PR 3 TBFO

Sunday, September 17, 2023

Nama: Raden Francisco Trianto Bratadiningrat

NIM: 13522091

* Exercise 2.5.1: Consider the following ϵ -NFA.

	ϵ	a	b	c
$\rightarrow p$	Ø	$ \begin{cases} \{p\} \\ \{q\} \\ \{r\} \end{cases} $	{q}	{r}
q	{p}	$\{q\}$	$\{r\}$	Ø
*r	$\{q\}$	{r}	Ø	{ <i>p</i> }

a) Compute the ε-closure of each state.

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

Aceppted: c,ac, bc, acc, bcc, aca, acb, bca, bcb

c) Convert the automaton to a DFA.

		а		b	C	:
	-> {p}	{p}		{p}	{q,	<i>r</i> }
-	*{q,r}	$\{p,q,r\}$	{	$o,q,\!r\}$	{q,	<i>r</i> }
	*{p,q,r}	{p,q,r}	{	$p,q,r\}$	{q,	<i>r</i> }

Exercise 2.5.2: Repeat Exercise 2.5.1 for the following ϵ -NFA:

	ϵ	a	b	c
$\rightarrow p$	$\{q,r\}$	Ø	{q}	$\{r\}$
$\begin{array}{c} \rightarrow p \\ q \\ *r \end{array}$	$\left\{ egin{array}{l} \{q,r\} \\ \emptyset \\ \emptyset \end{array} \right.$	{p}	$\begin{cases} r \end{cases}$	$\{p,q\}$

a) Compute the ϵ -closure of each state.

$$P \longrightarrow \{P, q, r\}$$

$$q \longrightarrow \{q\}$$

$$r \longrightarrow \{r\}$$

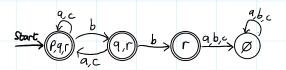
b) Give all the strings of length three or less accepted by the automaton.

Accepted: E, a, b, c, ba, bb, bc, ca, cb, cc, aaa, aab, aac, aba, abb, baa, bab, bac, bca, bcb, bcc, caa, cab, cac, cba, cbb, cbc, cca, ccb, ccc.



c) Convert the automaton to a DFA.

	а	b	С	
-> *{p,q,r}	{p,q,r}	{q,r}	{p,q	,r}
*{q,r}	{p,q,r}	{r}	{p,q	,r}
*{r}	Ø	Ø	Ø	
Ø	Ø	Ø	Ø	





Exercise 2.5.3: Design ϵ -NFA's for the following languages. Try to use ϵ transitions to simplify your design.



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.

b's, followed by zero S nation

Definisi $V \in -NFA$, $Na = (Q, \Sigma, \delta, q_s, \mp)$ $\Rightarrow Q = \{q_s, q_a, q_b, q_c\};$ $\Rightarrow \Sigma = \{a, b, c\};$ $\Rightarrow F = \{q_c\};$

$$\rightarrow \Sigma = \{a, b, c\};$$

$$\Rightarrow F = \{a, b, c\}$$

			٠.		
Start	(9s)-	$\stackrel{\mathcal{E}}{\longrightarrow} (\stackrel{g}{\downarrow}$) <u>E, a</u>	96)-	£, b \(\frac{4}{c} \)
		<u></u>	7		

State	ε	а	b		С
-> qs	{qa}	Ø	Ø		Ø
qa	{qb}	{qa}	Ø		Ø
qb	{qc}	Ø	{qb	}	Ø
*qc	Ø	Ø	Ø		{qc}



! b) The set of strings that consist of either 01 repeated one or more times or 010 repeated one or more times.

Definisi suatu e-NFA, Nb = (Q, Z, S, 9s, F)

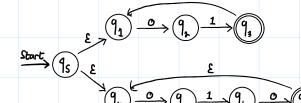
$$\Rightarrow Q = \{q_{s}, q_{1}, q_{s}, q_{s}, q_{u}, q_{s}, q_{b}, q_{7}\};$$
 $\Rightarrow \Sigma = \{0, 13;$

$$\overline{\Sigma} = \{0,1\}$$

$$\Rightarrow \mp = \{q_3, q_7\};$$

$$\Rightarrow \delta \text{ (tabel)}$$

		•			
S	tate	ε		0	1
-	> qs	{q1,	q4}	Ø	Ø
	q1	Ø		{q2}	Ø
	q2	Ø		Ø	{q3}
	*q3	{q:	1}	Ø	Ø
	q4	Ø		{q5}	Ø
	q5	Ø		Ø	{q6}
	q6	Ø		{q7}	Ø
	*q7	{q	4}	Ø	Ø



!c) The set of strings of 0's and 1's such that at least one of the last ten
positions is a 1.
Definisi Suatu e-NFA, Nb = (Q, Z, 8, 9s, 7)
> Q = { 95, 91, 92, 93, 94, 95, 96, 97, 90, 99, 900 };
· = \$0,13;
$\Rightarrow \mp = \{q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_9, q_9, q_9, q_9, q_9, q_9, q_9, q_9$
o (abel/
State ε 0 1
-> qs Ø {qs} {qs,q1} *q1 {q2} {q2} {q2}
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
*q3 {q4} {q4} {q4} *q4 {q5} {q5} {q5}
*q5 {q6} {q6} {q6}
*q6 {q7} {q8} {q8} {q8} *q8 {q8} {q8}
*q8 {q9} {q9} {q9}
*q9 {q10} {q10} *q10 Ø Ø Ø
410 9 9 9