Check-in

Review – FIRST Sets

Calculate first sets for this grammar

S ::= lpar X rpar

X ::= id comma X

| ε

Flipped Wednesday

Agenda

Some P2 info

Some First Set stuff

Building FIRST for a symbol string α

Let α be composed of symbols $\alpha_1\ \alpha_2 \ldots \alpha_n$

C_1: add FIRST(α_1) - ε

C_2: For all k < n: if $\alpha_1 \ldots \alpha_{k-1}$ is nullable, add FIRST(α_k) - ε

C_3: If $\alpha_1 \ldots \alpha_n$ is nullable, add ε

Building FIRST for a nonterminal X

For all productions with X on the LHS and ~~α~~ = $\alpha_1\ \alpha_2 \ldots \alpha n$ on the RHS

C_1: add FIRST(α_1) - ε

C_2: For all k < n: if $\alpha_1 \ldots \alpha_{k-1}$ is nullable, add FIRST(α_k) - ε

C_3: If $\alpha_1 \ldots \alpha_n$ is nullable, add ε

Building FIRST for a nonterminal X

For all productions with X on the LHS (i.e. X ::= α)

Add FIRST(α) to FIRST X

$X ::= Y\ Z$

$Y ::= a \mid Z \mid \epsilon$

$Z ::= b \mid \epsilon$

$FIRST(X) = \{a, b, \epsilon\}$

$X ::= Y\ Z$

$\alpha_1 \quad \alpha_2$

$FIRST(Y) = \{a, \epsilon, b\}$

$Y ::= a$

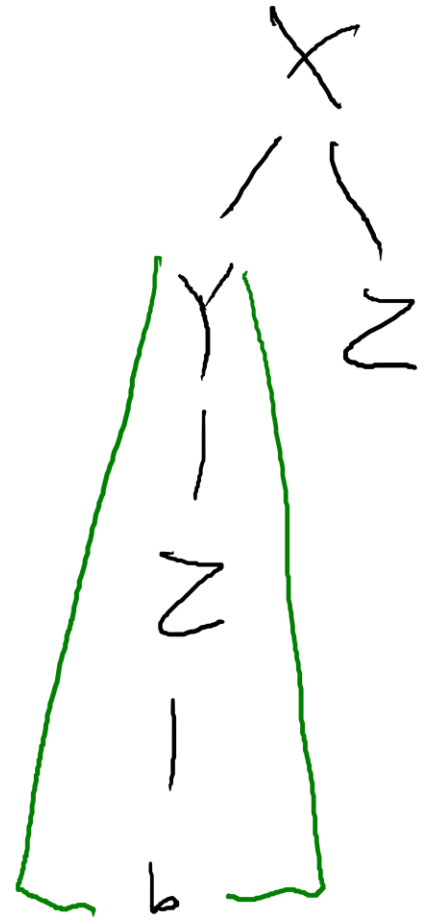
$Y ::= Z$

$Y ::= \epsilon$

$FIRST(Z) = \{b, \epsilon\}$

$Z ::= b$

$Z ::= \epsilon$



FIRST(X) = {a, b}

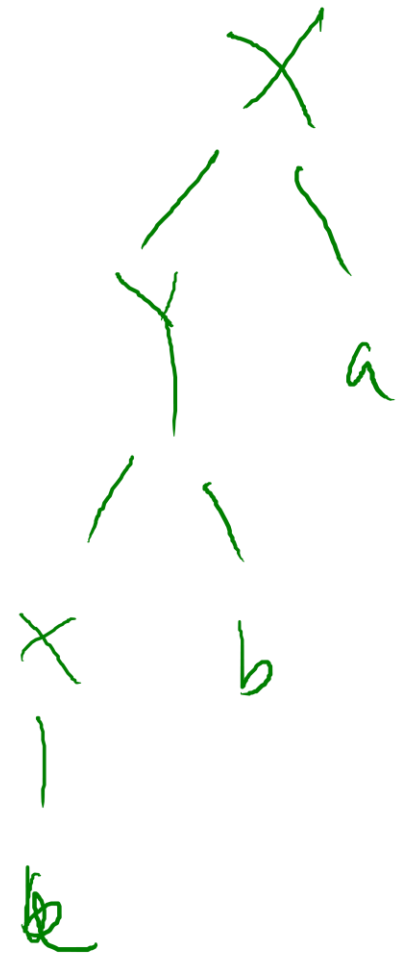
FIRST(Y) = b, a

X ::= Y a

| ε

Y ::= X b

| b



```
a;int;
a=2;
```

```
a: int = 2;
```