

$FIRST(s) \rightarrow \{ \text{terminals} \} \cup \{ \cancel{\epsilon} \}$
↑
new distinct

$FIRST(\text{terminal}) \rightarrow \{ \text{terminal} \}$

$FIRST(\underbrace{\text{nonterminal}}_X) = \{ \}$

for each production $X \rightarrow Y_1 Y_2 \dots Y_k$

nullable = true

for i in 1 to k ~~except ϵ~~ {

[add $FIRST(Y_i)$ to $FIRST(X)$

if $\epsilon \in FIRST(Y_i)$

continue

else

nullable = false

break

↓
 $NULLABLE(Y_i)$

~~if nullable {
add ϵ to $FIRST(X)$~~

$A \rightarrow \epsilon$

$X \rightarrow ABC \quad X \rightarrow 1+3$

repeat

$FOLLOW(\text{nonterminal}) \rightarrow \{\text{terminals}\} \cup \{\$ \}$

init $FOLLOW(\text{start}) = \{ \$ \}$

repeat until nothing new

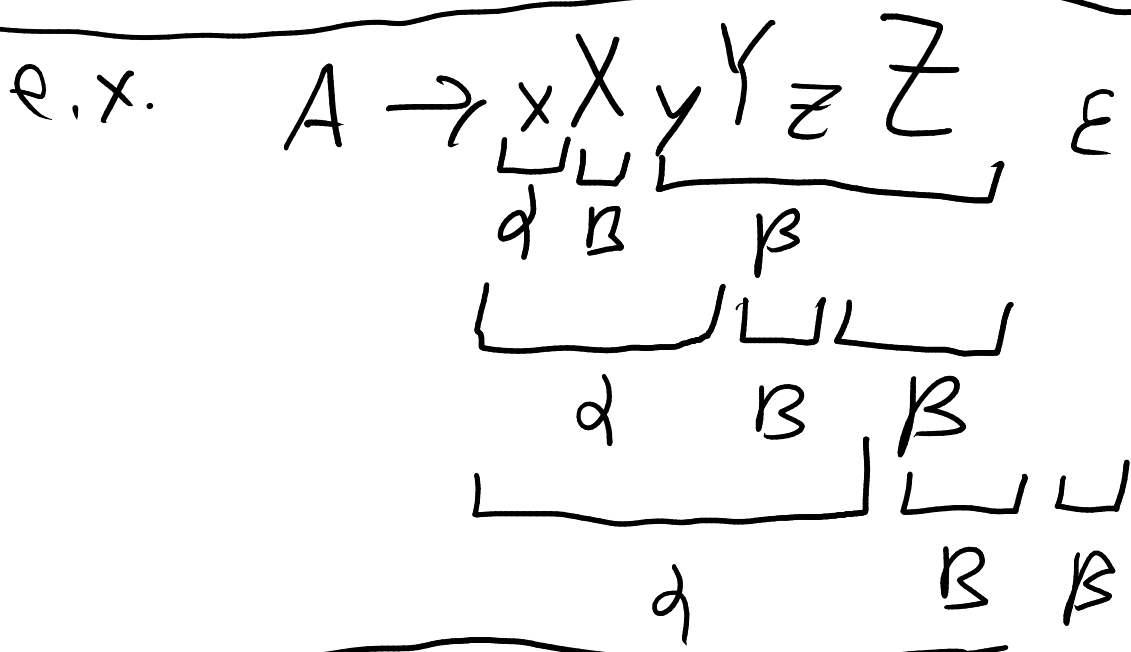
For each production $A \rightarrow \alpha \beta \leftarrow$ has a loop

nonterminal

if β is nullable ($\epsilon \in FIRST(\beta)$)

add $FOLLOW(A) \rightarrow FOLLOW(B)$

add $FIRST(\beta)$ except ϵ to $FOLLOW(B)$



$A \rightarrow \alpha \beta \epsilon$

$NULLABLE(s) \rightarrow \text{bool}$

s is a terminal \mapsto false

s is a nonterminal

if $S \rightarrow \epsilon \mapsto$ true

if $S \rightarrow ABC \mapsto$ true
 └───┬───┘
 nullable

$NULLABLE(s) \leftrightarrow \epsilon \in \text{FIRST}(s)$

$E \rightarrow T E' \quad E' \rightarrow + T E' \mid \epsilon$
 $T \rightarrow F T' \quad T' \rightarrow * F T' \mid \epsilon$
 $F \rightarrow (E') \mid id$

$E \rightarrow E + T \mid T$
 $T \rightarrow T + F \mid F$

Symbol	NULLABLE	FIRST	FOLLOW
E	false	(id	\$)
E'	true	+	\$)
T	false	(id	+ \$)
T'	true	*	+ \$)
F	false	(id	* + \$)
+	false	+	
*	false	*	
(false	(
)	false)	
id	false	id	