PSD - C

TUGAS MANDIRI 6

ALDEN LUTHFI
2 2 0 6 0 2 8 9 3 2

(1.) 2 dimensi

Current State		Next State				Output	
		X=0		X=1		X=0	X=1
A(t)	B(t)	A(t+1)	B(t+1)	A(t+1)	B(t+1)	Y	Y
0	0	0	1	1	0	0	1
0	1	1	1	0	0	0	1
1	0	0	1	0	0	0	1
1	1	0	1	1	1	0	0

1 dimensi

Current State		Input	Next State		Output
A(t)	B(t)	X	A(t+1)	B(t+1)	Y
0	0	0	0	1	0
0	0	1	1	0	1
0	1	0	1	1	0
0	1	1	0	0	1
1	0	0	0	1	0
1	0	1	0	0	1
1	1	0	0	1	0
1	1	1	1	1	0

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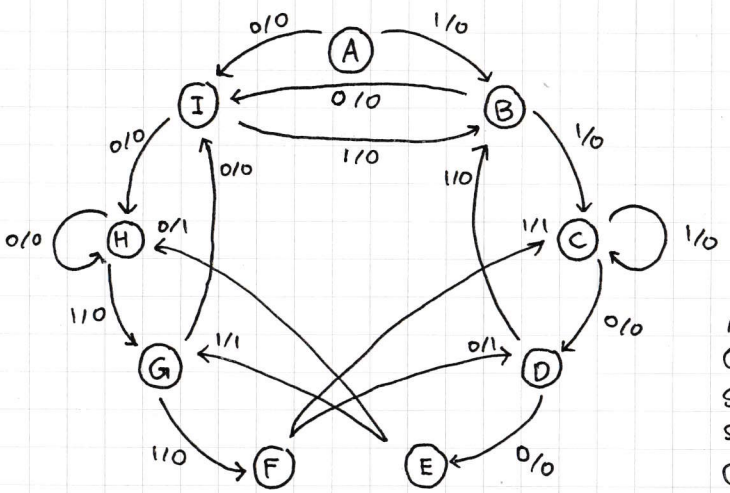
② ⓐ State diagnam



ASUMSI:
Output hanya keluar setelah clock cycle selanjutnya (next state)

ⓑ State table (Binary State Assignment)

Current State					Next State x = 0					Next State x = 1				Output x=0	Output x=1
	P	Q	R	S		P^+	Q^+	R^+	S^+		P^+	Q^+	R^+	S^+	Y	Y
A	0	0	0	0	I	1	0	0	0	B	0	0	0	1	0	0
B	0	0	0	1	I	1	0	0	0	C	0	0	1	0	0	0
C	0	0	1	0	D	0	0	1	1	C	0	0	1	0	0	0
D	0	0	1	1	E	0	1	0	0	B	0	0	0	1	0	0
E	0	1	0	0	H	0	1	1	1	G	0	1	1	0	1	1
F	0	1	0	1	D	0	0	1	1	C	0	0	1	0	1	1
G	0	1	1	0	I	1	0	0	0	F	0	1	0	1	0	0
H	0	1	1	1	H	0	1	1	1	G	0	1	1	0	0	0
I	1	0	0	0	H	0	1	1	1	B	0	0	0	1	0	0

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② ⓒ Output Equation Deter minantion and determination

P^+

PQ \ RS	00	01	11	10
00	1	0	0	0
01	0	0	0	1
11	x	x	x	x
10	0	x	x	x

$\bar{X}$

PQ \ RS	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	x	x	x	x
10	0	x	x	x

X

$\therefore P^+ = \bar{X}\bar{P}\bar{Q}\bar{R} + \bar{X}Q\bar{R}\bar{S} + PR$

Q^+

PQ \ RS	00	01	11	10
00	0	0	1	0
01	1	0	1	0
11	x	x	x	x
10	1	x	x	x

$\bar{X}$

PQ \ RS	00	01	11	10
00	0	0	0	0
01	1	0	1	1
11	x	x	x	x
10	0	x	x	x

X

$\therefore Q^+ = \bar{X}RS + Q\bar{R}\bar{S} + \bar{X}\bar{P} + PR + XQR$

R^+

PQ \ RS	00	01	11	10
00	0	0	0	1
01	1	1	1	0
11	x	x	x	x
10	1	x	x	x

$\bar{X}$

PQ \ RS	00	01	11	10
00	0	1	0	1
01	1	1	1	0
11	x	x	x	x
10	0	x	x	x

X

$\therefore R^+ = \bar{Q}RS + Q\bar{R} + QS + \bar{X}P + PR + X\bar{R}\bar{S}$

S^+

PQ \ RS	00	01	11	10
00	0	0	0	1
01	1	1	1	0
11	x	x	x	x
10	1	x	x	x

$\bar{X}$

PQ \ RS	00	01	11	10
00	1	0	1	0
01	0	0	0	1
11	x	x	x	x
10	1	x	x	x

X

$\therefore S^+ = \bar{X}\bar{Q}RS + \bar{X}QR + \bar{X}QS + P + X\bar{Q}R\bar{S} + X\bar{Q}RS + XQR\bar{S}$

Y

PQ \ RS	00	01	11	10
00	0	0	0	0
01	1	1	0	0
11	x	x	x	x
10	0	x	x	x

PQ \ RS	00	01	11	10
00	0	0	0	0
01	1	1	0	0
11	x	x	x	x
10	0	x	x	x

$\therefore Y = Q\bar{R} + PR$

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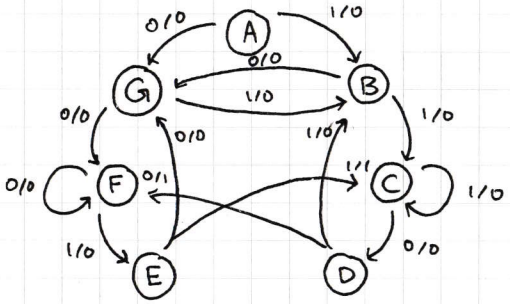
② ⓐ State Diagram (version 2)



ASUNSI :
Output keluar saat clock cycle saat ini (current state)

⑥ State table (version 2, Binary State Assignment)

Current State				Next State						Output	
				x=0			x=1			x=0	x=1
	P	Q	R	P^+	Q^+	R^+	P^+	Q^+	R^+	Y	Y
A	0	0	0	G	1	0	B	0	1	0	0
B	0	0	1	G	1	0	C	1	0	0	0
C	0	1	0	D	0	1	C	1	0	0	0
D	0	1	1	F	1	1	B	0	1	1	0
E	1	0	0	G	1	0	C	1	0	0	1
F	1	0	1	F	1	1	E	1	0	0	0
G	1	1	0	F	1	1	B	0	1	0	0

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② ⓒ Version 2 Output Equation Determination and Determination

P^+

XP \ QR	00	01	11	10
0	0	1	1	1
1	0	1	x	1
0	0	1	x	0
1	0	0	x	0

Q^+

XP \ QR	00	01	11	10
0	0	1	0	1
1	0	1	x	0
0	0	1	x	0
1	0	1	0	1

R^+

XP \ QR	00	01	11	10
0	0	0	1	1
1	0	1	x	1
0	0	0	x	1
1	0	1	1	0

Y

XP \ QR	00	01	11	10
0	0	0	1	0
1	0	0	x	0
0	1	0	x	0
1	0	0	0	0

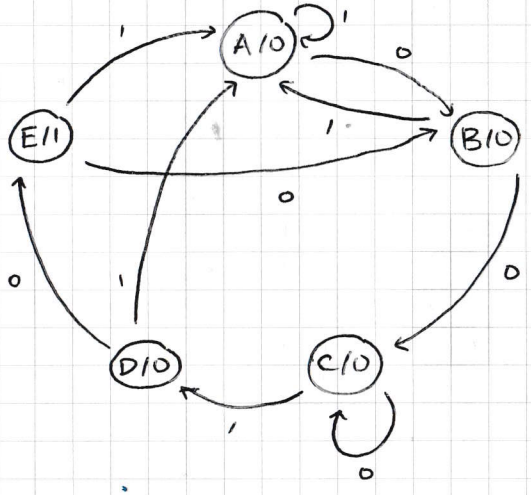
$P^+ = \bar{X}\bar{Q} + \bar{X}R + \bar{X}P + PR$

$Q^+ = \bar{X}P\bar{Q} + P\bar{Q}R + P\bar{Q}\bar{R} + PQ\bar{R}$

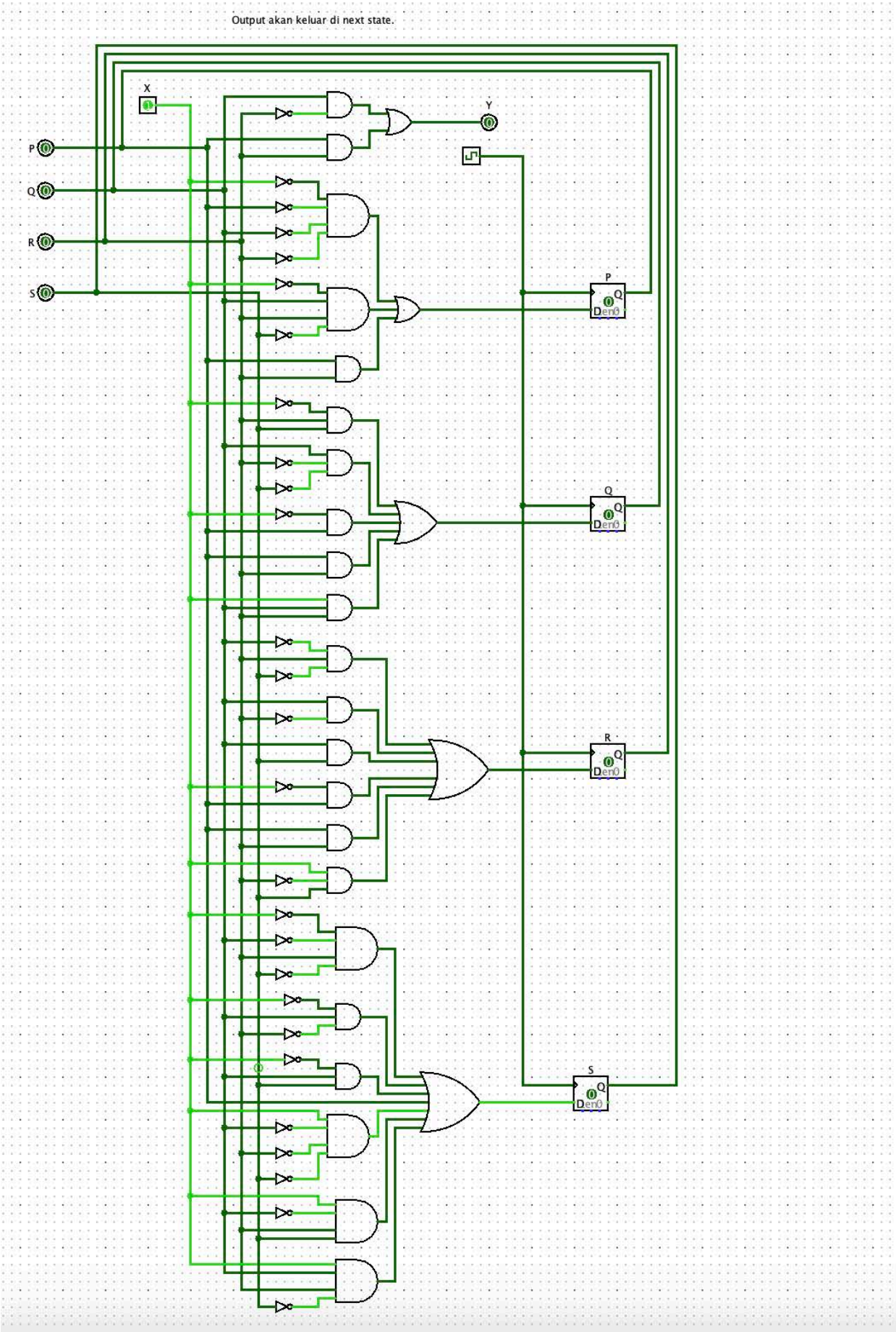
$R^+ = \bar{X}Q + QR + \bar{X}PR + PQ + XP\bar{Q}\bar{R}$

$Y = \bar{X}QR + PQR + XP\bar{Q}\bar{R}$

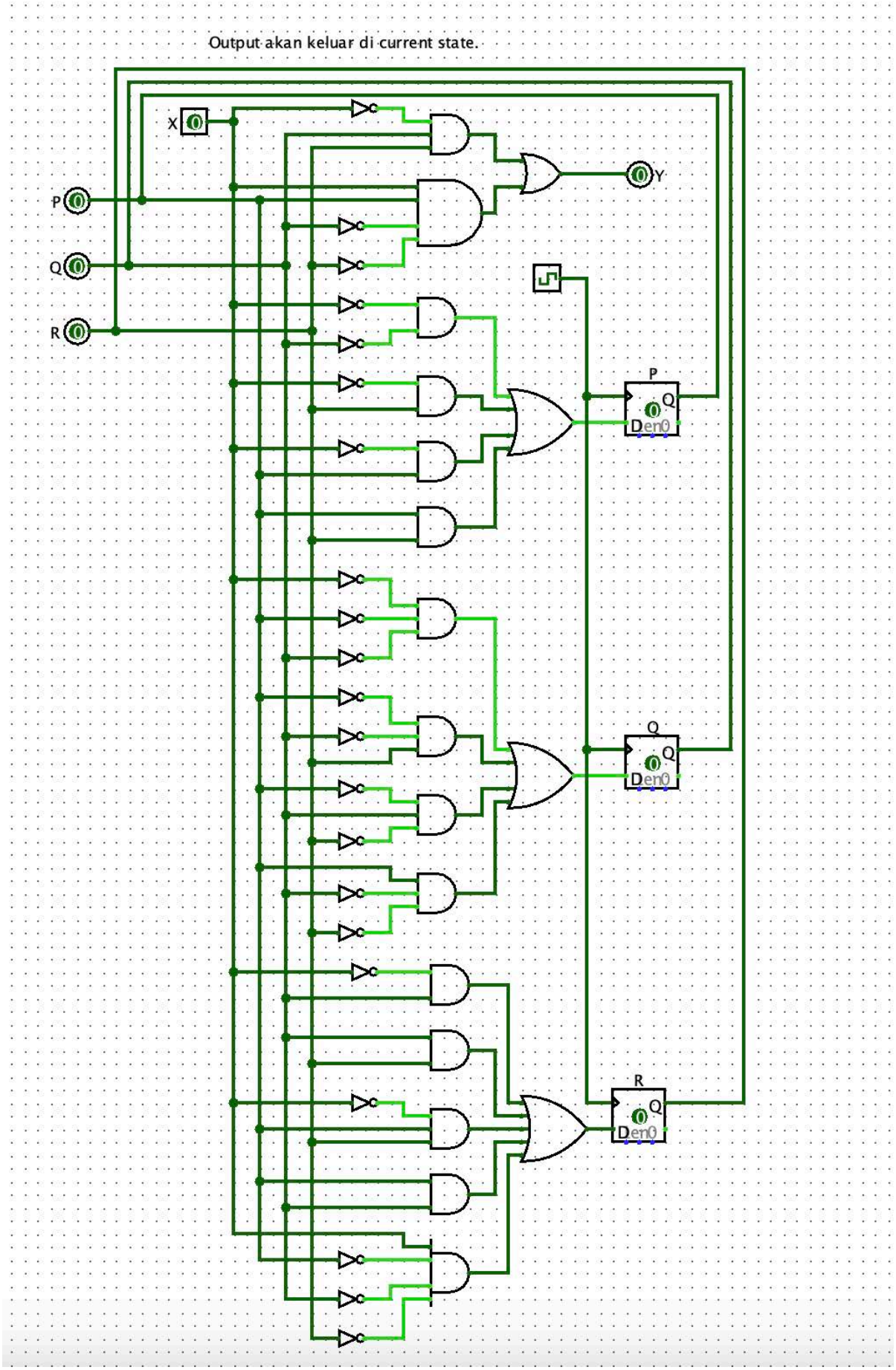
③ ⓐ State diagram (0010 recognizer)



No 2c Technological Mapping (Version 1)



No 2c Technological Mapping (Version 2)



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(2)(b) state table (Binary state assignment)

Current State				Next State						Output
				x=0			x=1			
	P	Q	R	P^+	Q^+	R^+	P^+	Q^+	R^+	Y
A	0	0	0	B	0	0	1	A	0	0	0	0
B	0	0	1	C	0	1	0	A	0	0	0	0
C	0	1	0	C	0	1	0	D	0	1	1	0
D	0	1	1	E	1	0	0	A	0	0	0	0
E	1	0	0	B	0	0	1	A	0	0	0	1

(c) Flip-flop input determination and output equation determination

Present state			Input	Next state			Output	flip-flop Input					
P	Q	R	X	P^+	Q^+	R^+	Y	J_A	K_A	J_B	K_B	J_C	K_C
0	0	0	0	0	0	1	0	0	X	0	X	1	X
0	0	0	1	0	0	0	0	0	X	0	X	0	X
0	0	1	0	0	1	0	0	0	X	1	X	X	1
0	0	1	1	0	0	0	0	0	X	0	X	X	1
0	1	0	0	0	1	0	0	0	X	X	0	0	X
0	1	0	1	0	1	1	0	0	X	X	0	1	X
0	1	1	0	1	0	0	0	1	X	X	1	X	1
0	1	1	1	0	0	0	0	0	X	X	1	X	1
1	0	0	0	0	0	1	1	X	1	0	X	1	X
1	0	0	1	0	0	0	1	X	1	0	X	0	X

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(3)(c) Optimization

A = P
B = Q
C = R

J_A

AB \ CX	00	01	11	10
00	0	0	0	0
01	0	0	0	1
11	X	X	X	X
10	X	X	X	X

K_A

AB \ CX	00	01	11	10
00	X	X	X	X
01	X	X	X	X
11	X	X	X	X
10	1	1	X	X

J_B

AB \ CX	00	01	11	10
00	0	0	0	1
01	X	X	X	X
11	X	X	X	X
10	0	0	X	X

K_B

AB \ CX	00	01	11	10
00	X	X	X	X
01	0	0	1	1
11	X	X	X	X
10	X	X	X	X

J_C

AB \ CX	00	01	11	10
00	1	0	X	X
01	0	1	X	X
11	X	X	X	X
10	1	0	X	X

K_C

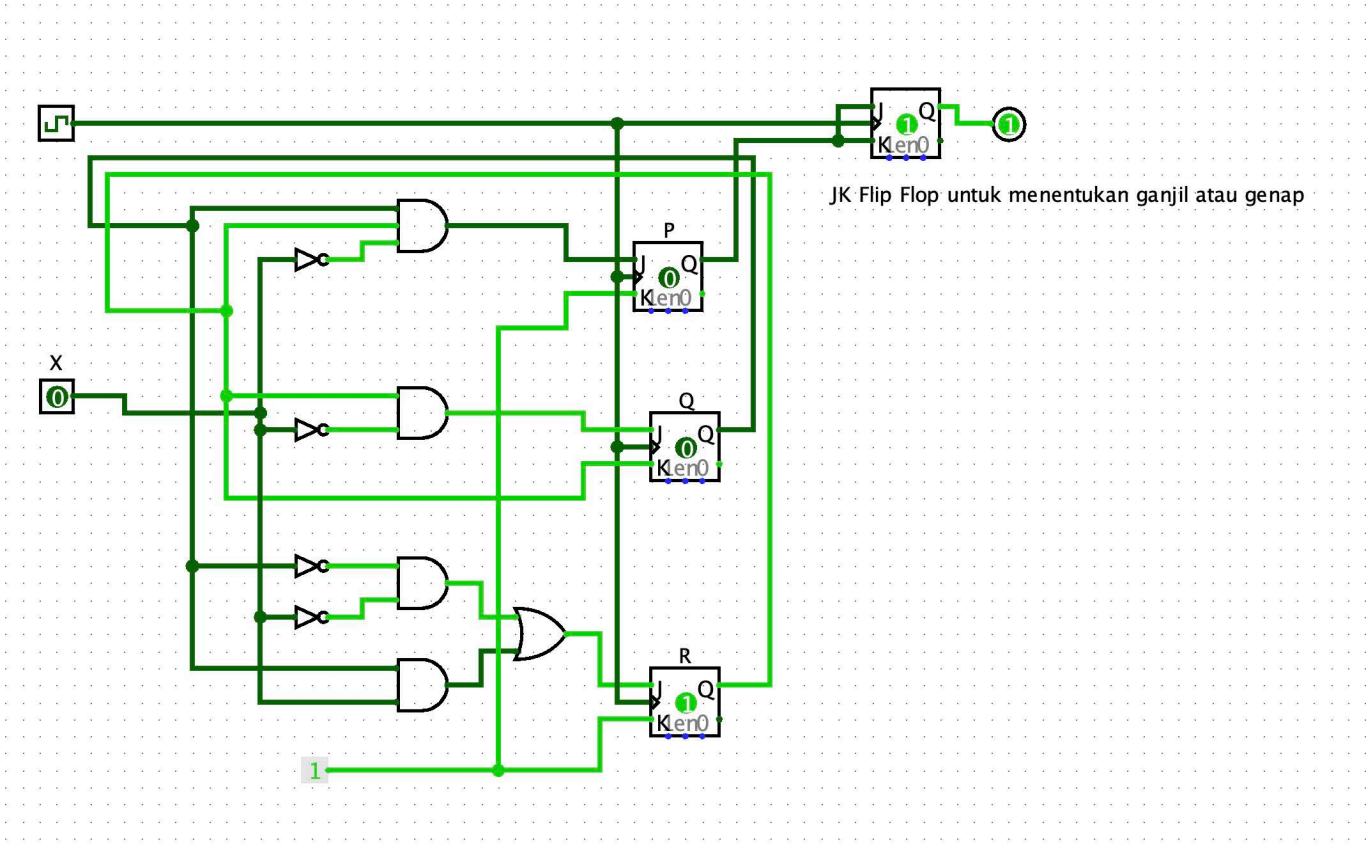
AB \ CX	00	01	11	10
00	X	X	1	1
01	X	X	1	1
11	X	X	X	X
10	X	X	X	X

Y

A \ BC	00	01	11	10
0	0	0	0	0
1	1	X	X	X

$J_A = QR\bar{X}$
$K_A = 1$
$J_B = R\bar{X}$
$K_B = R$
$J_C = \bar{Q}\bar{X} + QX$
$K_C = 1$
$Y = P$

No 3c Technological Mapping



JK Flip Flop untuk menentukan ganjil atau genap