编译原理第三章作业参考答案

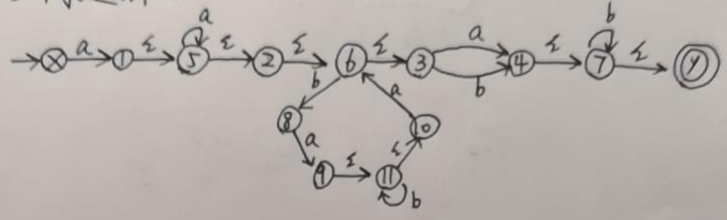
以下是编译原理第三章作业的参考答案和一些可能的解题思路。

补充练习参考答案：

CH3-exercises

(1) $aa^*(bab^*a)^*(a|b)b^*$

① 构造NFA：



②构造DFA.

	a	b
$I_0=\{x\}$	$\varepsilon\text{-c}(I_0\xrightarrow{a}\{1\})$ $=\{1,5,2,6,3\}=I_1$	
$I_1=\{1,5,2,6,3\}$	$\varepsilon\text{-c}(I_1\xrightarrow{a}\{5,4\})$ $=\{5,2,6,3,4,7,y\}=I_2$	$\varepsilon\text{-c}(I_1\xrightarrow{b}\{8,4\})$ $=\{8,4,7,y\}=I_3$
$I_2=\{5,2,6,3,4,7,y\}$ ○	$\varepsilon\text{-c}(I_2\xrightarrow{a}\{5,4\})$ $=I_2$	$\varepsilon\text{-c}(I_2\xrightarrow{b}\{8,4,7\})$ $=\{8,4,7,y\}=I_3$
$I_3=\{8,4,7,y\}$ ○	$\varepsilon\text{-c}(I_3\xrightarrow{a}\{9\})$ $=\{9,11,10\}=I_4$	$\varepsilon\text{-c}(I_3\xrightarrow{b}\{7\})$ $=\{7,y\}=I_5$
$I_4=\{9,11,10\}$	$\varepsilon\text{-c}(I_4\xrightarrow{a}\{6\})$ $=\{6,3\}=I_6$	$\varepsilon\text{-c}(I_4\xrightarrow{b}\{11\})$ $=\{11,10\}=I_7$
$I_5=\{7,y\}$ ○	$\varepsilon\text{-c}(I_5\xrightarrow{a}\{\})$	$\varepsilon\text{-c}(I_5\xrightarrow{b}\{7\})=\{7,y\}$ $=I_5$
$I_6=\{6,3\}$	$\varepsilon\text{-c}(I_6\xrightarrow{a}\{4\})$ $=\{4,7,y\}=I_8$	$\varepsilon\text{-c}(I_6\xrightarrow{b}\{8,4\})$ $=\{8,4,7,y\}=I_3$
$I_7=\{11,10\}$	$\varepsilon\text{-c}(I_7\xrightarrow{a}\{6\})=\{6,3\}=I_6$	$\varepsilon\text{-c}(I_7\xrightarrow{b}\{11\})=\{11,10\}=I$
$I_8=\{4,7,y\}$ ○	$\varepsilon\text{-c}(I_8\xrightarrow{a}\{\})$	$\varepsilon\text{-c}(I_8\xrightarrow{b}\{7\})=\{7,y\}$ $=I_5$

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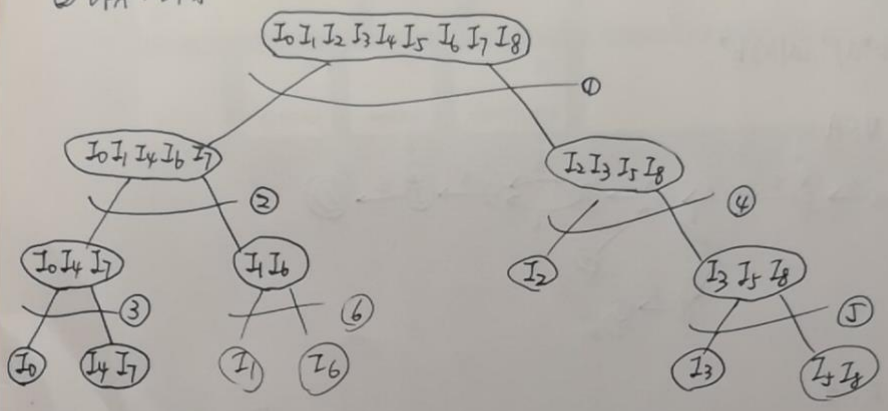
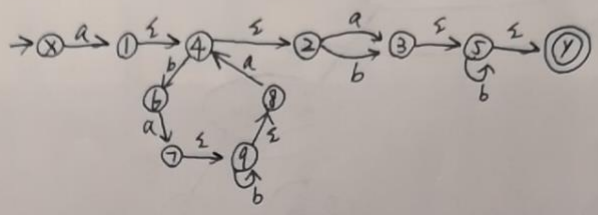
③ DFA→DFA°



选择 I_0、I_4、I_1、I_6、I_2、I_3、I_5

(2) $a(bab^*a)^*(a|b)b^*$

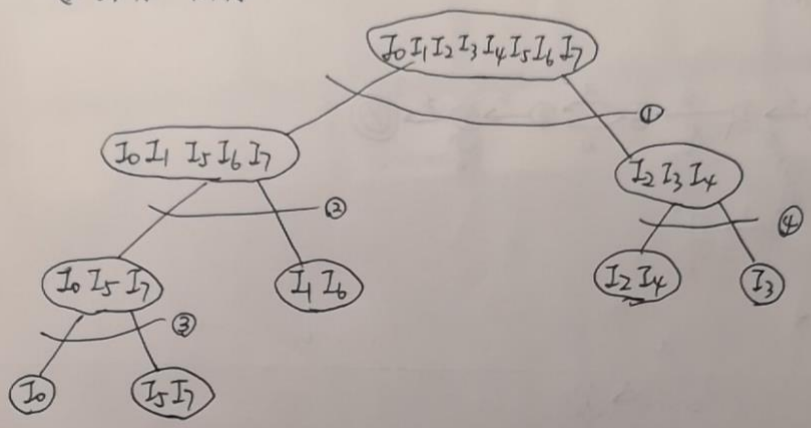
① 构造NFA：



② NFA→DFA：

	a	b
$I_0=\{X\}$	$\varepsilon\text{-}c(I_0\xrightarrow{a}\{1\})$ $=\{1,4,2\}=I_1$	
$I_1=\{1,4,2\}$	$\varepsilon\text{-}c(I_1\xrightarrow{a}\{3\})$ $=\{3,5,Y\}=I_2$	$\varepsilon\text{-}c(I_1\xrightarrow{b}\{6,3\})$ $=\{6,3,5,Y\}=I_3$
$I_2=\{3,5,Y\}$		$\varepsilon\text{-}c(I_2\xrightarrow{b}\{5\})=\{5,Y\}=I_4$
$I_3=\{6,3,5,Y\}$	$\varepsilon\text{-}c(I_3\xrightarrow{a}\{7\})$ $=\{7,9,8\}=I_5$	$\varepsilon\text{-}c(I_3\xrightarrow{b}\{5\})=\{5,Y\}=I_4$
$I_4=\{5,Y\}$		$\varepsilon\text{-}c(I_4\xrightarrow{b}\{5\})=\{5,Y\}=I_4$
$I_5=\{7,9,8\}$	$\varepsilon\text{-}c(I_5\xrightarrow{a}\{4\})$ $=\{4,2\}=I_6$	$\varepsilon\text{-}c(I_5\xrightarrow{b}\{9\})=\{9,8\}=I_7$
$I_6=\{4,2\}$	$\varepsilon\text{-}c(I_6\xrightarrow{a}\{3\})=\{3,5,Y\}=I_2$	$\varepsilon\text{-}c(I_6\xrightarrow{b}\{6,3\})=\{6,3,5,Y\}=I_3$
$I_7=\{9,8\}$	$\varepsilon\text{-}c(I_7\xrightarrow{a}\{4\})=I_6$	$\varepsilon\text{-}c(I_7\xrightarrow{b}\{9\})=I_7$

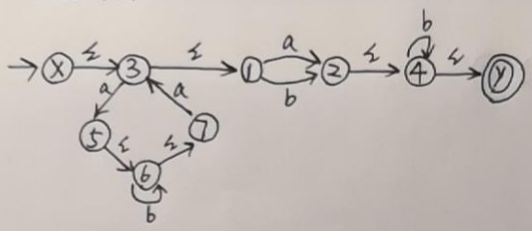
③ DFA → DFA°



选择 I_0、I_5、I_1、I_2、I_3

(3) $(ab^*a)^*(a|b)b^*$

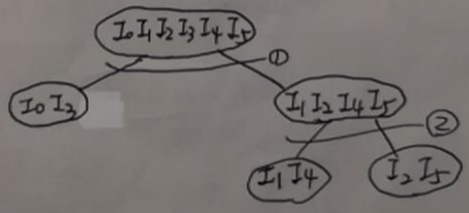
① 构造 NFA：



② NFA → DFA：

	a	b
$I_0=\{X,3,1\}$	$\varepsilon\text{-}c(I_0\xrightarrow{a}\{5,2\})$ $=\{5,6,7,2,4,y\}=I_1$	$\varepsilon\text{-}c(I_0\xrightarrow{b}\{2\})=\{2,4,y\}=I_2$
$I_1=\{5,6,7,2,4,y\}$	$\varepsilon\text{-}c(I_1\xrightarrow{a}\{3\})=\{3,1\}=I_3$	$\varepsilon\text{-}c(I_1\xrightarrow{b}\{6,4\})=\{6,7,4,y\}=I_4$
$I_2=\{2,4,y\}$		$\varepsilon\text{-}c(I_2\xrightarrow{b}\{4\})=\{4,y\}=I_5$
$I_3=\{3,1\}$	$\varepsilon\text{-}c(I_3\xrightarrow{a}\{5,2\})$ $=\{5,6,7,2,4,y\}=I_1$	$\varepsilon\text{-}c(I_3\xrightarrow{b}\{2\})=I_2$
$I_4=\{6,7,4,y\}$	$\varepsilon\text{-}c(I_4\xrightarrow{a}\{3\})=I_3$	$\varepsilon\text{-}c(I_4\xrightarrow{b}\{6,4\})=I_4$
$I_5=\{4,y\}$		$\varepsilon\text{-}c(I_5\xrightarrow{b}\{4\})=I_5$

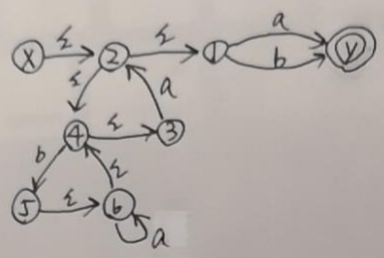
③ DFA → DFA°



选择 I_0、I_1、I_2

(4) $((ba^*)^*a)^*(a|b)$

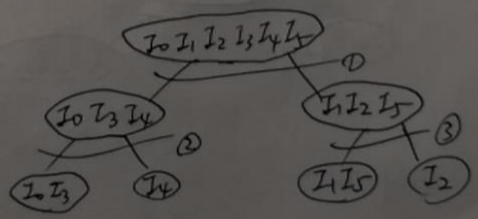
① NFA:



② NFA → DFA:

	a	b
$I_0=\{X,2,1,4,3\}$	$\varepsilon c(I_0 \xrightarrow{a} \{Y,2\})$ $=\{Y,2,1\}=I_1$	$\varepsilon c(I_0 \xrightarrow{b} \{Y,5\})$ $=\{Y,5,6,4,3\}=I_2$
$I_1=\{Y,2,1\}$	$\varepsilon c(I_1 \xrightarrow{a} \{Y,2\})=I_1$	$\varepsilon c(I_1 \xrightarrow{b} \{Y,5\})=I_2$
$I_2=\{Y,5,6,4,3\}$	$\varepsilon c(I_2 \xrightarrow{a} \{6,2\})$ $=\{6,4,3,2,1\}=I_3$	$\varepsilon c(I_2 \xrightarrow{b} \{5\})=\{5,6,4,3\}$ $=I_4$
$I_3=\{6,4,3,2,1\}$	$\varepsilon c(I_3 \xrightarrow{a} \{6,2,Y\})$ $=\{6,4,3,2,1,Y\}=I_5$	$\varepsilon c(I_3 \xrightarrow{b} \{5,Y\})=I_2$
$I_4=\{5,6,4,3\}$	$\varepsilon c(I_4 \xrightarrow{a} \{6,2\})=I_3$	$\varepsilon c(I_4 \xrightarrow{b} \{5\})=I_4$.
$I_5=\{6,4,3,2,1,Y\}$	$\varepsilon c(I_5 \xrightarrow{a} \{6,2,Y\})=I_5$	$\varepsilon c(I_5 \xrightarrow{b} \{5,Y\})=I_2$.

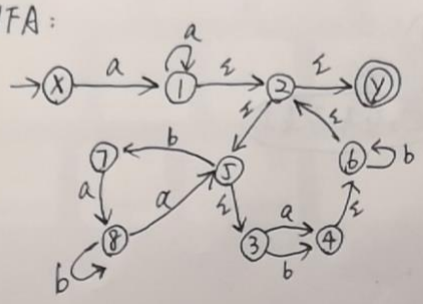
③ DFA → DFA°



选择 I_0、I_4、I_1、I_2

(5) $aa^*((bab^*a)^*(a|b)b^*)^*$

① NFA:



② NFA → DFA:

	a	b
$I_0=\{X\}$	$\varepsilon c(I_0 \xrightarrow{a} \{1\})$ $=\{1,2,y,5,3\}=I_1$	
$I_1=\{1,2,y,5,3\}$	$\varepsilon c(I_1 \xrightarrow{a} \{1,4\})$ $=\{1,2,y,5,3,4,6\}=I_2$	$\varepsilon c(I_1 \xrightarrow{b} \{7,4\})$ $=\{7,4,6,2,y,5,3\}=I_3$
$I_2=\{1,2,y,5,3,4,6\}$	$\varepsilon c(I_2 \xrightarrow{a} \{1,4\})=I_2$	$\varepsilon c(I_2 \xrightarrow{b} \{7,4,6\})$ $=\{7,4,6,2,5,3,y\}=I_3$
$I_3=\{7,4,6,2,y,5,3\}$	$\varepsilon c(I_3 \xrightarrow{a} \{8,4\})$ $=\{8,4,6,2,y,5,3\}=I_4$	$\varepsilon c(I_3 \xrightarrow{b} \{6,7,4\})$ $=\{7,6,2,5,3,4,y\}=I_3$
$I_4=\{8,4,6,2,y,5,3\}$	$\varepsilon c(I_4 \xrightarrow{a} \{5,4\})$ $=\{5,3,4,6,2,y\}=I_5$	$\varepsilon c(I_4 \xrightarrow{b} \{8,6,7,4\})$ $=\{8,6,7,4,2,5,y\}=I_6$
$I_5=\{5,3,4,6,2,y\}$	$\varepsilon c(I_5 \xrightarrow{a} \{4\})$ $=\{4,6,2,5,3,y\}=I_7$	$\varepsilon c(I_5 \xrightarrow{b} \{7,4,6\})$ $=I_3$
$I_6=\{8,6,7,4,2,5,y\}$	$\varepsilon c(I_6 \xrightarrow{a} \{5,4\})=I_5$	$\varepsilon c(I_6 \xrightarrow{b} \{8,4,6,7\})=I_6$
$I_7=\{4,6,2,5,3,y\}$	$\varepsilon c(I_7 \xrightarrow{a} \{4\})=I_7$	$\varepsilon c(I_7 \xrightarrow{b} \{4,6,7\})=I_3$

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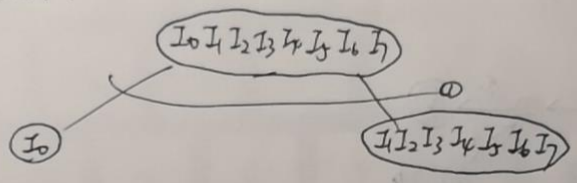
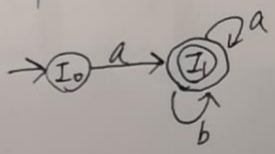
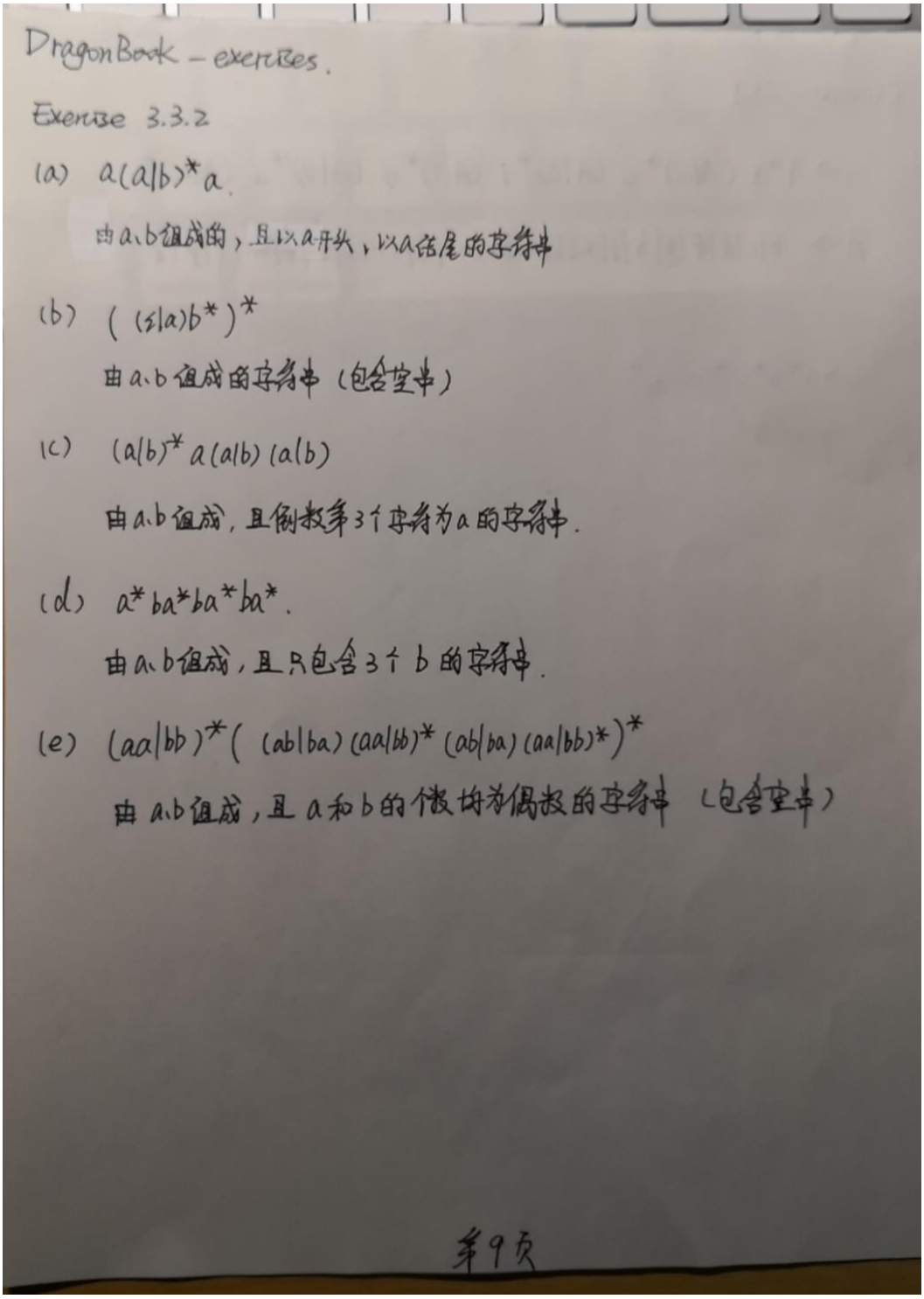
③ DFA→DFA°.



选择 I_0、I_1



龙书题目部分参考答案：



DragonBook – exercises.

Exercise 3.3.2

(a) $a(a|b)^*a$

由a、b组成的，且以a开头，以a结尾的字符串

(b) $((\varepsilon|a)b^*)^*$

由a、b组成的字符串（包含空串）

(c) $(a|b)^*a(a|b)(a|b)$

由a、b组成，且倒数第3个字符为a的字符串.

(d) $a^*ba^*ba^*ba^*$.

由a、b组成，且只包含3个b的字符串.

(e) $(aa|bb)^*((ab|ba)(aa|bb)^*(ab|ba)(aa|bb)^*)^*$

由a、b组成，且a和b的个数均为偶数的字符串（包含空串）

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3.3.5

(a) other → [bcdfghjklmnpqrstvwxyz]

other*a(other|a)*e(other|e)*i(other|i)*o(other|o)*u(other|u)*

(b) a*b*…z*

(c) /@["@"]*|".*"|@+[^/]*@*@/

(@代表星号)

(d) 以{0,1,2}为例

$r_0 \to 0$, $r_1 \to 1$, $r_2 \to 2$

$r_{01} \to 0r_1 | 1r_0$, $r_{02} \to 0r_2 | 2r_0$, $r_{12} \to 1r_2 | 2r_1$

$r_{012} \to 0r_{12} | 1r_{02} | 2r_{01}$

$r \to r_0 | r_1 | r_2 | r_{12} | r_{01} | r_{02} | r_{012}$

(e) 基(d),以{0,1,2}为例

$r_{00} \to 0r_0$, $r_{11} \to 1r_1$ $r_{22} \to 2r_2$

$r_{001} \to 0r_{01} | 1r_{00}$

$r_{002} \to 0r_{02} | 2r_{00}$

……

$r_{122} \to 1r_{22} | 2r_{12}$

$r_{0012} \to 0r_{012} | 1r_{002} | 2r_{001}$

……

$r_{0122} \to \cdots$

$r \to r_0 | r_1 | \cdots | r_{012} | r_{0012} | r_{0112} | r_{0122}$

(f) $S \to bE | a(aa|bb)^*(ab|ba)E$

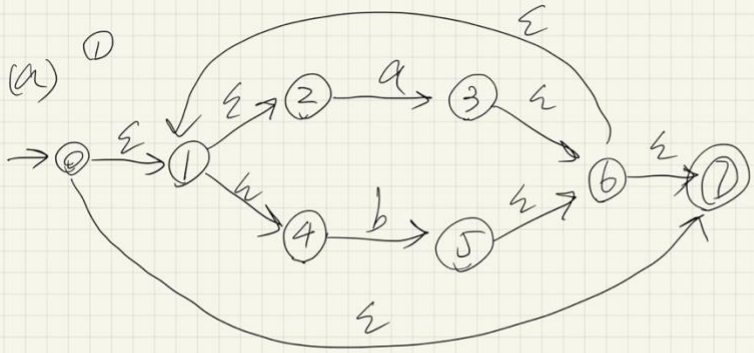
$E \to (aa|bb)^*((ab|ba)(aa|bb)^*(ab|ba)(aa|bb)^*)^*$ (答案不唯一，[redacted]作答即可，写出过程)

(h) $b^*(a|ab)^*$ (同上)

(i) $b^*a^*b?a^*$ (同上)

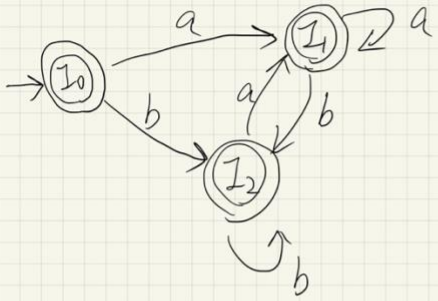
3.7.3

(a) ①



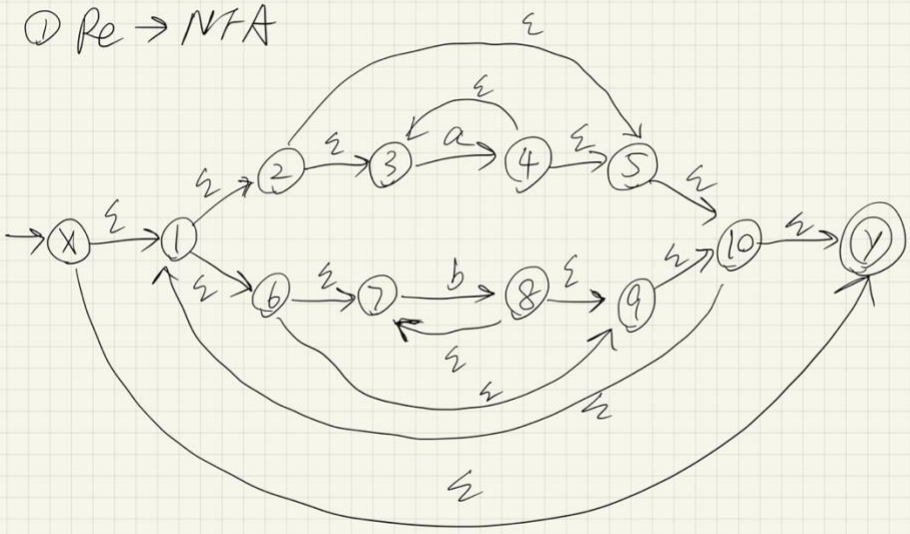
② NFA → DFA

I	a	b
$I_0=\{0,1,2,4,7\}$	$I_1=\{1,2,3,4,6,7\}$	$I_2=\{5,6,1,2,4,7\}$
I_1	I_1	I_2
I_2	I_1	I_2



(b) $(a^*|b^*)^*$

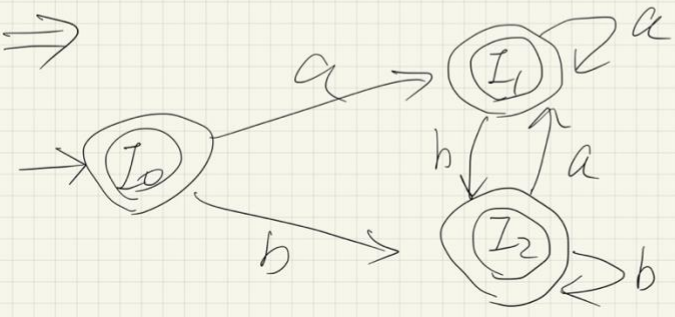
① Re → NFA



② NFA → DFA

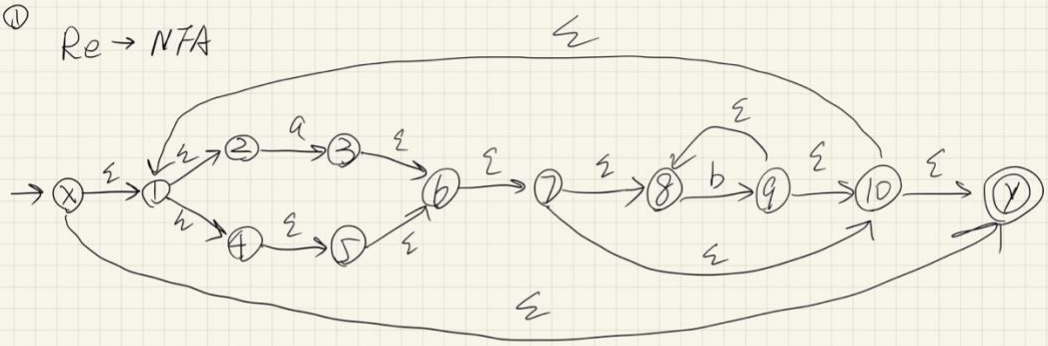
I	a	b
$I_0=\{X,1,2,3,5,6,7,9,10,Y\}$	$I_1=\{4,3,5,10,1,2,6,7,9,Y\}$	$I_2=\{8,9,10,7,1,2,3,6,5,Y\}$
I_1	I_1	I_2
I_2	I_1	I_2

⇒



(C) $((\varepsilon|a)b^*)^*$

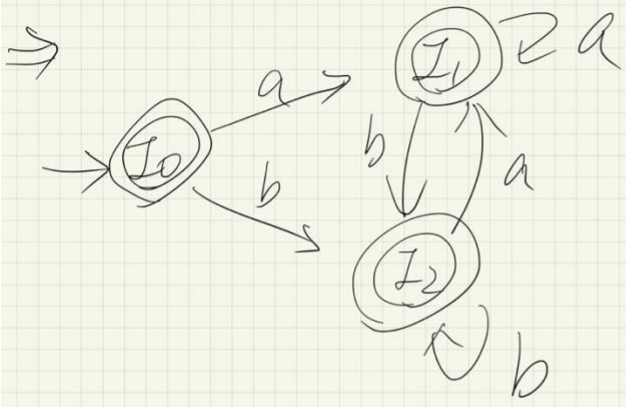
① Re → NFA



② NFA → DFA

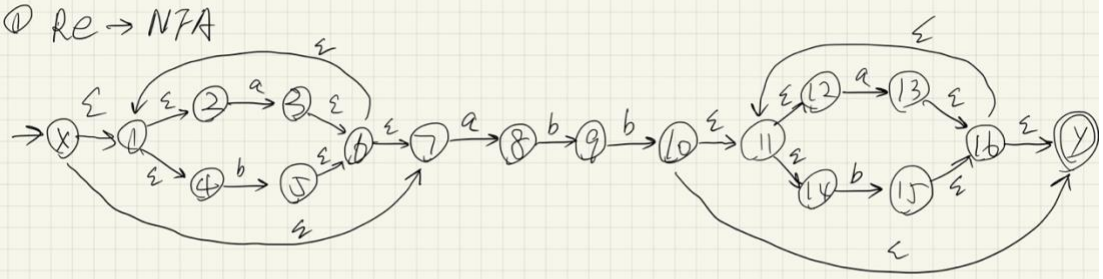
I	a	b
I_0 = {x, 1, 2, 4, 5, 6, 7, 8, 10, y}	I_1	I_2
I_1 = {3, 6, 7, 8, 10, 1, 2, 4, 5, y}	I_1	I_2
I_2 = {9, 8, 10, 1, 2, 4, 5, 6, 7, y}	I_1	I_2

⇒



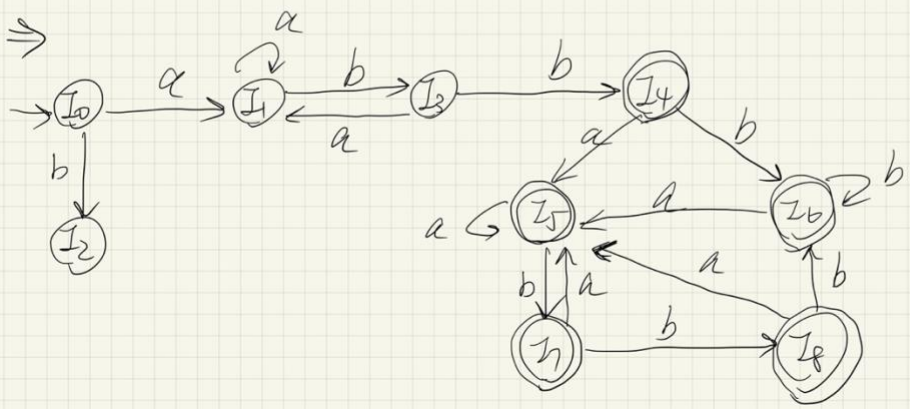
(4) $(a|b)^*abb(a|b)^*$

① Re → NFA



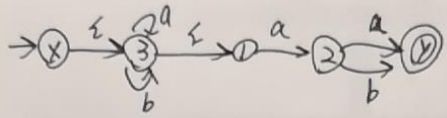
② NFA → DFA

I	a	b
$I_0=\{X,1,2,4,7\}$	I_1	I_2
$I_1=\{1,2,3,4,6,7,8\}$	I_1	I_3
$I_2=\{1,2,4,5,6,7\}$	I_1	I_2
$I_3=\{1,2,4,5,6,7,9\}$	I_1	I_4
$I_4=\{1,2,4,5,6,7,10,11,12,14,Y\}$	I_5	I_6
$I_5=\{1,2,3,4,6,7,8,11,12,13,14,16,Y\}$	I_5	I_7
$I_6=\{1,2,4,5,6,7,11,12,14,15,16,Y\}$	I_5	I_6
$I_7=\{1,2,4,5,6,7,9,11,12,14,15,16,Y\}$	I_5	I_8
$I_8=\{1,2,4,5,6,7,10,11,12,14,15,16,Y\}$	I_5	I_6



Exercise 3.9.4

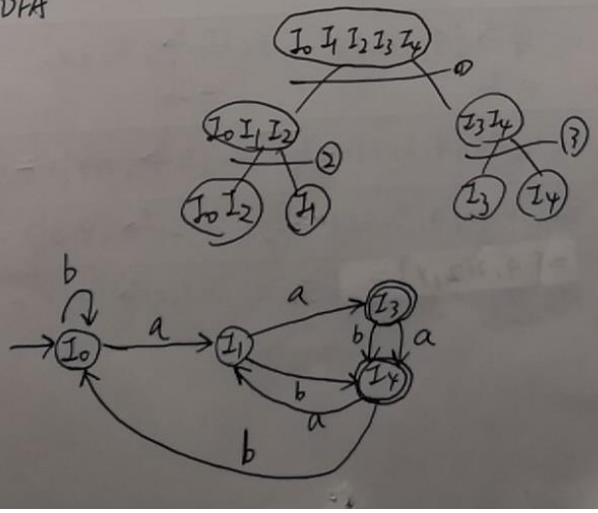
a) $(a|b)^* a(a|b)$



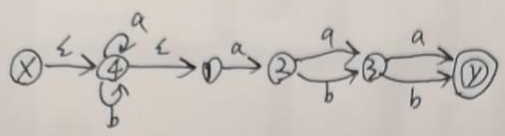
NFA → DFA:

	a	b
$I_0 = \{X, 3, 1\}$	$\varepsilon\text{-c}(I_0 \xrightarrow{a} \{3,2\}) = \{3,1,2\} = I_1$	$\varepsilon\text{-c}(I_0 \xrightarrow{b} \{3\}) = \{3,1\} = I_2$
$I_1 = \{3,1,2\}$	$\varepsilon\text{-c}(I_1 \xrightarrow{a} \{3,2,Y\}) = \{3,2,Y,1\} = I_3$	$\varepsilon\text{-c}(I_1 \xrightarrow{b} \{3,Y\}) = \{3,1,Y\} = I_4$
$I_2 = \{3,1\}$	$\varepsilon\text{-c}(I_2 \xrightarrow{a} \{3,2\}) = I_1$	$\varepsilon\text{-c}(I_2 \xrightarrow{b} \{3\}) = I_2$
$I_3 = \{3,2,Y,1\}$	$\varepsilon\text{-c}(I_3 \xrightarrow{a} \{3,Y\}) = I_4$	$\varepsilon\text{-c}(I_3 \xrightarrow{b} \{3,Y\}) = I_4$
$I_4 = \{3,1,Y\}$	$\varepsilon\text{-c}(I_4 \xrightarrow{a} \{3,2\}) = I_1$	$\varepsilon\text{-c}(I_4 \xrightarrow{b} \{3\}) = I_2$

DFA → DFA°



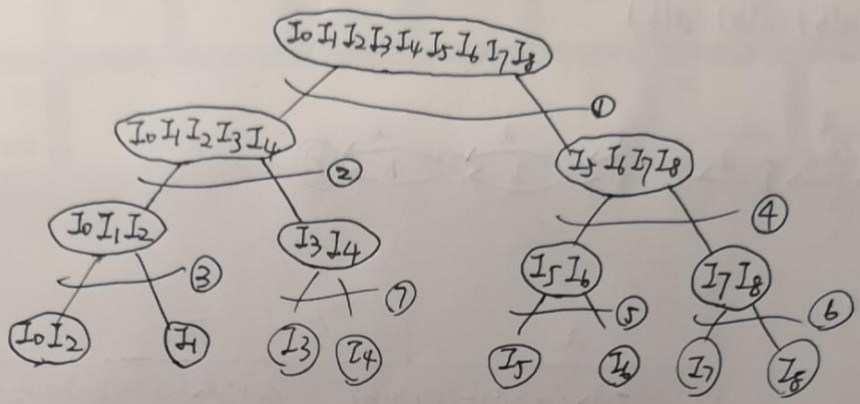
b) $(a|b)^*a(a|b)(a|b)$



NFA → DFA.

	a	b
$I_0=\{X,4,1\}$	$\varepsilon c(I_0 \xrightarrow{a} \{4,2\})$ $=\{4,1,2\}=I_1$	$\varepsilon c(I_0 \xrightarrow{b} \{4\})$ $=\{4,1\}=I_2$
$I_1=\{4,1,2\}$	$\varepsilon c(I_1 \xrightarrow{a} \{4,2,3\})$ $=\{4,1,2,3\}=I_3$	$\varepsilon c(I_1 \xrightarrow{b} \{4,3\})$ $=\{4,1,3\}=I_4$
$I_2=\{4,1\}$	$\varepsilon c(I_2 \xrightarrow{a} \{4,2\})=I_1$	$\varepsilon c(I_2 \xrightarrow{b} \{4\})=I_2$
$I_3=\{4,1,2,3\}$	$\varepsilon c(I_3 \xrightarrow{a} \{4,2,3,Y\})$ $=\{4,1,2,3,Y\}=I_5$	$\varepsilon c(I_3 \xrightarrow{b} \{4,3,Y\})$ $=\{4,1,3,Y\}=I_6$
$I_4=\{4,1,3\}$	$\varepsilon c(I_4 \xrightarrow{a} \{4,2,Y\})$ $=\{4,1,2,Y\}=I_7$	$\varepsilon c(I_4 \xrightarrow{b} \{4,Y\})$ $=\{4,1,Y\}=I_8$
$I_5=\{4,1,2,3,Y\}$	$\varepsilon c(I_5 \xrightarrow{a} \{4,2,3,Y\})$ $=I_5$	$\varepsilon c(I_5 \xrightarrow{b} \{4,3,Y\})$ $=I_6$
$I_6=\{4,1,3,Y\}$	$\varepsilon c(I_6 \xrightarrow{a} \{4,2,Y\})=I_7$	$\varepsilon c(I_6 \xrightarrow{b} \{4,Y\})=I_8$
$I_7=\{4,1,2,Y\}$	$\varepsilon c(I_7 \xrightarrow{a} \{4,2,3\})=I_3$	$\varepsilon c(I_7 \xrightarrow{b} \{4,3\})=I_4$
$I_8=\{4,1,Y\}$	$\varepsilon c(I_8 \xrightarrow{a} \{4,2\})=I_1$	$\varepsilon c(I_8 \xrightarrow{b} \{4\})=I_2$

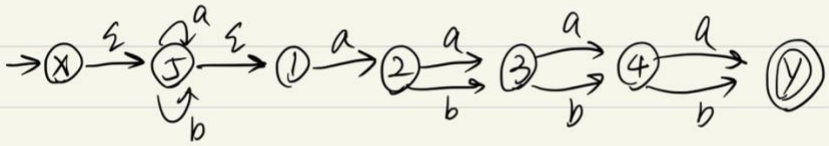
b/ DFA → DFA°


$I_0 I_1 I_2 I_3 I_4 I_5 I_6 I_7 I_8$
①
$I_0 I_1 I_2 I_3 I_4$
$I_5 I_6 I_7 I_8$
②
④
$I_0 I_1 I_2$
$I_3 I_4$
$I_5 I_6$
$I_7 I_8$
③
⑦
⑤
⑥
$I_0 I_2$
I_1
I_3
I_4
I_5
I_6
I_7
I_8

3.9.4

(C)

1° Re → NFA.



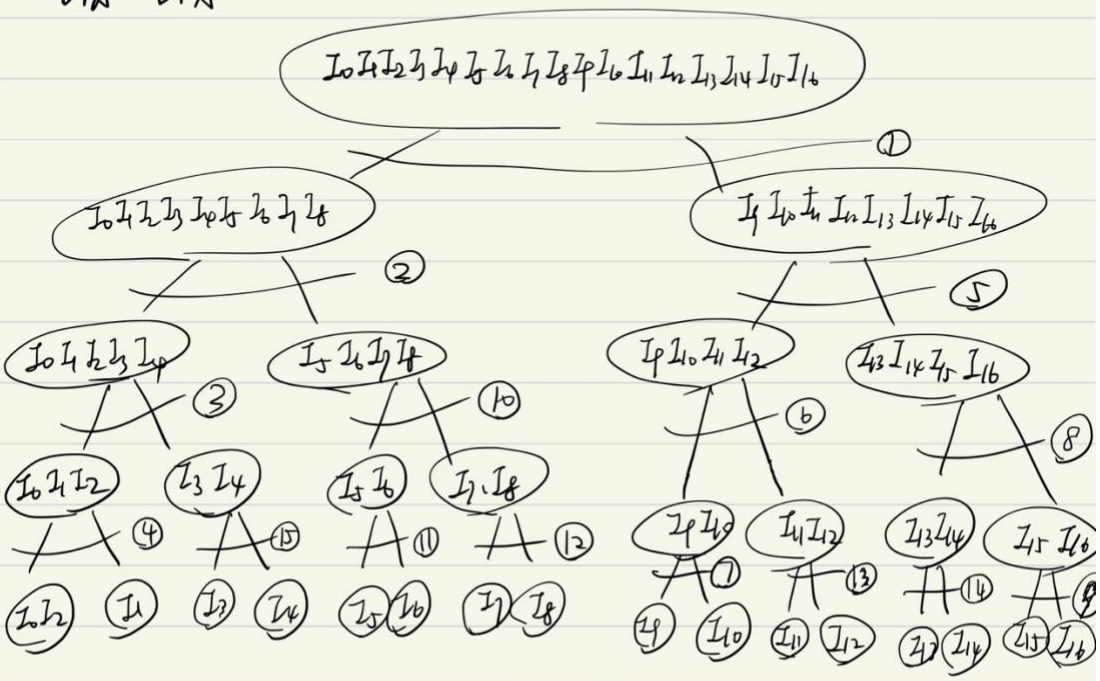
2° NFA → DFA :

I	a	b
$I_0=\{X,S,1\}$	$\varepsilon\text{-}c(I_0 \xrightarrow{a} \{S,2\})=\{S,2,1\}=I_1$	$\varepsilon\text{-}c(I_0 \xrightarrow{b} \{S\})=\{S,1\}=I_2$
$I_1=\{S,2,1\}$	$\varepsilon\text{-}c(I_1 \xrightarrow{a} \{S,3,2\})=\{S,3,2,1\}=I_3$	$\varepsilon\text{-}c(I_1 \xrightarrow{b} \{S,3\})=\{S,3,1\}=I_4$
$I_2=\{S,1\}$	$\varepsilon\text{-}c(I_2 \xrightarrow{a} \{S,2\})=\{S,2,1\}=I_1$	$\varepsilon\text{-}c(I_2 \xrightarrow{b} \{S\})=\{S,1\}=I_2$
$I_3=\{S,3,2,1\}$	$\varepsilon\text{-}c(I_3 \xrightarrow{a} \{S,4,3,2,1\})=\{S,4,3,2,1\}=I_5$	$\varepsilon\text{-}c(I_3 \xrightarrow{b} \{S,4,3\})=\{S,4,3,1\}=I_6$
$I_4=\{S,3,1\}$	$\varepsilon\text{-}c(I_4 \xrightarrow{a} \{S,4,2\})=\{S,4,2,1\}=I_7$	$\varepsilon\text{-}c(I_4 \xrightarrow{b} \{S,4\})=\{S,4,1\}=I_8$
$I_5=\{S,4,3,2,1\}$	$\varepsilon\text{-}c(I_5 \xrightarrow{a} \{S,Y,4,3,2\})=\{S,Y,4,3,2,1\}=I_9$	$\varepsilon\text{-}c(I_5 \xrightarrow{b} \{S,Y,4,3\})=\{S,Y,4,3,1\}=I_{10}$
$I_6=\{S,4,3,1\}$	$\varepsilon\text{-}c(I_6 \xrightarrow{a} \{S,Y,4,2\})=\{S,Y,4,2,1\}=I_{11}$	$\varepsilon\text{-}c(I_6 \xrightarrow{b} \{S,Y,4\})=\{S,Y,4,1\}=I_{12}$

$I_7 = \{5,4,2,1\}$	$cl(I_7 \xrightarrow{a} \{5,4,3,2\})$ $= \{5,4,3,2,1\} = I_{13}$	$cl(I_7 \xrightarrow{b} \{5,4,3\})$ $= \{5,4,3,1\} = I_{14}$
$I_8 = \{5,4,1\}$	$cl(I_8 \xrightarrow{a} \{5,4,2\})$ $= \{5,4,2,1\} = I_{15}$	$cl(I_8 \xrightarrow{b} \{5,4\})$ $= \{5,4,1\} = I_{16}$
$I_9 = \{5,4,3,2,1\}$	$cl(I_9 \xrightarrow{a} \{5,4,3,2\})$ $= \{5,4,3,2,1\} = I_9$	$cl(I_9 \xrightarrow{b} \{5,4,3\})$ $= \{5,4,3,1\} = I_{10}$
$I_{10} = \{5,4,3,1\}$	$cl(I_{10} \xrightarrow{a} \{5,4,2\})$ $= \{5,4,3,2,1\} = I_{11}$	$cl(I_{10} \xrightarrow{b} \{5,4\})$ $= \{5,4,3,1\} = I_{12}$
$I_{11} = \{5,4,3,2,1\}$	$cl(I_{11} \xrightarrow{a} \{5,4,3,2\})$ $= \{5,4,3,2,1\} = I_{13}$	$cl(I_{11} \xrightarrow{b} \{5,4,3\})$ $= \{5,4,3,1\} = I_{14}$
$I_{12} = \{5,4,3,1\}$	$cl(I_{12} \xrightarrow{a} \{5,4,2\})$ $= \{5,4,3,2,1\} = I_{15}$	$cl(I_{12} \xrightarrow{b} \{5,4\})$ $= \{5,4,3,1\} = I_{16}$
$I_{13} = \{5,4,3,2,1\}$	$cl(I_{13} \xrightarrow{a} \{5,4,3,2\})$ $= \{5,4,3,2,1\} = I_{15}$	$cl(I_{13} \xrightarrow{b} \{5,4,3\})$ $= \{5,4,3,1\} = I_{16}$
$I_{14} = \{5,4,3,1\}$	$cl(I_{14} \xrightarrow{a} \{5,4,2\})$ $= \{5,4,2,1\} = I_7$	$cl(I_{14} \xrightarrow{b} \{5,4\})$ $= \{5,4,1\} = I_8$

$I_{15}=\{5,y,2,1\}$	$\varepsilon\text{-c}(I_{15}\xrightarrow{a}\{5,3,2\})$ $=\{5,3,2,1\}=I_3$	$\varepsilon\text{-c}(I_{15}\xrightarrow{b}\{5,3\})$ $=\{5,3,1\}=I_4$
$I_{16}=\{5,y,1\}$	$\varepsilon\text{-c}(I_{16}\xrightarrow{a}\{5,2\})$ $=\{5,2,1\}=I_1$	$\varepsilon\text{-c}(I_{16}\xrightarrow{b}\{5\})$ $=\{5,1\}=I_2$

3° DFA → DFA°



结论：若有n个(a|b)，则状态数为 2^{n+1}

（每多一个(a|b)，则状态数翻倍）