Final (Compiler) Name: _____ Grade:_____

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

S → ABBA

A → a

A → λ

B → b

B → λ

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

**<exp> ::= <term> | <exp> + <term> |<exp> - <term>**

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

stat → **if** cond **then** stat
**| if** cond **then** stat **else** stat
| other-stat

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

S' → S S → (S)S S → (* 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, type--> float, the related semantic rule is type.dtype = real.

decl--> type var-list

type-->int

type-->float

var-list$_1$-->id, var-list$_2$

var-list-->id

7. (10%) For the following grammar, go_to table and action table, write down the parsing steps by the shift-reduce driver, given the input "((a))".

(R1) A'→ A　　(R2) A → (A)　　(R3) A→ a

GoTo

| | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| ( | 3 | | | 3 | | |
| a | 2 | | | 2 | | |
| A | 1 | | | 4 | | |
| ) | | | | | 5 | |

Action

| State | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| action | S | A | R3 | S | S | R2 |

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

S→$E$;　E→F;　F→F+T ;　F→T;　T→ ID ;　T→(E)

| | E | F | T | ID | + | ( | ) | $ |
|---|---|---|---|---|---|---|---|---|
| E | | | | | | | ≐ | ≐ |
| F | | | | | ≐ | | o> | o> |
| T | | | | | o> | | o> | o> |
| ID | | | | | o> | | o> | o> |
| + | | | ≐ | <o | | <o | | |
| ( | ≐ | <o | <o | <o | | <o | | |
| ) | | | | | o> | | o> | o> |
| $ | ≐ | <o | <o | <o | | <o | | |

| Step | Parse Stack | Remaining Input |
|---|---|---|
| 1 | | $ID+(ID+ID)$ |

9. (20%) Lab.

請用"簡短的"敍述回答以下問題(寫出重點即可, 不需寫得太複雜)

(a) (4%) 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?

(b) (4%) 試寫出 yylex()以及 yyparse()之間的關係,簡單說明即可。

(c) (4%) 在 Lex 中,若要指定 value 給欲回傳給 YACC 的 token,可以使用哪一個變數?

(d) (4%) 在 yacc 中,假設有一條文法是 S->a B c ， $2 這個變數指的是哪一個 nonterminal 或 terminal 的值?

(e) (4%) 當你程式寫完之後要編譯時,你應該先編譯 yacc 還是 lex ,還是沒差?