Context Free Languages (PDA) → npda, dpda

★ npda is more powerful than dpda

$A \rightarrow x$

Only single non-terminal ↑

↑ combination of terminals + non-terminals

★ If alternate powers are equal then not CFL. eg $a^m a^n b^m c^n$

★ If more than 2 powers are equal then not CFL.
eg: $a^n b^n c^n d^m$

★ Removal of Null productions from a grammer leads to increse in number of unit productions.

→ Ambiguity: if a single expression has more than one derivation tree.

CNF :- Chomsky Normal Form.

$A \rightarrow BC$ (exactly 2 non terminals on RHS)

$A \rightarrow a$ (exactly one terminal on RHS)

★ If a Lang. is in CNF; for a string of length 'n', number of steps in derivation = $2n-1$.

WCNF :- Weak chomsky Normal Form

CNF + λ (Null prod^n)

$A \rightarrow BC$

$A \rightarrow a$

$A \rightarrow \lambda$