

浙江大学 2002-2003 学年第二学期期末考试

《编译技术》课程试卷（闭卷）

校区_____ 学院_____ 专业_____ 姓名_____ 学号_____
考试时间长度 2 小时 考试成绩 _____

一、Describe and explain the main translation phases of a compiler. (5)

二、Show that a left-recursive grammar $A \rightarrow A a \mid b$ cannot be LL(1). (A is a nonterminal, a and b are terminals.) (5)

三、Grammar G containing the following state I_s , describe the condition of this grammar being LR(1). (X is a terminal) (5)

I_s

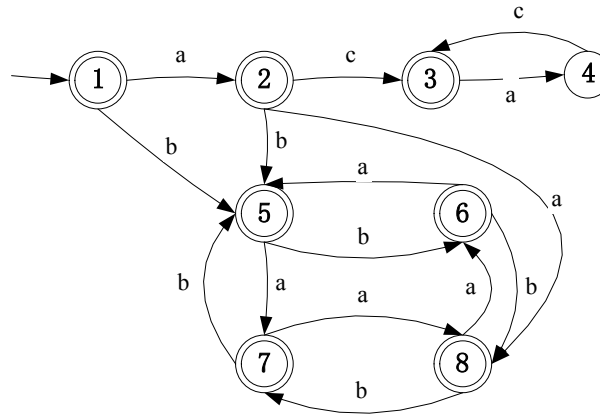
$A \rightarrow \alpha . X \beta$, a
$A \rightarrow \alpha .$, b
$B \rightarrow \gamma .$, c

四、Explain the relationships of the concepts: Attribute grammar, Dependency graph, Synthesized and Inherited Attributes. (5)

五、Give the output of the following program (in C syntax) using the four parameter passing methods. (8)

```
#include <stdio.h>
int i = 0;
void swap(int x, int y)
{
    x = x + y;
    y = x - y;
    x = x - y;
}
main ()
{
    int a[3] = {1,2,0};
    swap(i, a[i]);
    printf("%d %d %d \n", a[0], a[1], a[2]);
    return 0;
}
```

六、6.1 Apply the state minimization algorithm to the following DFA: (5)



6.2 Which of the following regular expression produce the same language as the minimized DFA? Using Thompson's construction to convert the selected regular expression into an NFA. (5)

- (1) $(a|b)^*|ac(ac)^*$ (2) $(ac)^*|(a|b)^*$ (3) $(ac)^* | a (a|b)^*$

6.3 Convert the above NFA into a DFA using the subset construction. (5)

七、 Give the grammar

$$S \rightarrow a S b S \mid b S a S \mid \varepsilon$$

7.1 Give the left-most derivation and right-most derivation of the abab. (3)

7.2 Prove this grammar is ambiguity. (5)

7.3 Explain the language defined by this grammar using natural language.(2)

八、 Consider the following grammar.

0. $S' \rightarrow S$

1. $S \rightarrow Aa$

2. $S \rightarrow dAb$

3. $S \rightarrow Bb$

4. $S \rightarrow dBa$

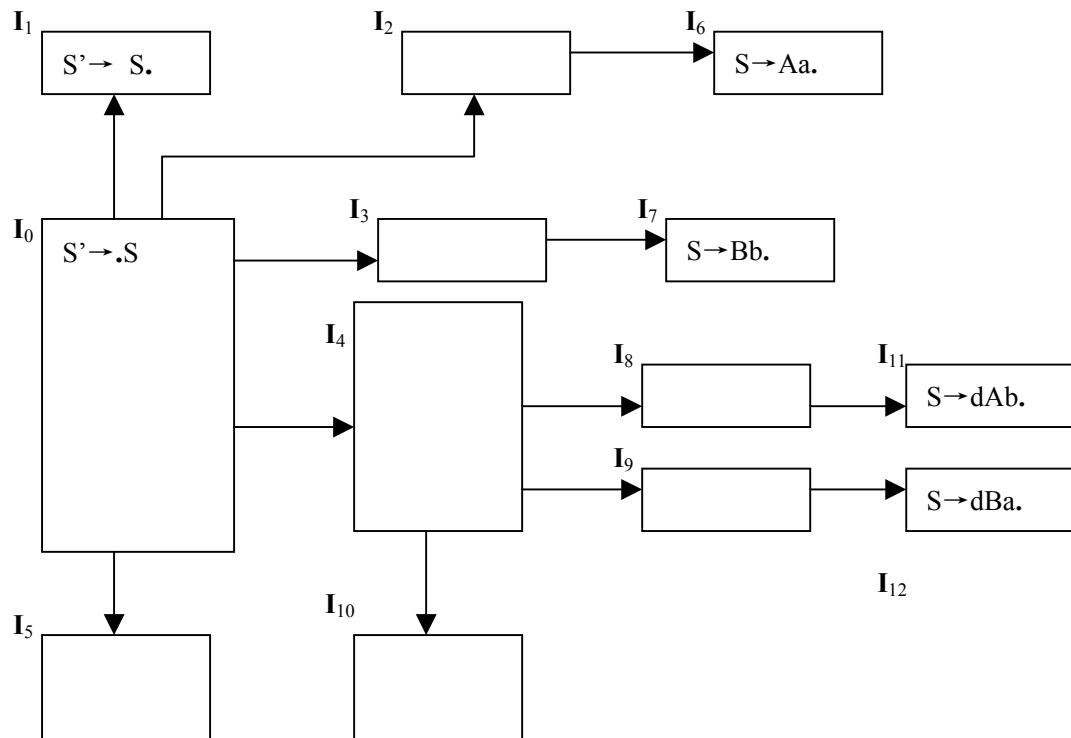
5. $A \rightarrow c$

6. $B \rightarrow c$

8.1 Construct the DFA of LR(1) for this grammar. (7)

8.2 Construct the LR(1) parsing table. (5)

8.3 Show the parsing stack and the actions of the LR(1) parser for the input string 'dca'. (5)



LR(1) parsing table

S	ACTION					GOTO		
	a	b	c	d	#	S	A	B
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Parsing for input string 'dca'

	Parsing stack	Input string	ACTION	GOTO

九、. In order to implement the most closely nested rule for block structure, please design two kinds of implementation for the HASH symbol table and use the following example (After processing the line 9) to illustrate the status of the symbol table. (10)

```

1  int i, j;
2  int f(int size)
3  { char i, temp;
4      ...
5      {char j;
6          ...
7      }
8      ...
9      {double *j;
10         ...
11     }
12 }
```

十、 Consider the following program: (10)

```

program ex;
  a : integer;
  procedure PP ( x : integer);
  begin
    x :=5;    x:=a+1;
  end;
begin
```

```

    a :=2;
    PP(a);
    write(a)
end.

```

Please draw the stack of activation records before the call to PP(a) and after the call to PP(a), showing the control and access links.

十一、Consider the following statement: (10)

```

if (a>b) while (x>0) x = x-2;
else y=y+1;

```

It generates the uncompleted p-code sequence, try to fill the blank in this sequence.

```

lod a
lod b
gt

```

```

lod x
ldc 0
gt

```

```

lda x
lod x
ldc 2
sbi
sto

```

```

lda y
lod y
ldc 1
adi
sto

```
