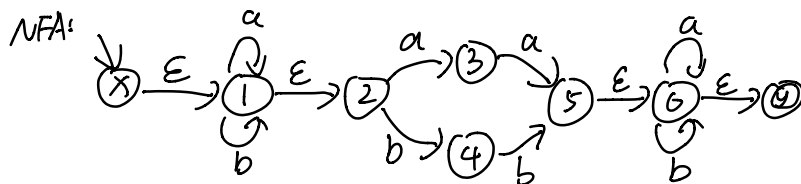
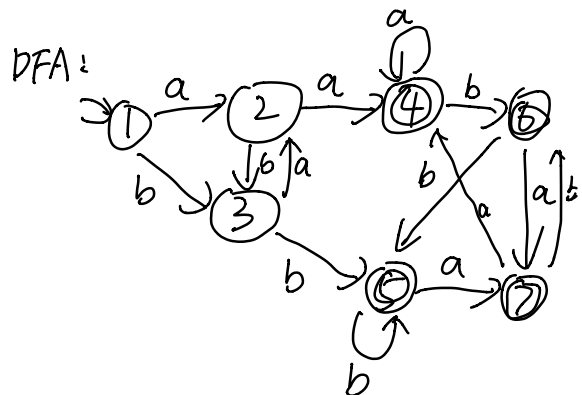


$$= (a|b)^*(aa|bb)(a|b)^*$$



		a	b
1	{x, 1, 2}	{1, 3, 2}	{1, 4, 2}
2	{1, 3, 2}	{1, 5, 3, 2, 6}	{1, 4, 2}
3	{1, 4, 2}	{1, 3, 2}	{1, 5, 4, 6, y}
4	{1, 5, 3, 2, 6, y}	{1, 5, 3, 6, 2, y}	{1, 4, 6, 2, y}
5	{1, 5, 4, 2, 6, y}	{1, 3, 6, 2, y}	{1, 5, 4, 6, 2, y}
6	{1, 4, 6, 2, y}	{1, 6, 3, 2, y}	{1, 5, 6, 4, 2, y}
7	{1, 3, 6, 2, y}	{1, 5, 6, 3, 2, y}	{1, 6, 4, 2, y}

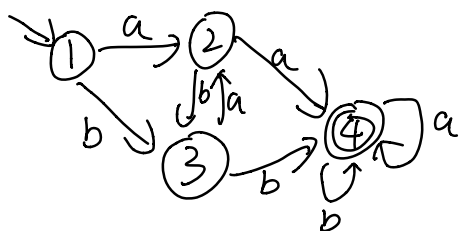


$$\{1, 2, 3\} \{4, 5, 6, 7\}$$

$$\{1\} \{2, 3\} \{4, 5, 6, 7\}$$

$$\{1\} \{2\} \{3\} \{4, 5, 6, 7\}$$

∴



三、

消除左递归:

$$E \rightarrow TE'$$

$$E' \rightarrow +TE' \mid \varepsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' \mid \varepsilon$$

$$F \rightarrow (E) \mid i$$

$$\text{FIRST}(E) = \text{FIRST}(T) = \text{FIRST}(F) = \{ (, i \}$$

$$\text{FIRST}(E') = \{ +, \varepsilon \}$$

$$\text{FIRST}(T') = \{ *, \varepsilon \}$$

$$\text{FOLLOW}(E) = \{ \#,) \}$$

$$\text{FOLLOW}(E') = \{ \#,) \}$$

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

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

$$\text{FOLLOW}(F) = \{ *, \#,), + \}$$

① 无左递归

$$\text{② } \text{FIRST}(+TE') \cap \text{FIRST}(\varepsilon) = \{ + \} \cap \{ \varepsilon \} = \emptyset$$

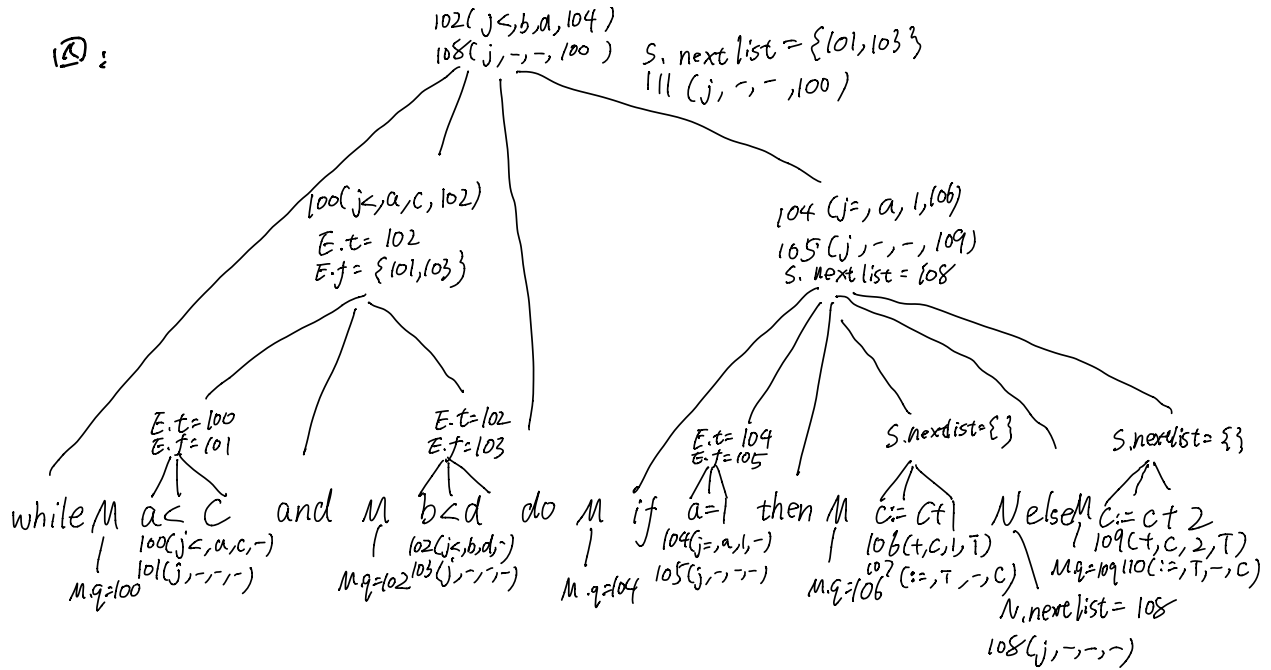
$$\text{FIRST}(*FT') \cap \text{FIRST}(\varepsilon) = \{ * \} \cap \{ \varepsilon \} = \emptyset$$

$$\text{③ } \text{FOLLOW}(E') \cap \text{FIRST}(E') = \emptyset$$

$$\text{FOLLOW}(T') \cap \text{FIRST}(T') = \emptyset$$

∴ 是 LL(1) 文法

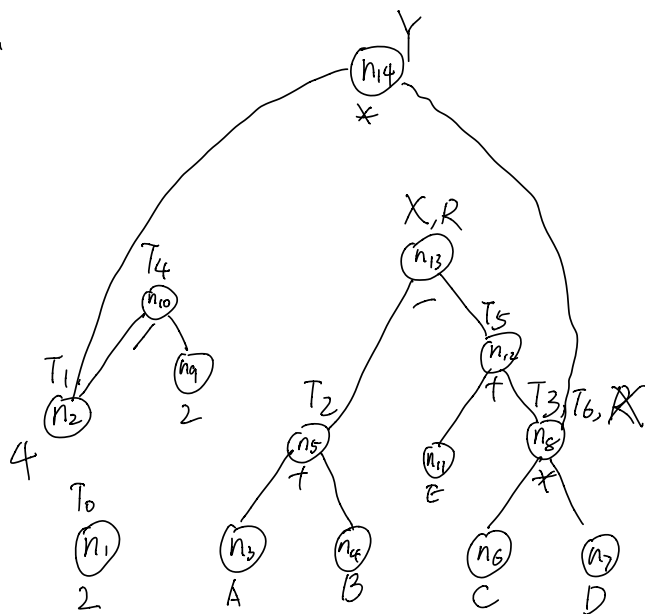
(A):



- 100 (j < a, c, 102)
- 101 (j, -, -, -)
- 102 (j < b, d, 104)
- 103 (j, -, -, -)
- 104 (j = a, 1, 106)
- 105 (j, -, -, 109)
- 106 (t, c, 1, T)
- 107 (:=, T, -, c)
- 108 (j, -, -, 100)
- 109 (t, c, 2, T)
- 110 (:=, T, -, c)
- 111 (j, -, -, 100)

五、

1.



∴ 优化后的序列为

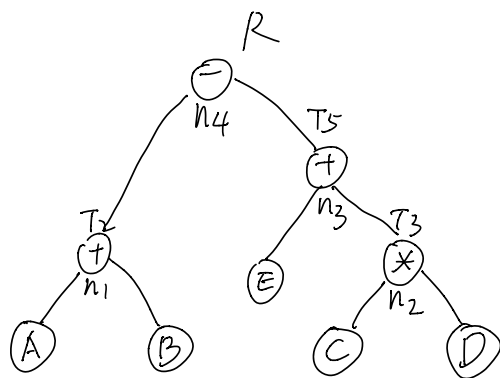
$$T_2 := A + B$$

$$T_3 := C * D$$

$$T_5 := E + T_3$$

$$R := T_2 - T_5$$

(2)



~~n4, n1, n3, n2~~
n2, n3, n1, n4

\therefore $T_3 := C * D$
 (2,Y) (1,1) (1,1)
 $T_5 := E + T_3$
 (4,Y) (1,1) (1,1)
 $T_2 := A + B$
 (4,Y) (1,1) (1,1)
 $R := T_2 - T_5$
 (1,Y) (1,1) (1,1)

中间代码	目标代码	RVALUE	AVALUE
$T_3 := C * D$	LD R0, C MUL R0, D	R0 T_3	T_3 在 R0
$T_5 := E + T_3$	LD R1, E ADD R1, R0	R1 T_5	T_5 在 R1
$T_2 := A + B$	LD R0, A ADD R0, B	R0 T_2 R1 T_5	T_2 在 R0 T_5 在 R1
$R := T_2 - T_5$	SUB R0, R1	R0 R	R 在 R0
ST R0, R			