

國立東華大學資訊工程系博士班資格考

程式語言與編譯器, 2010/4

1. (10) Please construct the follow set, first set, predict set and parse table of the following grammar.

<program> -> begin <statement list> end
<statement list> -><statement> {<statement>}
<statement> ->ID:=<expression>;
<statement> ->read (<id list>);
<statement> ->write (<expr list>);
<id list> ->ID {, ID}
<exp list> -><expression> {, <expression>}
<expression> -><factor> { <add op> <factor>}
<factor> -><primary> {<mult op> <primary>}
<primary> ->ID
<primary> ->INTLITERAL
<primary> ->(<expression>)
<add op> ->PLUSOP
<add op> ->MINUSOP
<mult op> ->MULTOP
<mult op> ->DIVIDOP
<system goal> -><program> SCANEOF

2. (10) Please write the parse tree of the following codes according to the modified grammar in 1.
begin read (A,B); B := (A+3)*2; A := B*4-A; write (A,B,4/2); end SCANEOF

3. (20)Please construct the LR(1) machine, goto table, and action table of the following grammar, and trace the parsing steps performed by the LR(1) parser on the input {ID=ID;{ID=ID}} \$ and show the parsing steps.

$P \rightarrow B\$$

$B \rightarrow \{S\}$

$S \rightarrow S;E \mid E$

$E \rightarrow B \mid ID=E \mid ID$

4. (10)Please construct the SLR machine, goto table, and action table of the following grammar in 3, and trace the parsing steps performed by the SLR parser on the input {ID=ID;{ID=ID}} \$ and and show the parsing steps.

(背面還有試題)

5. (20) Consider the following BNF grammar of algebraic expressions with a single identifier a

$$S \rightarrow S + S \mid S - S \mid S * S \mid S / S \mid (S) \mid a$$

How many parse trees are there for each of the following:

- (i) $a + a * a$ (ii) $a + a * a / a$ (iii) $a + a + a + a$ (iv) $(a + (a + a)) + a$

Explain your answer in each case. Try to explain without drawing all the parse trees.

6. (10) Explain briefly what the problems of aliasing, dangling pointers and memory garbage are in conjunction with pointer types in a language such as C.

7. (20) Consider the following program written in C syntax:

```
int list[2] = {1, 3};
void fun(int first, int second) {
    first += first;
    second += second;
}
void main() {
    fun(list[0], list[1]);
}
```

For each of the following parameter-passing methods, what are all of the values of the list array after execution?

- (i) Pass by value
- (ii) Pass by reference
- (iii) Pass by value-result
- (iv) Pass by name