

Final (Compiler) Name: _____ Grade: _____

1.(10%).Is the following grammar LL(1) ? Explain why ?

$S \rightarrow Ab$

$A \rightarrow a$

$A \rightarrow B$

$A \rightarrow \epsilon$

$B \rightarrow b$

$B \rightarrow \epsilon$

2. (10%) Rewrite the following left recursive grammar into non-recursive EBNF grammar.

$S \rightarrow Aa \mid b$

$A \rightarrow Ac \mid Sd \mid \epsilon$

3.(10%) Use one example to show that the following grammar is ambiguous.

$\text{stat} \rightarrow \begin{array}{l} \text{if cond then stat} \\ | \text{if cond then stat else stat} \\ | \text{other-stat} \end{array}$

4.(10%) Is the following grammar SLR(1) ?

$S' \rightarrow S$

$S \rightarrow (S)S$

$S \rightarrow (* \text{ empty string } *)$

5. (10%) Based on the Post-fix form of a parsing tree, transfer the following expression into the intermediate code (quadruples, 四項式).

$R = (a * b + c) - (a * (b + c))$

6. (10%) For the following grammar rules, write the related semantic rules. For example, for the rule, $\text{type} \rightarrow \text{float}$, the related semantic rule is $\text{type.dtype} = \text{real}$.

$\text{decl} \rightarrow \text{type var-list}$

$\text{type} \rightarrow \text{int}$

$\text{type} \rightarrow \text{float}$

$\text{var-list}_1 \rightarrow \text{id}, \text{var-list}_2$

$\text{var-list} \rightarrow \text{id}$

7. (10%) Given the declaration $B: \text{array}[0..3, 1..6]$ of integer, show the corresponding quadruples (四項式), for the statement $B[I, J] := 5$. Assuming that data is stored in

the row-major and an integer is represented in 3 bytes.

8.(10%) For the Precedence table for the following grammar, write down the parsing steps for the input \$ID+(ID+ID)\$.

$S \rightarrow E\$$

$E \rightarrow F$

$F \rightarrow F+T$

$F \rightarrow T$

$T \rightarrow ID$

$T \rightarrow (E)$

	E	F	T	ID	+	()	\$
E							<u>o</u>	<u>o</u>
F					<u>o</u>		o>	o>
T					o>		o>	o>
ID					o>		o>	o>
+			<u>o</u>	<o		<o		
(<u>o</u>	<o	<o	<o		<o		
)					o>		o>	o>
\$	<u>o</u>	<o	<o	<o		<o		

Step	Parse Stack	Remaining Input
1		\$ID+(ID+ID)\$

9. (20%) Lab.

- 在你的 yacc 檔案中，必須呼叫哪一個 function，yacc 才會去執行判斷文法的動作？
- 如果你有一個叫 NUMBER 的 token，在你的 yacc 檔中，要如何告訴 yacc 你有這個 token？
- 在編譯 yacc 檔案時，必須加上什麼指令，才會產生定義 token 代碼的檔案？
- 承 (c)，這個定義 token 代碼的檔案叫什麼名字？
- 假設有一條 “ $A \rightarrow B+C$ ” 的文法，在你的 yacc 檔案中要如何定義它？