PR 5 TBFO

Ahmad Nadil
13521029
K3

Ex 4.1.1.

a.) $\{0^n 1^n \mid n \geq 1\}$. → Asumsi regular expression

Pumping length = p

$S = 0^p 1^p$ → $S = 000111$

- x
- y
- z

i) $\underbrace{00}_{x}\underbrace{01}_{y}\underbrace{11}_{z}$ ii) $\underbrace{000}_{x}\underbrace{1}_{y}\underbrace{1}_{?}\underbrace{1}_{z}$ iii) $\underbrace{0}_{x}\underbrace{00\,1}_{y}\underbrace{11}_{z}$

Theorem :

1. $S = xy^1z = xy^2z$
   - i) 00000111 $5 \neq 3$
   - ii) 00011111 $3 \neq 5$
   - iii) 00010111
2. $|xy| \leq p$
   - i) $3 \leq 3$
   - ii) $5 \leq 3$
   - iii) $4 \leq 3$

(1 dan 2 saling contradiksi)

∴ $\{0^n 1^n \mid n \geq 1\}$ bukan regular language

b.) Set of strings of balanced parentheses.

⇒ Asumsi L regular expression

Pumping length = p

$S = xyz$ $|xy| \leq n$ $5 \leq 5$

$|y| > 0$ $3 > 0$

$\{xy^iz\} \in L$ if $i > 0$

$p = 5$ n_L = component left

n_R = Component right

Condition 1 : $\underbrace{n_L n_L}_{x}\ \underbrace{n_L n_L n_L}_{y}\ \underbrace{n_R n_R n_R n_R n_R}_{z}$

Theorem : xy^2z $\underbrace{n_L n_L}_{x}\ \underbrace{n_L n_L n_L n_L n_L n_L}_{y}\ \underbrace{n_R n_R n_R n_R n_R}_{z} \neq 5$ (Contradiction)

∴ Set of string of balanced parentheses is not regular language c.) $\{0^n 1^n \mid n \geq 1\}$ → Assume regular

Pumping length = P

$S = 0^P 1 0^P$ → $\underbrace{000}_{x = 0^{P-1}}\ \underbrace{0101}_{y = (01)^i}\ \underbrace{0000}_{z = 0^P}$

- x
- y
- z

↳ Tak bisa diulang!

Theorem $S = xyz$ → Kontradiksi

∴ $\{0^n 1 0^n \mid n \geq 1\}$ bukan regular language

d.) $\{0^n 1^m 2^n \mid n$ and m are arbitrary integers$\}$ → assume regular

Pumping length : P

$S = 0^P 1^m 2^P$ → $\underbrace{00}_{x}\ \underbrace{01^m}_{y}\ \underbrace{2^P}_{z}$

- x
- y
- z

theorem : $|xy^2z$ $00(01^m)z$

↳ tidak bisa diulang

∴ $\{0^n 1^m 2^n \mid n$ dan m arbitrary integers$\}$ bukan reguler language

e.) $\{0^n 1^n \mid n \leq m\}$ → Assume regular

Pumping length : P

$S = 0^P 1^m$

- x
- y
- z

Theoren : $xy^2z = 00000111$

$5 \neq 3$

∴ $\{0^n 1^m \mid n \leq m\}$ bukan regular language

f.) $\{0^n 1^{2n} \mid n \geq 1\}$ → Asumsi regular

pumping length : P

$S = 0^n 1^{2n}$ → $\underbrace{00}_{x}\underbrace{0}_{y}\ \underbrace{111111}_{z}$

- x
- y
- z

theorem :
1.) $|xy| \leq P$ → $3 \leq 3$
2.) $y > 0$ → $2 > 0$
3.) $S' = xy^2z$ → 00000 111111 $5 \neq 6$ (kontradiksi)

∴ $\{0^n 1^{2n} \mid n \geq 1\}$ bukan regular Language.

Ex 4.4.1

a.) Draw the table of distinguishabilities for this automaton.

	A	B	C	D	E	F	G
B	X						
C	X	X					
D	X	X	X				
E	X	X	•	X			
F	X	•	X	X	X		
G	•	X	X	X	X	X	
H	X	X	X	X	X	X	X

0 Equivalence
{A, B, C, E, F, G, H} , {D}

1 Equivalence
{A, B, F, G} , {C, E} , {H} , {D}

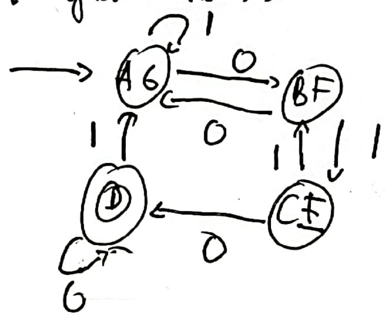
2 Equivalence
{A, G} , {B, F} , {C, E} , {H} , {D}

3 Equivalence
{A, G} , {B, F} , {C, E} , {H} , {D}

b.) Construct the minimum-state equivalent DFA

	0	1
→ AG	BF	AG
BF	AE	CE
CE	D	BF
H	AG	D
*D	D	AG

Diagram transisi



Ex 4.4.2

a.)

	A	B	C	D	E	F	G	H
B	X							
C	X	X						
D	•	X	X					
E	X	•	X	X				
F	X	X	•	X	X			
G	•	X	X	•	X	X		
H	X	•	X	X	•	X	X	
I	X	X	•	X	X	•	X	X

0 Equivalence {A, B, D, E, G, H} , {C, F, I}

1 Equivalence {A, D, G} , {B, E, H} , {C, F, I}

2 Equivalence {A, D, G} , {B, E, H} , {C, F, I}

b.)

	0	1
→ ADG	BEH	BEH
BEH	CFI	CFI
*D	ADG	BEF