

Checkin 12

Describe the difference between an LL(1) and LR(1) parser. Which is more powerful?

Administrivia

P3 Due next week

Flipped Wednesday



Written Work #3

Topics:

- LL(1) Grammars

Question 1

Left factor the following grammar

$$\begin{array}{lcl}
 A & ::= & yAAxxA \\
 & | & yAAxAy \\
 & | & yAy \\
 & | & x
 \end{array}$$

$$\begin{array}{lcl}
 B & ::= & \gamma \alpha \\
 & | & \gamma \Delta
 \end{array}$$



$$\begin{array}{lcl}
 A & ::= & yAC \\
 & | & x
 \end{array}$$

$$\begin{array}{lcl}
 A & ::= & yAC \\
 & | & x
 \end{array}$$

$$\begin{array}{lcl}
 B & ::= & \gamma C
 \end{array}$$

$$\begin{array}{lcl}
 C & ::= & Ax \Delta \\
 & | & Ax Ay \\
 & | & y
 \end{array}$$



$$\begin{array}{lcl}
 C & ::= & Ax D
 \end{array}$$

$$\begin{array}{lcl}
 C & ::= & \alpha \\
 & | & \Delta
 \end{array}$$

$$\begin{array}{lcl}
 D & ::= & yAx Ay
 \end{array}$$

Question 2

Eliminate left recursion in the following grammar

$L ::= L L E$
 $L ::= G$
 $G ::= G b$
 $| a$
 $E ::= k$

$G \Rightarrow G f$

$L' = G L'$

$L' = L E L'$

$| E$

$G' = a G' \mid c G'$

$G' = b G'$

$| f$

$E = k$

$f G'$

$G' = c \quad L' = G L'$

$L' = L E L'$

$| E$

$G' = G \phi$

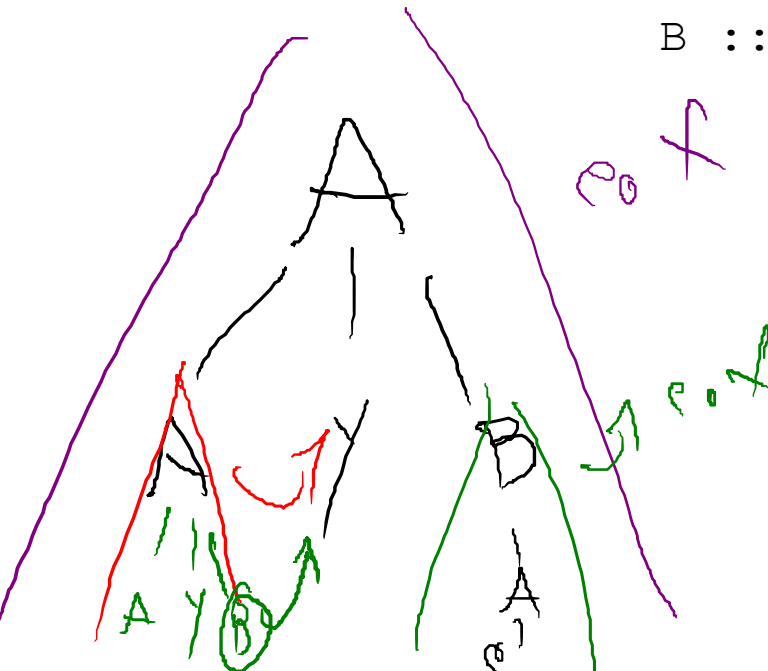
$| a$

$E = k$

Question 3

What are the FIRST and FOLLOW sets for the following grammar

$A ::= \bar{A} y B$
 $A ::= z$
 $A ::= \epsilon$
 $B ::= \bar{A}$



$FIRST(A)$
 $\{z, \epsilon, y\}$

$FIRST(B)$
 $\{z, \epsilon, y\}$

$FOLLOW(A)$
 $\{\epsilon, y\}$

$FOLLOW(B)$
 $\{\epsilon, y\}$

$FIRST(A y B)$
 $\{z, \epsilon, y\}$

$FIRST(z)$
 $\{z\}$

$FIRST(\epsilon)$
 $\{\epsilon\}$

$FIRST(A)$
 $\{z, \epsilon, y\}$

Question 4

Is it possible to generate FIRST sets for a grammar with syntactic ambiguity? Explain your reasoning.

$A \rightarrow X$
 $A \rightarrow A$
 $A \rightarrow A$
 $A \rightarrow X$

$A ::= A$
 $A ::= X$

A $\begin{matrix} X \\ \boxed{P_1} \\ P_2 \end{matrix}$
 $\equiv A ::= X$



$S ::= A$
 $\quad B$

$A ::= K \ x \ g$

$B ::= K \ y \ g$

