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Q.2.2 a.

Use languages $A = \{a^m b^n c^n \mid m, n \geq 0\}$
$B = \{a^n b^n c^m \mid m, n \geq 0\}$

Language A is context free
$S \to XY, \quad X = aX \mid \varepsilon, \quad Y \to bYc \mid \varepsilon$

Language B is is context free
$S \to XY, \quad X \to aXb \mid \varepsilon, Y \to cY \mid \varepsilon$

$A \cap B = \{a^n b^n c^n \mid n \geq 0\}$, we know this is not context free from example 2.36

b. Use part a & DeMorgan to show class of context free LA is not closed under intersection

Prove by contradiction
  Assume it's true.
Assm. Context free languages are closed under complement
Assm. implies $\bar{A}$, $\bar{B}$ are context free.
We know context free langs are closed under union
so $\bar{A} \cup \bar{B}$ is context free.
Use Assm. again $\overline{\bar{A} \cup \bar{B}}$ is context free
By DeMorgan $A \cap B = \overline{\bar{A} \cup \bar{B}}$, but this contradicts example 2.36.

  Therefore assumption is wrong.