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Which of the following grammars are ambiguous?

Show LL(1) parsing table using First and Follow to determine whether the grammar is ambiguous or not.

1) $S \rightarrow 0A \mid 1B$

$A \rightarrow 0AA \mid 1S \mid 1$

$B \rightarrow 1BB \mid 0S \mid 0$

2) $S \rightarrow aSb \mid bSa \mid SS \mid \epsilon$

3) $S \rightarrow 1S1 \mid T$

$T \rightarrow 1X1 \mid X$

$X \rightarrow 0X0 \mid 1$

Expert Answer



Anonymous answered this
380 answers

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1)

Non terminal	First	Follow
S	0,1	0,1,\$
A	0,1	0,1,\$
B	0,1	0,1,\$

LL(1) parsing table:

	\$	0	1
S		$S \rightarrow 0A$	$S \rightarrow 1B$
A		$A \rightarrow 0AA$	$A \rightarrow 1S$ $A \rightarrow 1$
B		$B \rightarrow 0S$ $B \rightarrow 0$	$B \rightarrow 1BB$

Since there is a conflict detected, the grammar is not LL(1) and is ambiguous

2)

Non terminal	First	Follow
S	a,b,\$	a,b,\$

LL(1) parsing table:

	\$	a	b
S	$S \rightarrow SS$ $S \rightarrow \epsilon$	$S \rightarrow aSb$ $S \rightarrow SS$ $S \rightarrow \epsilon$	$S \rightarrow bSa$ $S \rightarrow SS$ $S \rightarrow \epsilon$

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Non terminal	First	Follow
S	0,1	1,\$
T	0,1	1,\$
X	0,1	0,1,\$

LL(1) parsing table:

	\$	0	1
S		S -> T	S -> 1S1 S->T
T		T->X	T-> 1X1 T->X
X		X-> 0X0	X->1

Since there is a conflict detected, the grammar is not LL(1) and is ambiguous

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