCFL
- There exists some language which are finite and irregular. The number of correct statements from the above statements are



Consider the following languages.



$$L_1 = \{a^n b^n \mid n \ge 0\}$$

$$L_{2} = \{a^{n} b^{m} c^{k} \mid n, m, k \ge 0 \land n \ne m \lor m \ne k\}$$

Which of the following statements is correct?



L₁ is CFL and L₂ is DCFL



L₁ is DCFL and L₂ is CFL



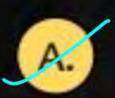
L₁ and L₂ both are DCFL

D.

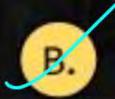
None of these.

Which of the following grammar is/are generating DCFL but not regular language?





$$S \rightarrow aa Sbb \mid \in \square \bigcirc 2^n 2^n$$

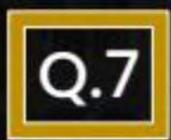


$$S \rightarrow a S bb \mid \in \implies a^{5}b^{2n}$$



$$S \rightarrow aaSb \mid \in \implies a^{2n}b^n$$

D.
$$S \rightarrow abS \mid \in \bowtie (ab)^*$$



Consider the following languages:

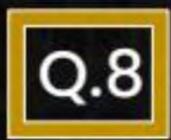


$$L_1 = \{a^m b^n c^k \mid \text{if } (m = \text{even}) \text{ then } (n = k)\}$$

$$L_2 = \{a^n \underline{c} b^n\} \cup \{a^n \underline{d} b^n\} = \alpha'(c+d)b''$$

Which of the following is correct statement?

- A. Only L₁ is DCFL.
- B. Only L₂ is DCFL.
- C. Both L₁ and L₂ are CFL but not DCFL
- Both L₁ and L₂ are DCFL but not regular.



Consider the following grammar:

$$S \rightarrow \underline{AB}$$
 $A \rightarrow a \ A \ a \ | \ b \ A \ b \ | \in$
 $B \rightarrow a \ B \ a \ | \ b \ B \ b \ | \in$
Which of the following is correct regarding

L= XXPyy x, y E { a, by }

Which of the following is correct regarding above grammar?



Language produced by S is L = $\{xx^R yy^R \mid x, y \in \{a, b\}^*\}$ and L is DCFL but not regular.

- Language produced by S is L = $\{xx^R yy^R \mid x, y \in \{a, b\}^*\}$ and L is CFL but not DCFL.
- Language produced by S is L = $\{xx^R yy^R \mid x, y \in \{a, b\}^*\}$ and L is DCFL
- None of the above.



