编译原理

好好学习！！！天天向上！！！

任课老师：谢晓园 邮箱：xxie@whu.edu.cn 办公室：计算机学院E301

助教：黎源 邮箱：1445660426@qq.com

P86 3.4.1

给出识别练习3.2.2中各个正则表达式所描述的语言的状态图：

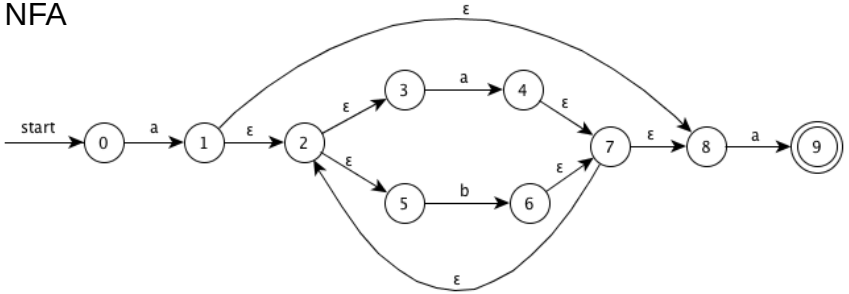
1） a(a|b)*a
2） ((ε|a)b*)*
3） (a|b)*a(a|b)(a|b)
4） a*ba*ba*ba*
5） (aa|bb)*((ab|ba)(aa|bb)*(ab|ba)(aa|bb)*)*

解答步骤：NFA -> DFA -> 最少状态的 DFA（状态转换图）

P86 3.4.1

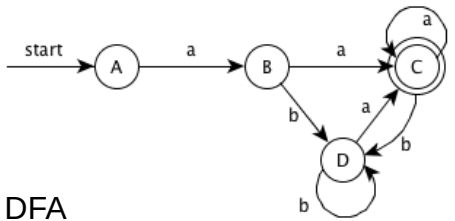
1) a(a|b)*a

NFA

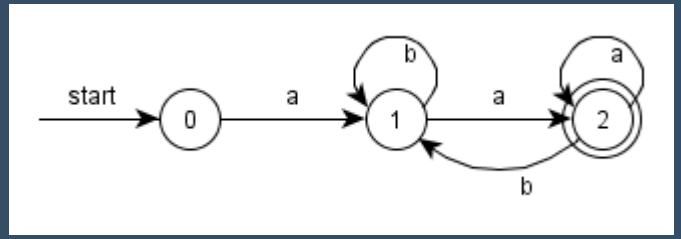


NFA	DFA	a	b
{0}	A	B	
{1,2,3,5,8}	B	C	D
{2,3,4,5,7,8,**9**}	**C**	C	D
{2,3,5,6,7,8}	D	C	D

DFA

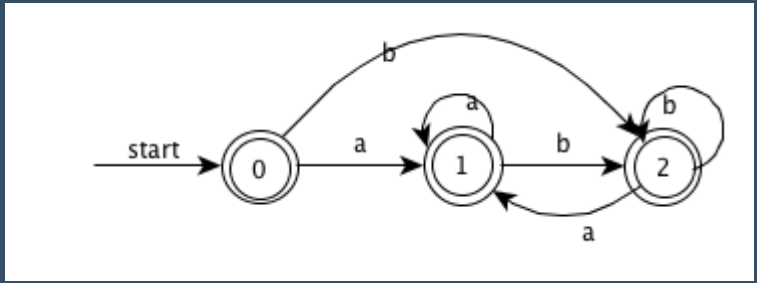


最少状态的 DFA(状态转换图):
合并不可区分的状态 B 和 D

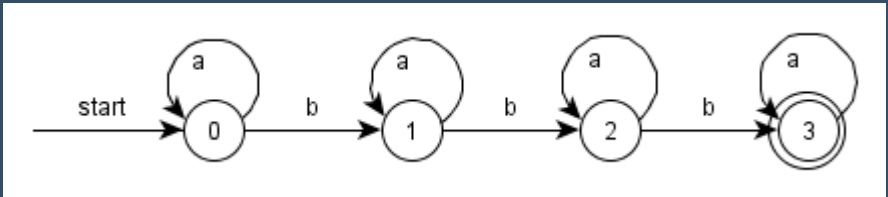


P86 3.4.1

2) ((ε|a)b*)*

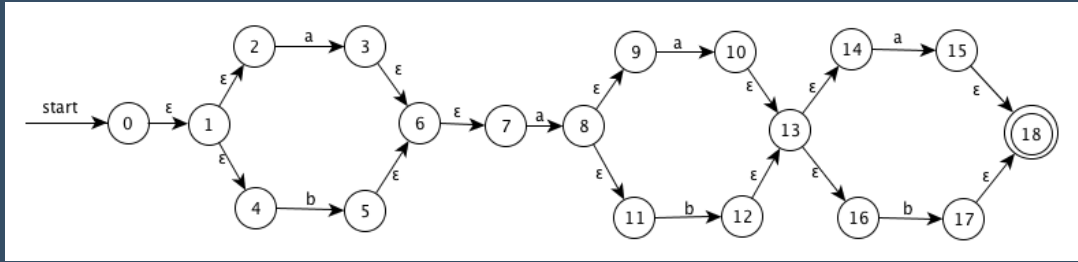


4) a*ba*ba*ba*



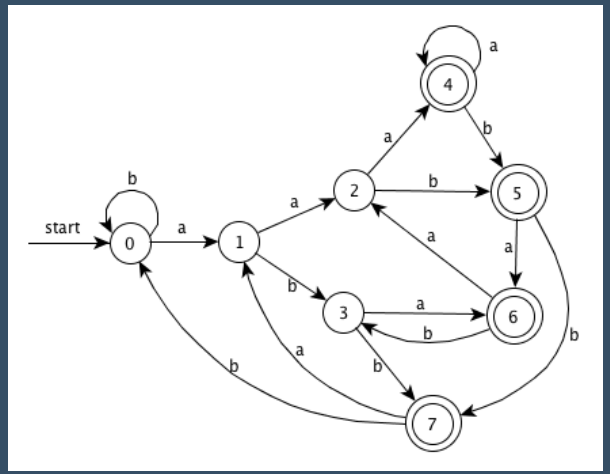
P86 3.4.1

3) (a|b)*a(a|b)(a|b)



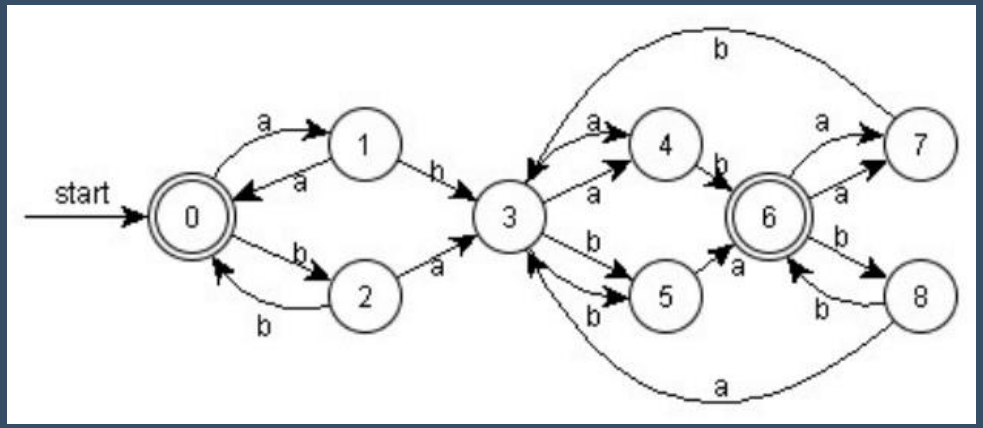
NFA	DFA	a	b
{0,1,2,4,7}	A	B	C
{1,2,3,4,6,7,8,9,11}	B	D	E
{1,2,4,5,6,7}	C	B	C
{1,2,3,4,6,7,8,9,10,11,13,14,16}	D	F	G
{1,2,4,5,6,7,12,13,14,16}	E	H	I
{1,2,3,4,6,7,8,9,10,11,13,14,15,16,**18**}	F	F	G
{1,2,4,5,6,7,12,13,14,16,17,**18**}	G	H	I
{1,2,3,4,6,7,8,9,11,15,**18**}	H	D	E
{1,2,4,5,6,7,17,**18**}	I	B	C

最少状态的 DFA(状态转换图):
合并不可区分的状态 A 和 C



P86 3.4.1

5) (aa|bb)*((ab|ba)(aa|bb)*(ab|ba)(aa|bb)*)*

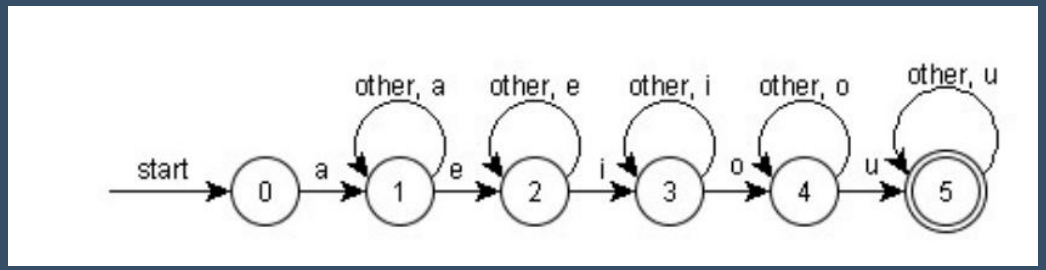


P86 3.4.2

给出识别练习3.3.5中各个正则表达式所描述的语言的状态转换图：

1) 包含5个元音的所有小写字母串，这些串中的元音按顺序出现。

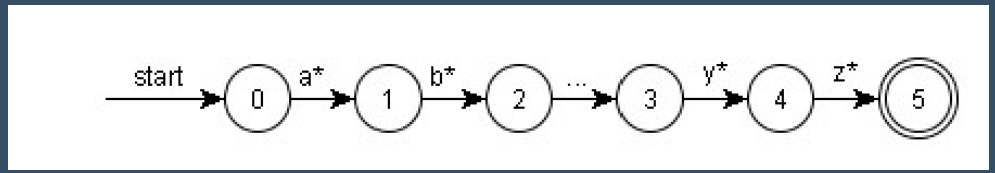
- S -> other* a (other|a)* e (other|e)* i (other|i)* o (other|o)* u (other|u)*
- other -> [bcdfghjklmnpqrstvwxyz]



P86 3.4.2

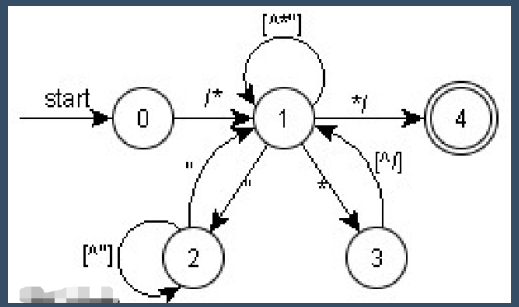
2) 所有由按词典递增序排列的小写字母组成的串。

- a* b* ... z*



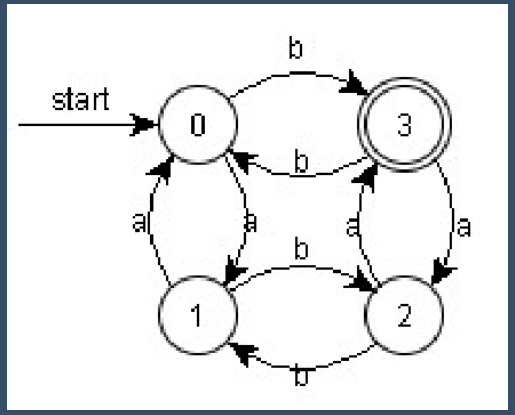
3) 注释，即/*和*/之间的串，且串中没有不在双引号（”）中的*/。

- \/* ([^*"]* | "[^*"]“ | * + [^/])* *\/

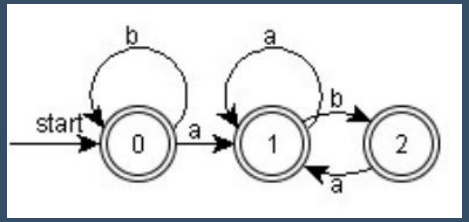


P86 3.4.2

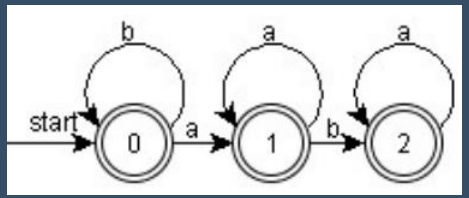
6) 所有由偶数个a和奇数个b构成的串。
- S -> (FE* G | (aa)* b) (E | GE* G)*
- E -> b(aa)* b
- F -> a(aa)* b
- G -> b(aa)* ab | a



8) 所有由a和b组成且不含子串abb的串。
- b* (a + b?)*



9) 所有由a和b组成且不含子序列abb的串
- b* | b*a + | b*a + ba*



P96 3.6.3

找出图3-29所示的NFA中所有标号为aabb的路径。这个NFA接受aabb吗？

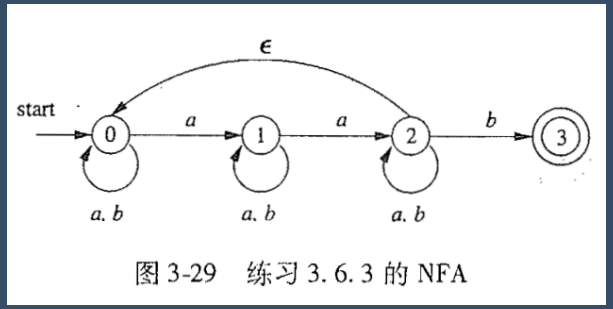


图 3-29　练习 3. 6. 3 的 NFA

- (0) -a-> (1) -a-> (2) -b-> (2) -b-> ((3))
- (0) -a-> (0) -a-> (0) -b-> (0) -b-> (0)
- (0) -a-> (0) -a-> (1) -b-> (1) -b-> (1)
- (0) -a-> (1) -a-> (1) -b-> (1) -b-> (1)
- (0) -a-> (1) -a-> (2) -b-> (2) -b-> (2)
- (0) -a-> (1) -a-> (2) -b-> (2) -ε-> (0) -b-> (0)
- (0) -a-> (1) -a-> (2) -ε-> (0) -b-> (0) -b-> (0)

这个NFA接受aabb

P96 3.6.4

对于图3-30的NFA中所有标号为aabb的路径。
这个NFA接受aabb吗？

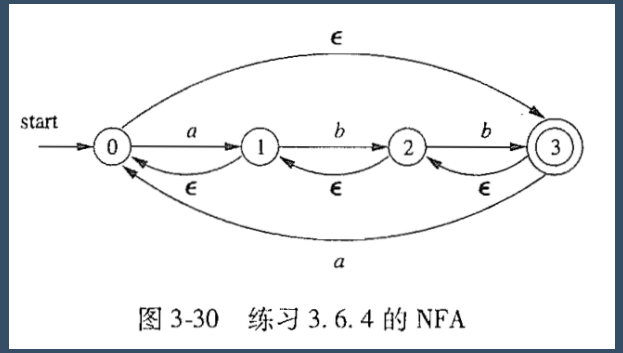


图 3-30　练习 3. 6. 4 的 NFA

- (0) -a-> (1) -ε-> (0) -a-> (1) -b-> (2) -b-> ((3))
- (0) -ε-> (3) -a-> (0) -a-> (1) -b-> (2) -b-> ((3))
- (0) -a-> (1) -ε-> (0) -a-> (1) -ε-> (0) -ε-> (3) -ε-> (2) -b-> (3) -ε-> (2) -b-> ((3))
- (0) -ε-> (3) -a-> (0) -a-> (1) -ε-> (0) -ε-> (3) -ε-> (2) -b-> (3) -ε-> (2) -b-> ((3))
- ……

这个NFA接受aabb

P96 3.6.5

给出如下练习中的NFA转换表：

1）练习3.6.3.

state	a	b	ε
0	{0,1}	{0}	∅
1	{1,2}	{1}	∅
2	{2}	{2,3}	{0}
3	∅	∅	∅

2）练习3.6.4

state	a	b	ε
0	{1}	∅	{3}
1	∅	{2}	{0}
2	∅	{3}	{1}
3	{0}	∅	{2}

3）图3-26

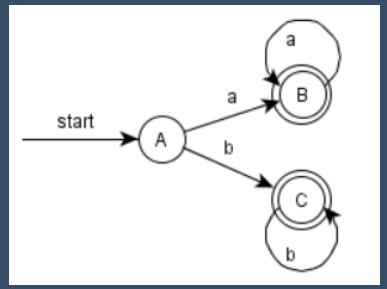
state	a	b	ε
0	∅	∅	{1,2}
1	{2}	∅	∅
2	{2}	∅	∅
3	∅	{4}	∅
4	∅	{4}	∅

P105 3.7.1

将下列图中的NFA转换为DFA：

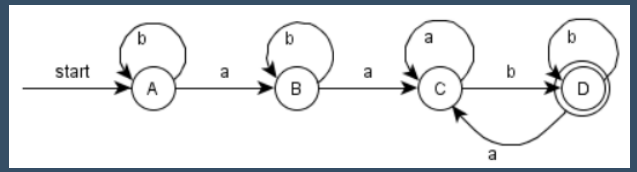
1）图3-26

NFA State	DFA State	a	b
{0,1,3}	A	B	C
{2}	B	B	∅
{4}	C	∅	C



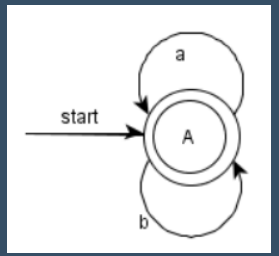
2）图3-29

NFA State	DFA State	a	b
{0}	A	B	A
{0,1}	B	C	B
{0,1,2}	C	C	D
{0,2,3}	D	C	D



3）图3-30

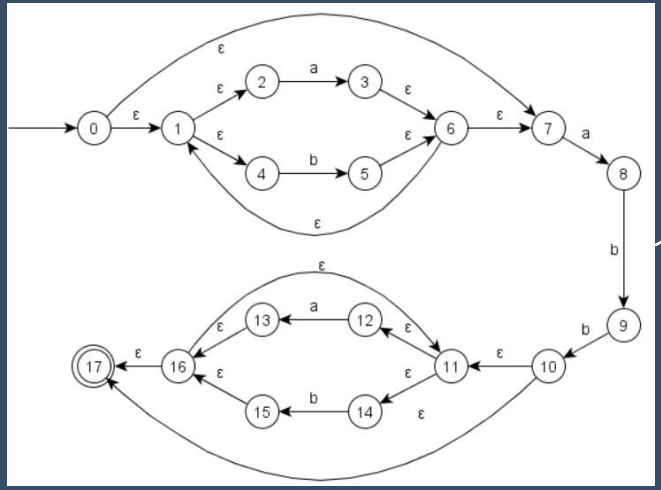
NFA State	DFA State	a	b
{0,1,2,3}	A	A	A



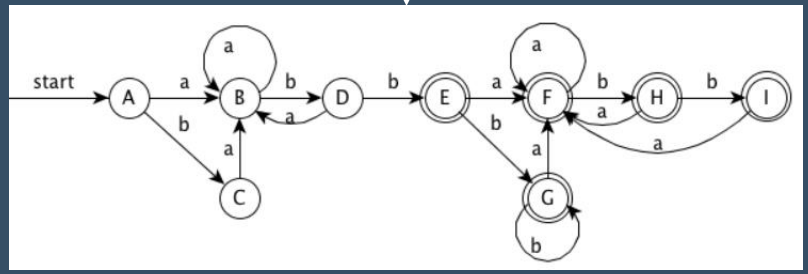
P105 3.7.3

使用算法3.23和3.20将下列正则表达式转换成DFA：

4）(a|b)*abb(a|b)*



NFA State	DFA State	a	b
{0,1,2,4,7}	A	B	C
{1,2,3,4,6,7,8}	B	B	D
{1,2,4,5,6,7}	C	B	C
{1,2,4,5,6,7,9}	D	B	E
{1,2,4,5,6,7,10,11,12,14,17}	E	F	G
{1,2,3,4,6,7,8,11,12,13,14,16,17}	F	F	H
{1,2,4,5,6,7,11,12,13,15,16,17}	G	F	G
{1,2,4,5,6,7,9,11,12,14,15,16,17}	H	F	I
{1,2,4,5,6,7,10,11,12,14,15,16,17}	I	F	G



THANK YOU

No matter how far you may fly, never forget where you come from.

——无论你能飞多远，都别忘了你来自何方。