

Left Factoring / Factored

If production of the form $A \rightarrow \alpha B_1 | \alpha B_2 | \alpha B_3$ has α as common prefix, By left factoring, we get equivalent grammar as

$$A \rightarrow \alpha A'$$

$$A' \rightarrow B_1 | B_2 | B_3$$

- 1) $A \rightarrow abB | aB | cdg | cdeB | cd\bar{t}B$
- 2) $S \rightarrow aSSbS | aSasb | abb | b$
- 3) $S \rightarrow xAy | xBy | xAz$
 $A \rightarrow q | qS$
 $B \rightarrow q$
- 4) $S \rightarrow abBc | abDr$
 $B \rightarrow b | \epsilon$
 $D \rightarrow d | \epsilon$
- 5) $S \rightarrow iCtS | iCtSeS | a$
 $C \rightarrow b$
- 6) $A \rightarrow aB | aC | aD | Ac$
 $B \rightarrow bBC | b$
 $C \rightarrow g | \epsilon$
 $D \rightarrow d | \epsilon$
- 7) $A \rightarrow acDq | aBq | \epsilon$
 $D \rightarrow d | \epsilon$
 $B \rightarrow e | \epsilon$
 $C \rightarrow Ct | p | \epsilon | BD | rAb$
- 8) $S \rightarrow aP | aY$
 $P \rightarrow +Sr | Yz | b | \epsilon$
 $Y \rightarrow \epsilon$
- 9) $S.$