

CSCI 447 – Spring 2001

LL Parsing

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Due Date: Thursday, April 19, 2001

1. For each of the following grammars, find the predict sets and state whether the grammar is LL(1) or not.

a. $S \rightarrow A B c$

$A \rightarrow a | \epsilon$

$B \rightarrow b | \epsilon$

b. $S \rightarrow A b$

$A \rightarrow a | B | \epsilon$

$B \rightarrow b | \epsilon$

c. $S \rightarrow A B B A$

$A \rightarrow a | \epsilon$

$B \rightarrow b | \epsilon$

d. $S \rightarrow a S e | B$

$B \rightarrow b B e | C$

$C \rightarrow c C e | d$

2. Given the following grammar

$lexp \rightarrow (lexpseq) | id | num$

$lexpseq \rightarrow lexp lextail$

$lextail \rightarrow , lexp lextail | \epsilon$

- a. Find the First and Follow sets of all nonterminals

- b. Find the predict sets of all productions

- c. Construct the LL(1) parse table

- d. Show the parsing of $((id , num) , id) \$$ and $(id , (id \$$

3. a) Show that an LL(1) grammar cannot be ambiguous.
b) Show that a left-recursive grammar cannot be LL(1).

4. Transform the following grammar into LL(1)

$DeclList \rightarrow DeclList ; Decl | Decl$

$Decl \rightarrow IdList : Type$

$IdList \rightarrow IdList , ID | ID$

$Type \rightarrow ScalarType | array (ScalarTypeList) of Type$

$ScalarTypeList \rightarrow ScalarTypeList , ScalarType | ScalarType$

$ScalarType \rightarrow ID | Bound .. Bound$

$Bound \rightarrow Sign INTLIT | ID$

$Sign \rightarrow + | - | \epsilon$