Problem

Let $B = \{a^i b^j c^k \mid i, j, k \geq 0 \text{ and } i = j \text{ or } i = k\}$. Prove that B is not a DCFL.

Step-by-step solution

Step 1 of 1

The following facts will be used to proof " $B = \{a^i b^j c^k \mid i, j, k \geq 0 \text{ and } i = j \text{ or } i = k\}$ is not a DCFL (Deterministic Context Free Language).

- B is context free.
- If B is deterministic context free then $\overline{B} = \{a, b, c\}^* - B$ is deterministic context free.
- $B_1 = \{a^i b^j c^k \mid i \neq j \text{ and } j \neq k\}$ is not context free .

Here, it is recorded that $\overline{B} \cap a^* b^* c^* = B_1$. **Suppose that $\overline{B}$ was a DCFL (Deterministic Context Free Language) implying that $\overline{B}$ must be a deterministic context free language.** Which in turn implies that $\overline{B}$ is a context free language (CFL). As the **intersection of a CFL and Regular Language is a CFL.** However, B_1 is not a context free language (CFL) that shows a contradiction. **Therefore, B is not Deterministic Context Free Language (DCFL)**.

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