

第三次课后作业参考答案

March 29, 2018

必做题

1 Ex.2.3.2

解答:

把NFA转化为DFA:

	0	1
$\rightarrow \{p\}$	$\{q, s\}$	$\{q\}$
$*\{q\}$	$\{r\}$	$\{q, r\}$
$\{r\}$	$\{s\}$	$\{p\}$
$*\{s\}$	ϕ	$\{p\}$
$*\{q, s\}$	$\{r\}$	$\{q, p, r\}$
$*\{q, r\}$	$\{r, s\}$	$\{q, p, r\}$
$*\{r, s\}$	$\{s\}$	$\{p\}$
$*\{q, p, r\}$	$\{q, r, s\}$	$\{q, p, r\}$
$*\{q, r, s\}$	$\{r, s\}$	$\{q, p, r\}$
ϕ	ϕ	ϕ

2 Ex.2.3.3

解答:

把NFA转化为DFA:

	0	1
$\rightarrow \{p\}$	$\{p, q\}$	$\{p\}$
$\{p, q\}$	$\{p, q, r, s\}$	$\{p, t\}$
$*\{p, q, r, s\}$	$\{p, q, r, s\}$	$\{p, t\}$
$*\{p, t\}$	$\{p, q\}$	$\{p\}$

非形式化地描述它接受的语言: 所有以00或01结尾的串的集合。

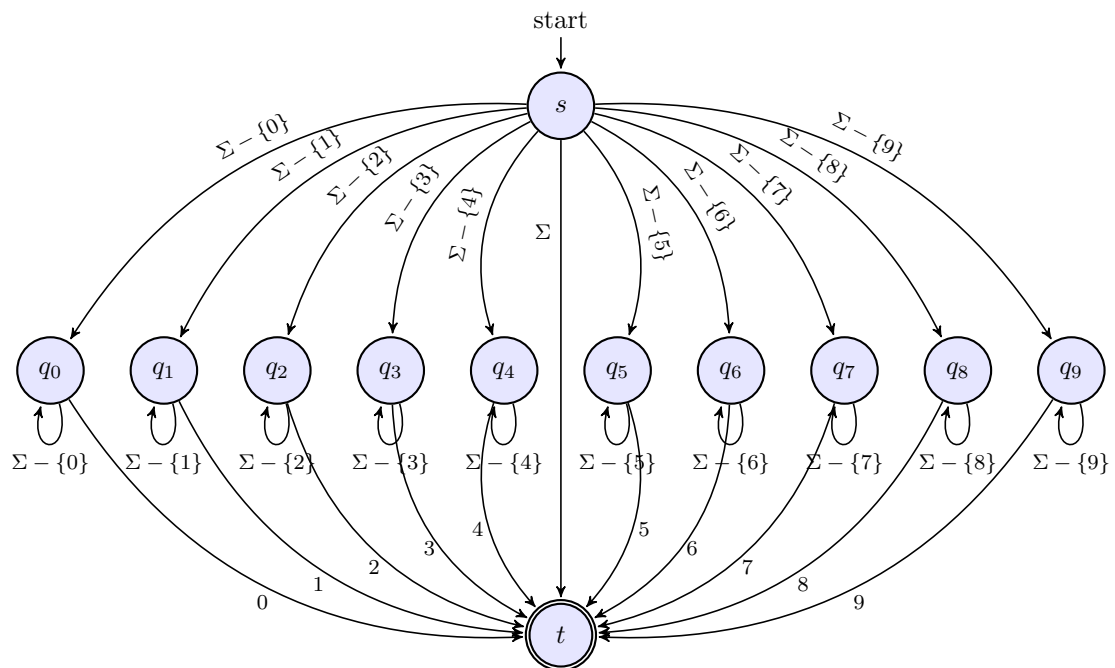
3 Ex.2.3.4

3.1 b)

在字母表 $\{0, 1, \dots, 9\}$ 上的串的集合, 使得结尾数字在前面没有出现过。

解答:

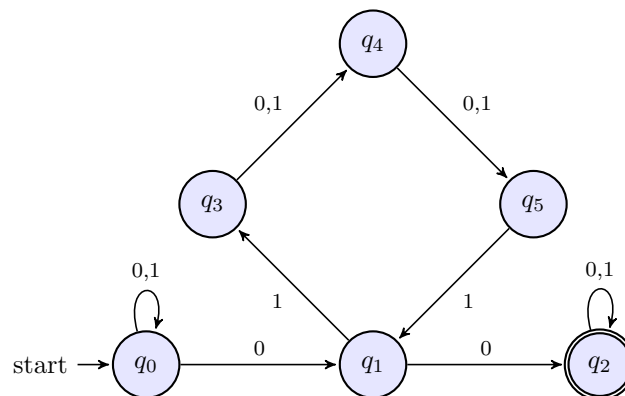
设 $\Sigma = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$,



其中从状态s到t的迁移表示输入只有1个字符的情况。

3.2 c)

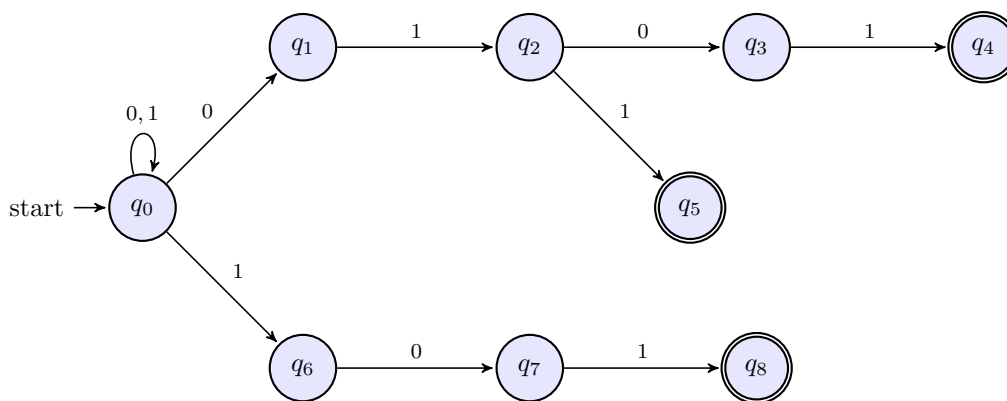
0和1的串的集合，使得有两个0间隔的位置数是4的倍数。注意，0算是4的倍数。
解答：



4 Ex.2.4.1

4.1 b)

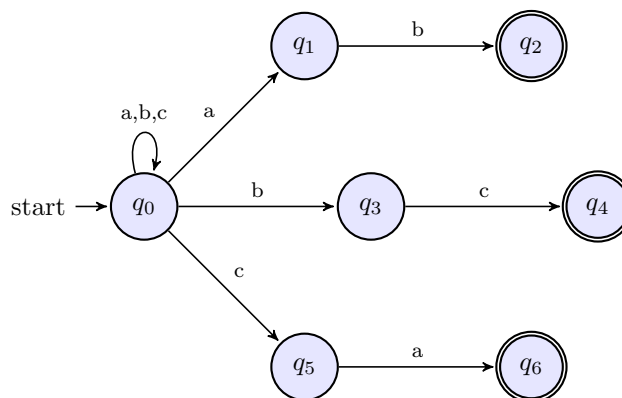
0101、101和011。
解答：



4.2 c)

ab、bc和ca，假设字母表是a,b,c,d。

解答：



5 Ex.2.4.2

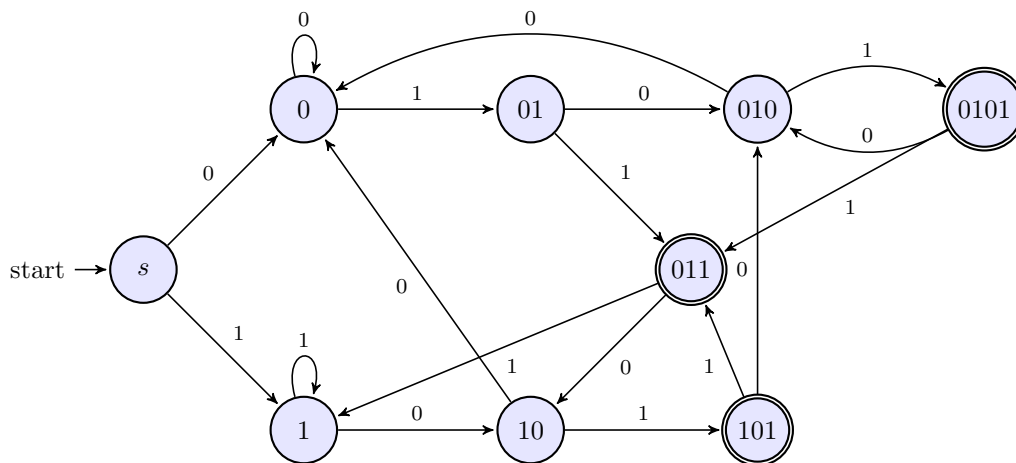
5.1 b)

解答：

从NFA转化：

	0	1
$\rightarrow \{q_0\}$	$\{q_0, q_1\}$	$\{q_0, q_6\}$
$\{q_0, q_1\}$	$\{q_0, q_1\}$	$\{q_0, q_6, q_2\}$
$\{q_0, q_6, q_2\}$	$\{q_0, q_1, q_7, q_3\}$	$\{q_0, q_6, q_5\}$
$\{q_0, q_1, q_7, q_3\}$	$\{q_0, q_1\}$	$\{q_0, q_6, q_2, q_8, q_4\}$
$*\{q_0, q_6, q_2, q_8, q_4\}$	$\{q_0, q_1, q_7, q_3\}$	$\{q_0, q_6, q_5\}$
$*\{q_0, q_6, q_5\}$	$\{q_0, q_1, q_7\}$	$\{q_0, q_6\}$
$\{q_0, q_1, q_7\}$	$\{q_0, q_1\}$	$\{q_0, q_6, q_2, q_8\}$
$*\{q_0, q_6, q_2, q_8\}$	$\{q_0, q_1, q_7, q_3\}$	$\{q_0, q_6, q_5\}$
$\{q_0, q_6\}$	$\{q_0, q_1, q_7\}$	$\{q_0, q_6\}$

也可以根据NFA直接构造DFA：



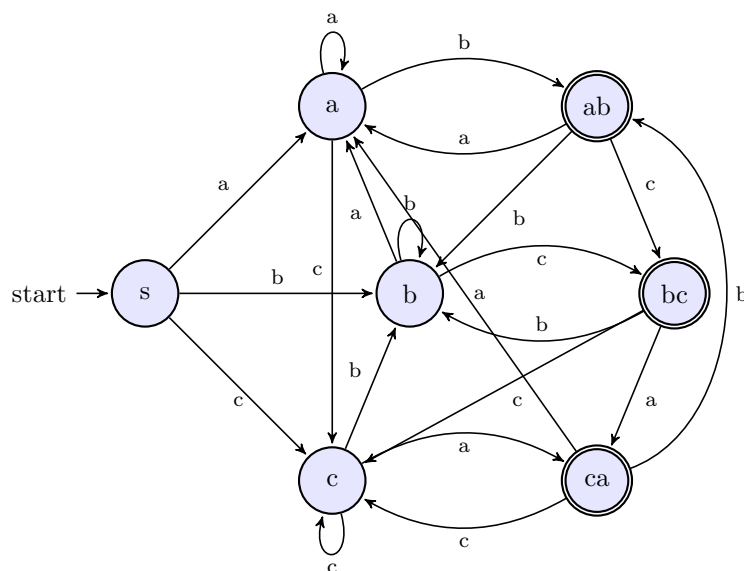
5.2 c)

解答:

从NFA转化:

	a	b	c
$\rightarrow \{q_0\}$	$\{q_0, q_1\}$	$\{q_0, q_3\}$	$\{q_0, q_5\}$
$\{q_0, q_1\}$	$\{q_0, q_1\}$	$\{q_0, q_3, q_2\}$	$\{q_0, q_5\}$
$*\{q_0, q_3, q_2\}$	$\{q_0, q_1\}$	$\{q_0, q_3\}$	$\{q_0, q_5, q_4\}$
$*\{q_0, q_5, q_4\}$	$\{q_0, q_1, q_6\}$	$\{q_0, q_3\}$	$\{q_0, q_5\}$
$*\{q_0, q_1, q_6\}$	$\{q_0, q_1\}$	$\{q_0, q_3, q_2\}$	$\{q_0, q_5\}$
$\{q_0, q_3\}$	$\{q_0, q_1\}$	$\{q_0, q_3\}$	$\{q_0, q_5, q_4\}$
$\{q_0, q_5\}$	$\{q_0, q_1, q_6\}$	$\{q_0, q_3\}$	$\{q_0, q_5\}$

也可以根据NFA直接构造DFA:



6 Ex.2.5.2

解答:

a)

$ECLOSE(p) = \{p, q, r\}$

$ECLOSE(q) = \{q\}$

$ECLOSE(r) = \{r\}$

b)

长度为0的串: ε
 长度为1的串: a, b, c
 长度为2的串: aa, ab, ac, ba, bb, bc, ca, cb, cc
 长度为3的串: aaa, aab, aac, aba, abb, abc, acb, acc, baa, bab, bac, bca, bcb, bcc, caa, cab, cac, cba, cbb, cbc, cca, ccb, ccc

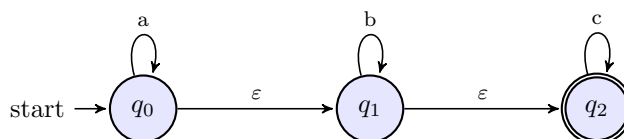
c)

	a	b	c
$\rightarrow * \{p, q, r\}$	$\{p, q, r\}$	$\{q, r\}$	$\{p, q, r\}$
$* \{q, r\}$	$\{p, q, r\}$	$\{r\}$	$\{p, q, r\}$
$* \{r\}$	ϕ	ϕ	ϕ
ϕ	ϕ	ϕ	ϕ

7 Ex.2.5.3(a)

包含零个或多个a, 后面跟着零个或多个b, 再跟着零个或多个c 的串的集合。(原文为consist of)

解答:



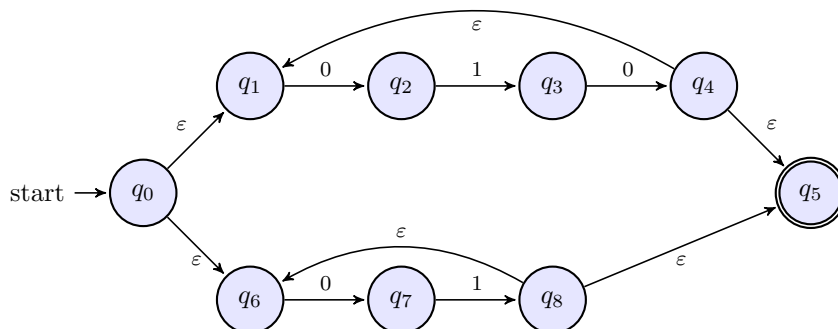
思考题

8 Ex.2.5.3

8.1 b)

包含着01重复一次或多次或010重复一次或多次的串的集合。(原文为consist of)

解答:



8.2 c)

使得最后10个位置上至少有一个是1的0和1的串的集合。

解答:

