

## 7.6

### CFGs normal form

# Normal Forms

**Normal forms** are a way to restrict form of production rules

**Advantage:** Simpler/more convenient algorithms and proofs

Two standard normal forms for CFGs

- Chomsky normal form
- Greibach normal form

# Normal Forms

**Normal forms** are a way to restrict form of production rules

**Advantage:** Simpler/more convenient algorithms and proofs

Two standard normal forms for **CFGs**

- Chomsky normal form
- Greibach normal form

# Normal Forms

## Chomsky Normal Form:

- Productions are all of the form  $A \rightarrow BC$  or  $A \rightarrow a$ .  
If  $\epsilon \in L$  then  $S \rightarrow \epsilon$  is also allowed.
- Every CFG  $G$  can be converted into CNF form via an efficient algorithm
- Advantage: parse tree of constant degree.

## Greibach Normal Form:

- Only productions of the form  $A \rightarrow a\beta$  are allowed.
- All CFLs without  $\epsilon$  have a grammar in GNF. Efficient algorithm.
- Advantage: Every derivation adds exactly one terminal.

# Normal Forms

## Chomsky Normal Form:

- Productions are all of the form  $A \rightarrow BC$  or  $A \rightarrow a$ .  
If  $\epsilon \in L$  then  $S \rightarrow \epsilon$  is also allowed.
- Every CFG  $G$  can be converted into CNF form via an efficient algorithm
- Advantage: parse tree of constant degree.

## Greibach Normal Form:

- Only productions of the form  $A \rightarrow a\beta$  are allowed.
- All CFLs without  $\epsilon$  have a grammar in GNF. Efficient algorithm.
- Advantage: Every derivation adds exactly one terminal.

# THE END

...

# (for now)