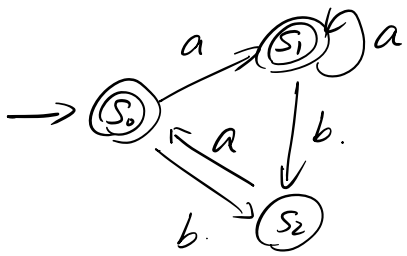
[1] 4.1(a). 确定化

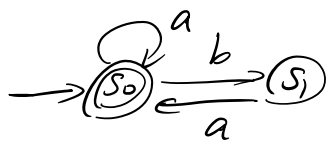
状态	输入 a	b
S_0	0	0,1	1
S_1	0,1	0,1	1
S_2	1	0	∅



最小化：

一致性条件：S_0 / S_1 / S_2

蔓延性条件：S_0 S_1 为 S_0；S_2 为 S_1



(b) 本身就已经是DFA，无需确定化

最小化

	输入 a	b
0	1	2
1	1	4
2	1	3
3	3	2
4	0	5
5	5	4

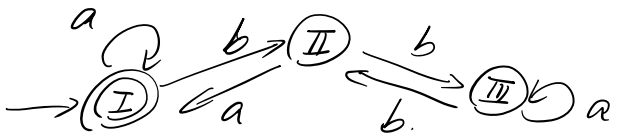
一致性条件：0,1,2,3,4,5 为 I；Ⅱ

蔓延性条件：

	a	b	
0	I	Ⅱ	
1	I	Ⅱ	I
2	I	Ⅱ	
3	Ⅱ	Ⅱ	Ⅱ
4	I	Ⅱ	Ⅲ
5	Ⅱ	Ⅱ	

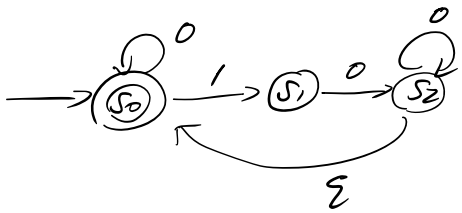
⇒

	a	b	
0	I	Ⅱ	I
1	I	Ⅱ	
2	I	Ⅲ	
3	Ⅲ	Ⅱ	Ⅱ
4	I	Ⅳ	Ⅲ
5	Ⅲ	Ⅱ	



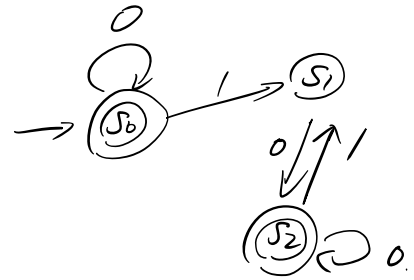
5. 每一个1都有0在后面 $0^*(100^*)^*$

画出NFA.



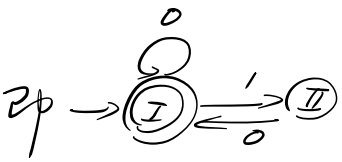
确定化

	0	1
$S_0 \to S_0$	S_0	S_1
$S_1 \to S_1$	S_0, S_2	∅
$S_2 \to S_0, S_2$	S_0, S_2	S_1



最小化. 一致性条件. S_0, S_1-II, S_2 → I

	0	1
S_0	I	II
S_1	I	∅
S_2	I	II



[12-1] 1. $FIRST(P) = \{(, a, b, \wedge\}$

$FIRST(P') = \{*, \varepsilon\}$.

$FIRST(F) = FIRST(P) = \{(, a, b, \wedge\}$.

$FIRST(T) = FIRST(F) = \{(, a, b, \wedge\}$.

$FIRST(T') = FIRST(T) \cup \{\varepsilon\} = \{(, a, b, \wedge, \varepsilon\}$.

$FIRST(Z') = \{+, \varepsilon\}$.

$FIRST(Z) = FIRST(T) = \{(, a, b, \wedge\}$.

$FOLLOW(Z) = \{\#,)\}$.

$FOLLOW(Z') = FOLLOW(Z) = \{\#,)\}$.

$FOLLOW(T) = (FIRST(Z') - \{\varepsilon\}) \cup FOLLOW(Z) = \{+, \#,)\}$.

$FOLLOW(T') = FOLLOW(T) = \{+, \#,)\}$.

$FOLLOW(F) = (FIRST(T') - \{\varepsilon\}) \cup FOLLOW(P) \cup FOLLOW(T)$

$= \{(, a, b, \wedge, +, \#,)\} \cup FOLLOW(P)$

$FOLLOW(F') = FOLLOW(F) = \{(, a, b, \wedge, +, \#,)\} \cup FOLLOW(P)$

$FOLLOW(P) = FIRST(F') \cup FOLLOW(F) = \{(, a, b, \wedge, +, \#,)\}$.

也可 $FOLLOW(Z) = \{\#,)\}$.

$FOLLOW(Z') = \{\#,)\}$.

$FOLLOW(T) = \{+, \#,)\}$.

$FOLLOW(T') = \{+, \#,)\}$.

$FOLLOW(F) = \{(, a, b, \wedge, +, \#,)$

$FOLLOW(F') = \{(, a, b, \wedge, +, \#,)\}$.

$FOLLOW(P) = \{(, a, b, \wedge, +, \#,)\}$.

(2). $FIRST(+Z) \wedge FIRST(\varepsilon) = \varnothing$.

$FIRST(T) \wedge FIRST(\varepsilon) = \varnothing$

$FIRST(*F) \wedge FIRST(\varepsilon) = \varnothing$

$FIRST((Z)) \wedge FIRST(a) \wedge FIRST(b) \wedge FIRST(\wedge) = \varnothing$.

$FIRST(+Z) \cap FOLLOW(Z') = \emptyset$

$FIRST(T) \cap FOLLOW(T') = \emptyset$

$FIRST(*F') \cap FOLLOW(F') = \emptyset$ 为LL(1)文法

(3).

	+	*	(	a	b	^	)	#
Z			TZ'	TZ'	TZ'	TZ'		
Z'	+Z						ε	ε
T			FT'	FT'	FT'	FT'		
T'	ε		T	T	T	T	ε	ε
F			PF'	PF'	PF'	PF'		
F'	ε	*F'	ε	ε	ε	ε	ε	ε
P			(Z)	a	b	^		

2、 $FIRST(S) = \{a, \varepsilon\}$.

$FIRST(A) = \{a, \varepsilon\}$.

$FIRST(B) = \{a, e, \varepsilon\}$.

$FIRST(C) = \{a, f, g, \varepsilon\}$.

$FOLLOW(S) = \{a, d, f\}$.

$FOLLOW(A) = \{a, b, d, e\}$.

$FOLLOW(B) = \{b\}$

$FOLLOW(C) = \{b, g\}$

(2) $FIRST(aABbd) = \{a\}$

$FIRST(\varepsilon) = \{\varepsilon\}$.

$FIRST(Asd) = \{a, d\}$.

$FIRST(Sah) = \{a\}$.

$FIRST(eC) = \{e\}$.

$FIRST(Sf) = \{a, f\}$.

$FIRST(Cg) = \{a, f, g\}$.

(3)、$FIRST(Sf) \cap FIRST(Cg) = \{a, f\} \neq \emptyset$ 为LL(1)文法

6. 文法的预测分析表不含多重定义入口

[12-2] 2.(2).

北京航空航天大学 软件学院

P279 练习12-2 第2题具体要求：

试用直观算符优先分析法分析下述表达式：

(1) a + * b

(2) a + b * (c + d) – e

判明是否是下述文法的合法句子，并列出分析过程。

文法：

E::= E + E | E – E | E * E | E / E | i | (E)

优先关系矩阵如右。

	–	+	*	/	i	(	)	#
–	>	>	<	<	<	<	>	>
+	>	>	<	<	<	<	>	>
*	>	>	>	>	<	<	>	>
/	>	>	>	>	<	<	>	>
i	>	>	>	>			>	>
(	<	<	<	<	<	<	=	
)	>	>	>	>			>	>
#	<	<	<	<	<	<	<	

步骤	符号栈	输入串	优先关系	动作
1	#	a+b*(c+d)-e#	#<a	移进
2	#a	+b*(c+d)-e#	a>+	规约
3	#E	+b*(c+d)-e#	#<+	移进
4	#E+	b*(c+d)-e#	+<b	移进
5	#E+b	*(c+d)-e#	b>*	规约
6	#E+E	*(c+d)-e#	+<*	移进
7	#E+E*	(c+d)-e#	*<(	移进
8	#E+E*(	c+d)-e#	(<c	移进
9	#E+E*(c	+d)-e#	c>+	规约
10	#E+E*(E	+d)-e#	(<+	移进
11	#E+E*(E+	d)-e#	+<d	移进
12	#E+E*(E+d	)-e#	d>)	规约
13	#E+E*(E+E	)-e#	+>)	规约
14	#E+E*(E	)-e#	(=)	弹出
15	#E+E*E	-e#	*>-	规约
16	#E+E	-e#	+>-	规约
17	#E	-e#	#<-	移进
18	#E-	e#	-<e	移进
19	#E-e	#	e>#	规约
20	#E-E	#	->#	规约
21	#E	#	停止	

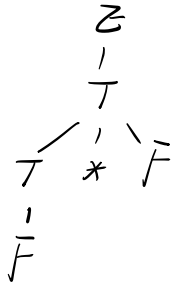
4. E: 短语. 没有. 素短语 没有.

T: E⇒T. 短语 T, 素短语 没有.

i: E⇒T⇒F⇒i. 短语 i, 素短语 i.

T*F: E⇒T⇒T*F. 短语 T*F 素短语 T*F

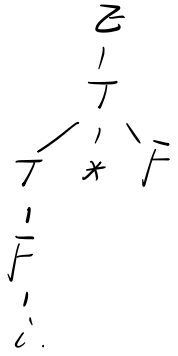
F*F:



短语 F, F*F

素短语: F*F.

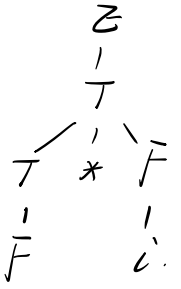
i*F.



短语 i, i*F.

素短语 i

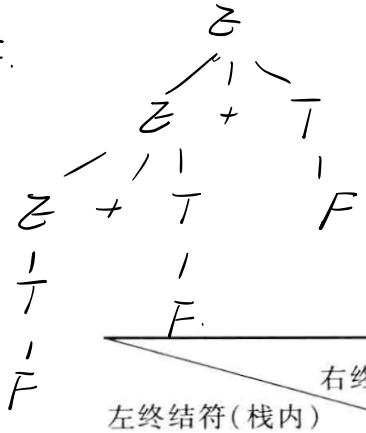
F*i.



短语 F, i, F*i.

素短语 i.

F+F+F.



短语 F, F+F, F+F+F

素短语 F+F.

5.

表 12.4 文法 $G[E]$的优先关系矩阵

左终结符(栈内) \ 右终结符(栈外)	+	*	i	(	)	#
+	>	<	<	<	>	>
*	>	>	<	<	>	>
i	>	>			>	>
(	<	<	<	<	=	
)	>	>			>	>
#	<	<	<	<		

步骤	句子	关系	最左子串	规约符号
1	#i`+i`#	#⋖i`⋗+⋖i`⋗#	i`	E
2	#E+i`#	#⋖+⋖i`⋗#	i`	T
3	#E+T#	#⋖+⋗#	E+T	E
1	#i`*(i`*i`)#	#⋖i`⋗*⋖(⋖i`⋗*⋖i`⋗)⋗#	i`	T
2	#T*(i`*i`)#	#⋖*⋖(⋖i`⋗*⋖i`⋗)⋗#	i`	T
3	#T*(T*i`)#	#⋖*⋖(⋖*⋖i`⋗)⋗#	i`	F
4	#T*(T*F)#	#⋖*⋖(⋖*⋗)⋗#	T*F	E
5.	#T*(E)#	#⋖*⋖(=)⋗#	(E)	F
6.	#T*F#	#⋖*⋗#	T*F	E

补充题

有如下文法 G[E]:

```
1 E ::= E'+'T | T
2 T ::= E | '('E')' | 'i'
```

（1）求每个非终结符的 FirstVt 集合和 LastVt 集合

（2）构造算符优先矩阵

（3）判断该文法是否是算符优先文法

(1)、

FIRSTVT	+	(	)	i`
E	✓	✓		✓
T	✓	✓		✓

LASTVT	+	(	)	i`
E	✓		✓	✓
T	✓		✓	✓

(2)、

	+	(	)	i`
+	⋗	⋖	⋗	⋖
(	⋖	⋖	=	⋖
)	⋗		⋗	
i`	⋗		⋗	

(3) + 和 + 关系出现冲突，不是算符优先文法