

Context Free Languages and Push Down Automata

- Context-free languages are both under **Union** operation
 - If L_1 and L_2 are CFLs, then $L_1 \cup L_2$ is a CFL
- Context-free languages are closed under **Concatenation** operation
 - If L_1 and L_2 are CFLs, then $L_1 L_2$ is a CFL
- Context-free languages are *not* closed under **Intersection**
 - If L_1 and L_2 are CFLs, then $L_1 \cap L_2$ *may not* be a CFL
- If G is a CFG and w is a string of length n in $L(G)$, then the derivation of w in G , if G is in Chomsky Normal Form will have $2n - 1$ steps
- Context-free languages are closed under **Kleen Star**
 - If L_1 is CFL, then L_1^* is a CFL
- $L = \{a^n b^n a^n \mid n \geq 0\}$ is *not* a CFL
- Context-free languages are *not* closed under **Compliment**
 - If L_1 is a CFL, then \bar{L}_1 *may not* be a CFL
 - This *does not* mean that the compliment of a CFL is *never* a CFL
- The **intersection** of a CFL and a Regular Language is a CFL
 - If L_1 is a CFL and L_2 is Regular, then $L_1 \cap L_2$ is a CFL
- There is *no* algorithm to check if a grammar is ambiguous – It is an **Undecidable Problem**
- **Inherently ambiguous** – A language where it is *not possible* to eliminate ambiguity
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