PR 3 TBFO

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Exercise 2.5.1

consider the following ε-NFA

	ε	a	b	c
→ p	∅	{p}	{q}	{r}
q	{p}	{q}	{r}	∅
*r	{q}	{r}	∅	{p}

a) ε-closure for each state

ε clore (p) = {p}
ε clore (q) = {p, q}
ε clore (r) = {p, q, r}

b) Give all the strings of length three or less accepted by the automaton

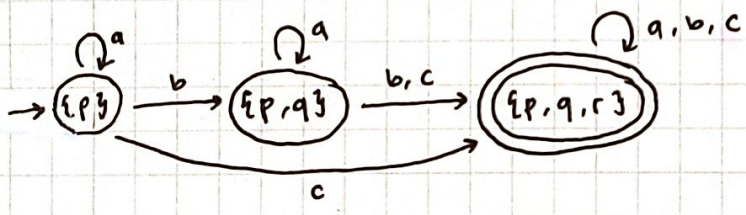
	a	b	c
→ p	{p}	{p, q}	{p, q, r}
q	{p, q}	{p, q, r}	{p, q, r}
*r	{p, q, r}	{p, q, r}	{p, q, r}

→ Table NFA

Inputs :
Length 1 : c
Length 2 : a-c, b-b, b-c, c-b, c-c, c-a
Length 3 : semua string dgn max input 'a' 1 kali
semua string dgn min input 'c' 2 kali dan 'a' 1 kali

c) Convert the automaton to a DFA

	a	b	c
→ p	{p}	{p, q}	{p, q, r}
{p, q}	{p, q}	{p, q, r}	{p, q, r}
*{p, q, r}	{p, q, r}	{p, q, r}	{p, q, r}



Exercise 2.5.2

	ε	a	b	c
→ p	{q, r}	∅	{q}	{r}
q	∅	{p}	{r}	{p, q}
*r	∅	∅	∅	∅

a) Compute ε-closure of each state

ε close (p) = {p, q, r}

ε close (q) = {q}

ε close (r) = {r}

b) Give all strings of length three or less accepted by automaton

	a	b	c
→ p	{p, q, r}	{q, r}	{p, q, r}
q	{p, q, r}	{r}	{p, q, r}
*r	∅	∅	∅

→ Table NFA

Inputs :

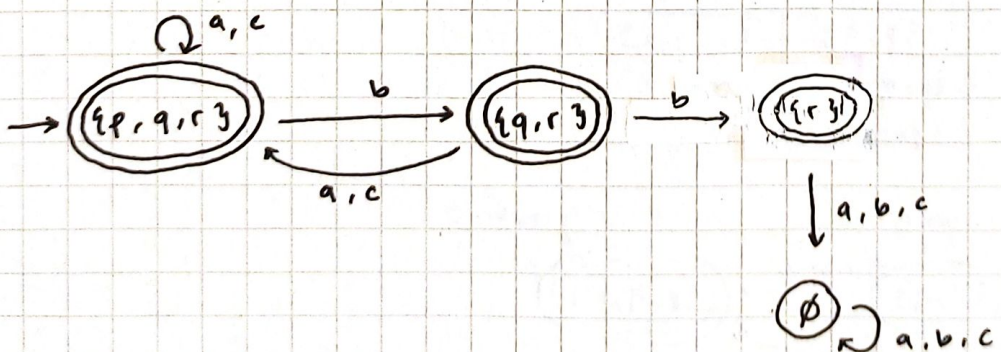
length 1 : a, b, c

length 2 : semua set string dgn panjang 2

length 3 : semua set string dgn panjang 3 kecuali yg dimulai dengan b-b (b-b-a, b-b-b, b-b-c)

c) Convert the automaton to DFA

	a	b	c
→*{p, q, r}	{p, q, r}	{q, r}	{p, q, r}
*{q, r}	{p, q, r}	{r}	{p, q, r}
*{r}	∅	∅	∅
∅	∅	∅	∅

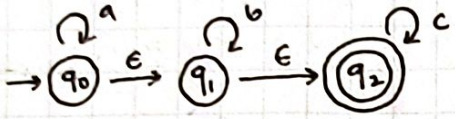


Exercise 2.5.3

Design ϵ-NFA's for the following languages

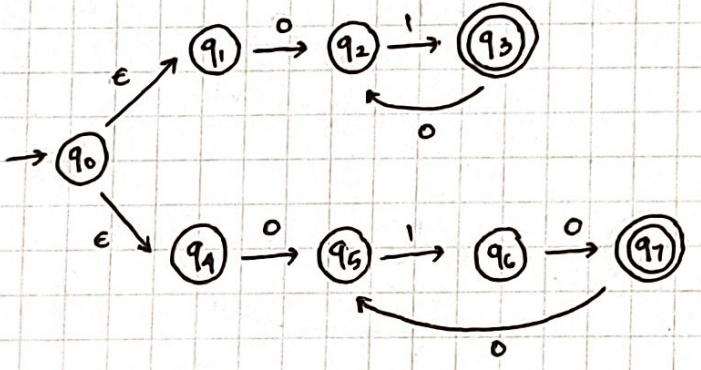
a) The set of strings consisting of zero or more a's followed by zero or more b's, followed by zero or more c's.

	ϵ	a	b	c
$\rightarrow q_0$	q_1	q_0	$\emptyset$	$\emptyset$
q_1	q_2	$\emptyset$	q_1	$\emptyset$
$*q_2$	$\emptyset$	$\emptyset$	$\emptyset$	q_2



b) Set of strings that consist of either 01 repeated one or more times or 010 repeated one or more times

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



c) Set of strings of 0's and 1's such that at least one of the last ten position is a 1.

	ϵ	0	1
$\rightarrow q_0$	$\emptyset$	q_0	$\{q_0, q_1\}$
q_1	q_2	q_2	q_2
q_2	q_3	q_3	q_3
q_3	q_4	q_4	q_4
q_4	q_5	q_5	q_5
q_5	q_6	q_6	q_6
q_6	q_7	q_7	q_7
q_7	q_8	q_8	q_8
q_8	q_9	q_9	q_9
q_9	q_{10}	q_{10}	q_{10}
$*q_{10}$	$\emptyset$	$\emptyset$	$\emptyset$