

Name:

Student ID:

Compiler Construction, Spring 2020 Quiz 3

Consider the context-free grammar, G , and answer the following questions.

- Please compute the FIRST, FOLLOW, and Predict Sets for G . (2pt)
- Please determine if G is an LL(1) grammar and explain your reason. (1pt)
- If G is an LL(1) grammar, please give its parse table.
Otherwise, revise G into an LL(1) grammar, G' , and give the parse table of G' . (2pt)

Context-free grammar, G

```

1| E → T X $
2| X → + E
3|   | λ
4| T → ( E )
5|   | int Y
6| Y → * T
7|   | λ

```

Version 1: Take "\$" as an end symbol

	Productions	FIRST()	FOLLOW()	Predict set
1	$E \rightarrow T X \$$	int, (), \$	int, (
2	$X \rightarrow + E$	+), \$	+
3	λ	λ), \$
4	$T \rightarrow (E)$	(+,), \$	(
5	int Y	int		int
6	$Y \rightarrow * T$	*	+,), \$	*
7	λ	λ		+,), \$

The example of the LL(1) parse table for G (or G').

G is an LL(1) grammar since it can make an unique prediction in each production.

In addition, G does not have ambiguity, left recursion, or common prefixes.

Non-terminals/Terminals	int	*	+	()	\$
E	1			1		
X			2		3	3
T	5			4		
Y		6	7		7	7

Version 2:

Take “\$” as a terminal symbol

	Productions	FIRST()	FOLLOW()	Predict set
1	$E \rightarrow T X \$$	int, (), \$, end “end” is optional	int, (
2	$X \rightarrow + E$	+	\$	+
3	λ	λ		\$
4	$T \rightarrow (E)$	(+, \$	(
5	int Y	int		int
6	$Y \rightarrow * T$	*	+, \$	*
7	λ	λ		+, \$

Non-terminals/Terminals	int	*	+	()	\$	end
E	1			1			
X			2			3	
T	5			4			
Y		6	7			7	