PR 2 TBFO

Sunday, September 10, 2023

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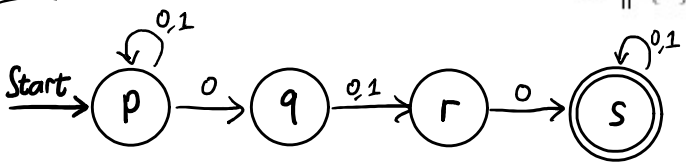
2.3.1

*** Exercise 2.3.1 :** Convert to a DFA the following NFA:

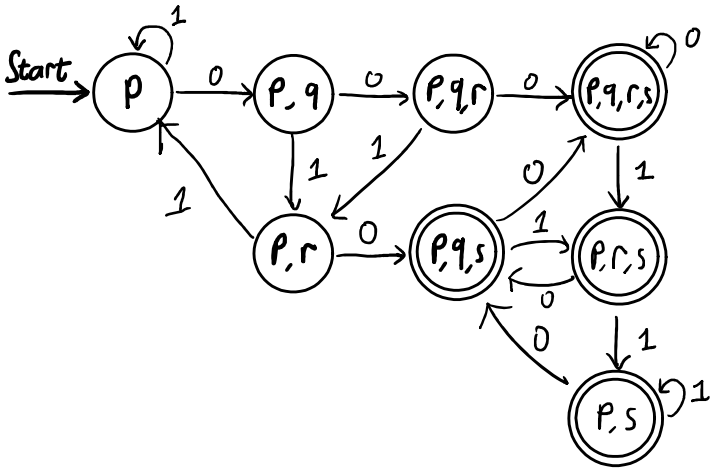
	0	1
$\rightarrow p$	$\{p, q\}$	$\{p\}$
q	$\{r\}$	$\{r\}$
r	$\{s\}$	$\emptyset$
$*s$	$\{s\}$	$\{s\}$

NFA



DFA

	0	1
-> p	{p,q}	{p}
{p,q}	{p,q,r}	{p,r}
{p,q,r}	{p,q,r,s}	{p,r}
{p,r}	{p,q,s}	{p}
*{p,q,r,s}	{p,q,r,s}	{p,r,s}
*{p,q,s}	{p,q,r,s}	{p,r,s}
*{p,r,s}	{p,q,s}	{p,s}
*{p,s}	{p,q,s}	{p,s}

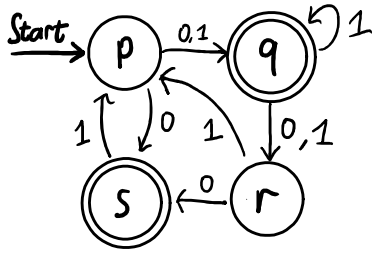


2.3.2

Exercise 2.3.2: Convert to a DFA the following NFA:

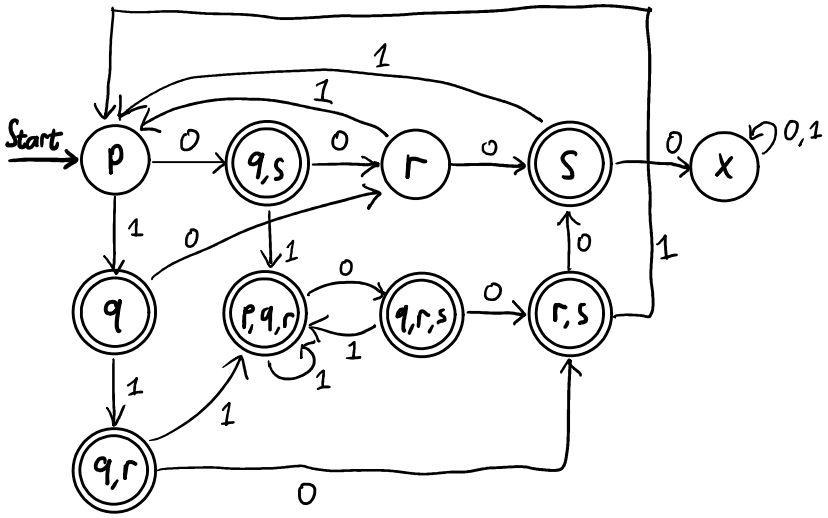
	0	1
$\rightarrow p$	$\{q, s\}$	$\{q\}$
$*q$	$\{r\}$	$\{q, r\}$
r	$\{s\}$	$\{p\}$
$*s$	$\emptyset$	$\{p\}$

NFA



DFA

	0	1
-> p	{q,s}	{q}
*{q}	{r}	{q,r}
{r}	{s}	{p}
*{s}	x	{p}
*{r,s}	{s}	{p}
*{q,r}	{r,s}	{p,q,r}
*{q,s}	{r}	{p,q,r}
*{p,q,r}	{q,r,s}	{p,q,r}
*{q,r,s}	{r,s}	{p,q,r}
x	x	x

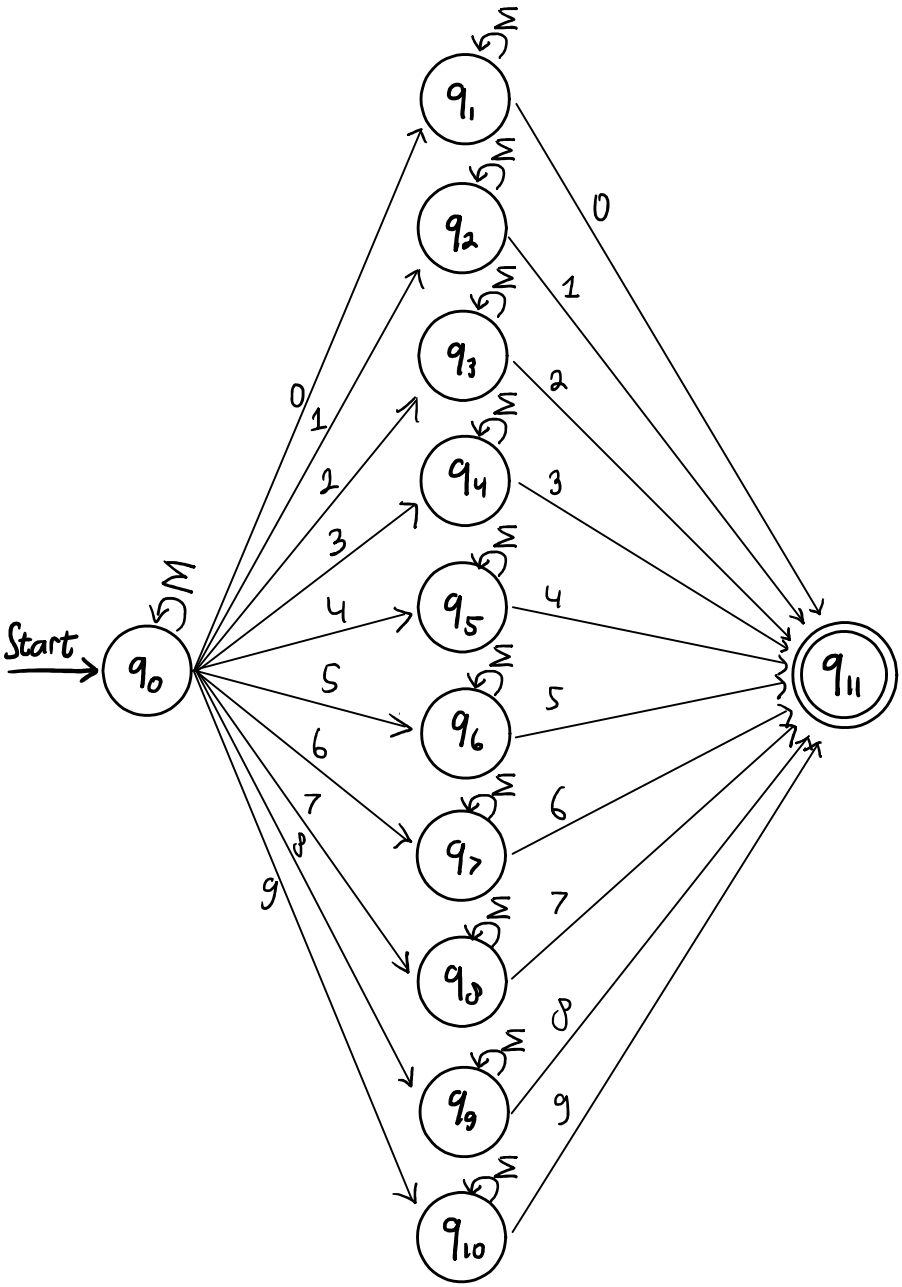


2.3.4

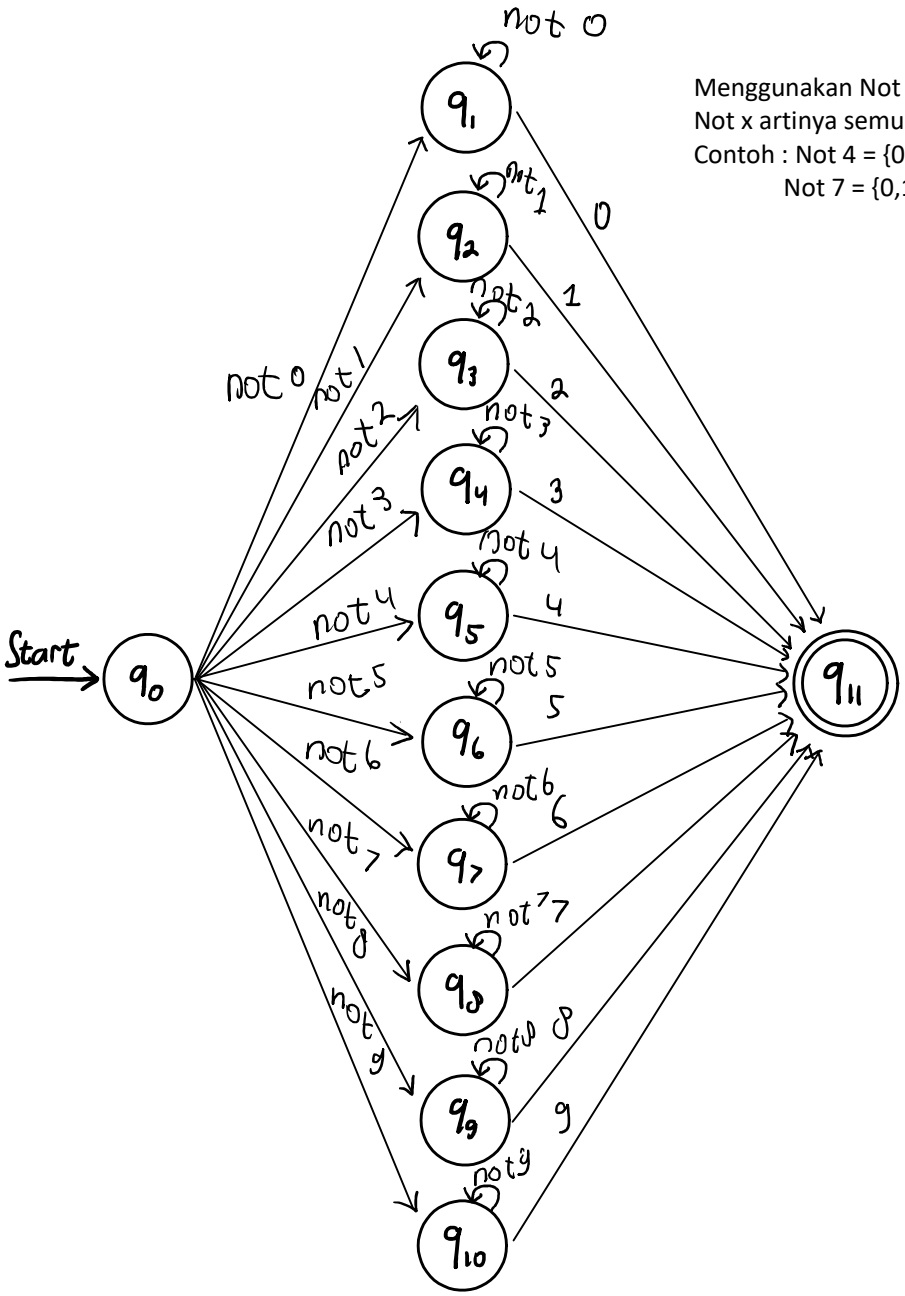
! **Exercise 2.3.4:** Give nondeterministic finite automata to accept the following languages. Try to take advantage of nondeterminism as much as possible.

(a)

* a) The set of strings over alphabet $\{0, 1, \ldots, 9\}$ such that the final digit has appeared before.



b) The set of strings over alphabet $\{0, 1, \ldots, 9\}$ such that the final digit has *not* appeared before.

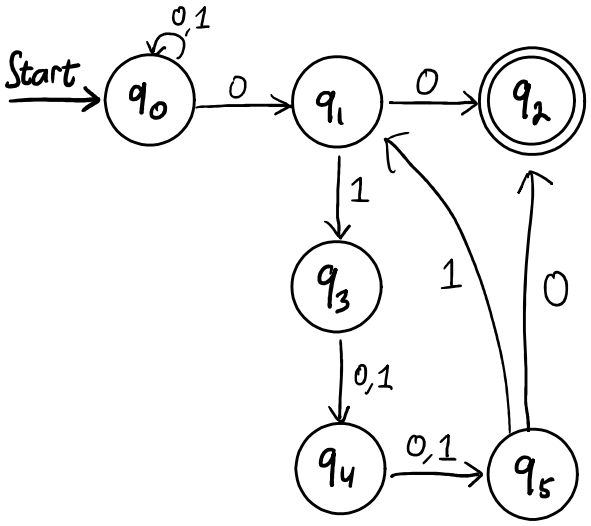


Menggunakan Not karena keterbatasan tempat menulis
Not x artinya semua alfabet selain x.
Contoh : Not 4 = {0,1,2,3,5,6,7,8,9}
Not 7 = {0,1,2,3,4,5,6,8,9}

c

c) The set of strings of 0's and 1's such that there are two 0's separated by a number of positions that is a multiple of 4. Note that 0 is an allowable multiple of 4.

	0	1
-> q0	{q0,q1}	{q0}
q1	{q2}	{q3}
*q2	∅	∅
q3	{q4}	{q4}
q4	{q5}	{q5}
q5	{q2}	{q1}



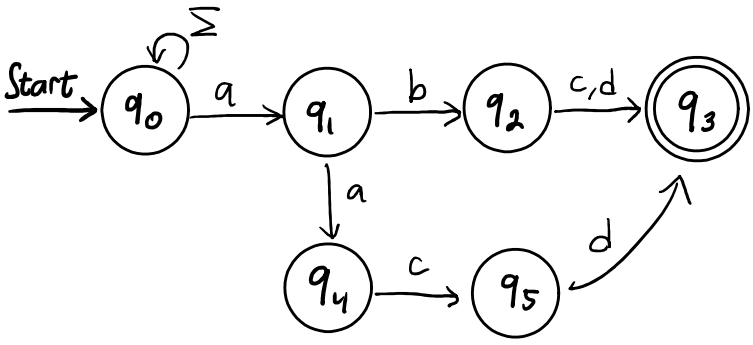
2.4.1

Exercise 2.4.1: Design NFA's to recognize the following sets of strings.

a

a) **abc**, **abd**, and **aacd**. Assume the alphabet is $\{a, b, c, d\}$.

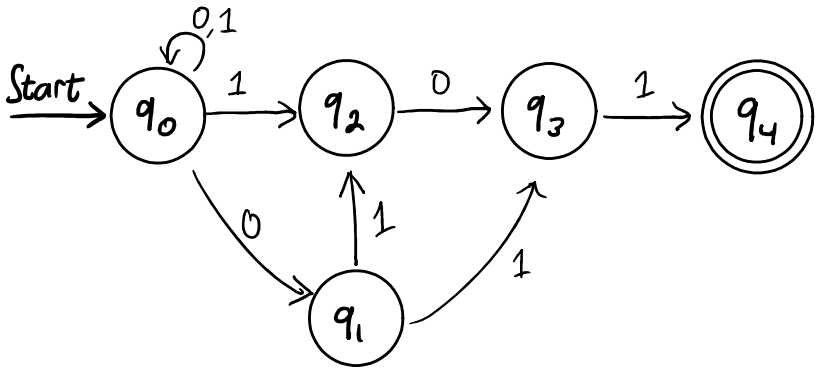
	a	b	c	d
-> q0	{q0,q1}	{q0}	{q0}	{q0}
q1	{q4}	{q2}	∅	∅
q2	∅	∅	{q3}	{q3}
*q3	∅	∅	∅	∅
q4	∅	∅	{q5}	∅
q5	∅	∅	∅	{q3}



(b)

b) 0101, 101, and 011.

	0	1
-> q0	{q0,q1}	{q0,q2}
q1	∅	{q2,q3}
q2	{q3}	∅
q3	∅	{q4}
q4	∅	∅



(c)

c) ab, bc, and ca. Assume the alphabet is $\{a, b, c\}$.

	a	b	c
-> q0	{q0,q1}	{q0,q2}	{q0,q3}
q1	∅	{q4}	∅
q2	∅	∅	{q4}
q3	{q4}	∅	∅
*q4	∅	∅	∅