

TUGAS MANDIRI 4

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i) Specification

$$F(A, B, C, D) = C + BC + AD + AB + ABD + ABC + ABCD$$

NAND Gate \rightarrow SOP

ii) Formulation

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0

A	B	C	D	F
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

iii) Optimization

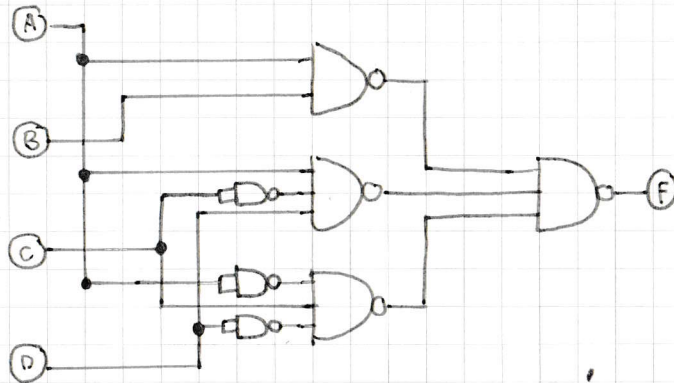
	\bar{C}	C	
\bar{A}	0	0	1
	0	0	1
	1	1	1
A	0	1	0
	\bar{D}	D	\bar{B}

$$F = AB + \bar{A}\bar{C}\bar{D} + A\bar{C}D$$

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2 2 0 6 0 2 8 9 3 2

(iv) Technological Mapping

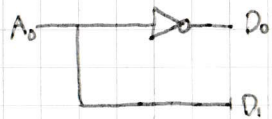


- (2) 8 to 1 Multiplexer:
- (i) 3 to 8 decoder
 - (ii) 1 OR Gate
 - (iii) 8, 2 input AND Gate

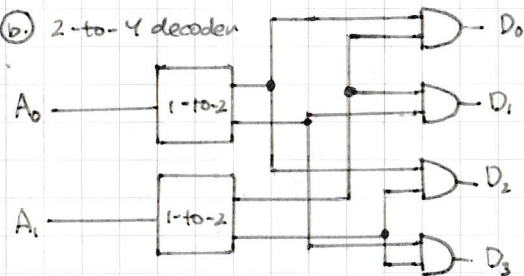
3 to 8 decoder:

- (i) 1 x 2 to 4 decoder
- (ii) 1 x 1 to 2 decoder

(a) 1-to-2 decoder



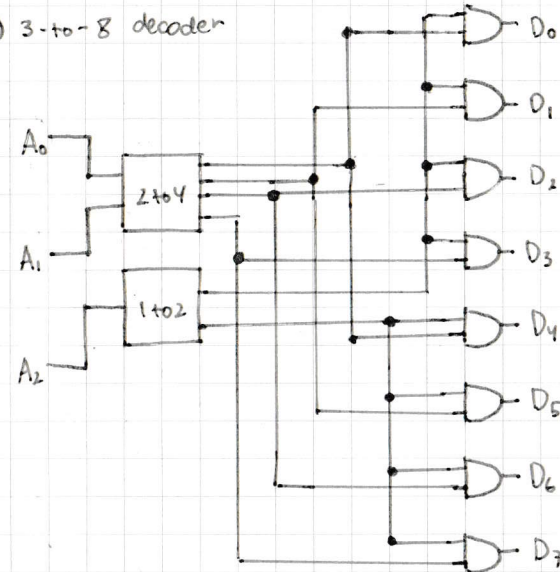
(b) 2-to-4 decoder



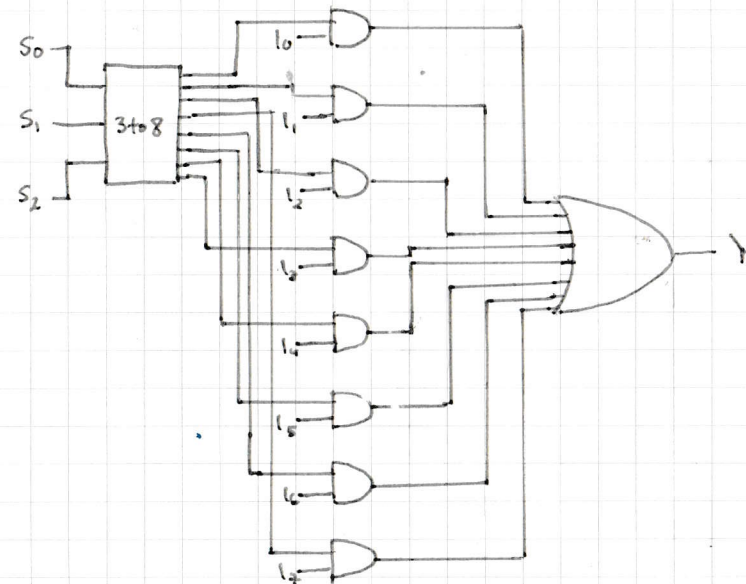
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2 2 0 6 0 2 8 9 3 2

(c) 3-to-8 decoder



(d) 8 to 1 Multiplexer



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3. a. Formulation

A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	X
0	0	1	1	1
0	1	0	0	0
0	1	0	1	X
0	1	1	0	0
0	1	1	1	X

A	B	C	D	F
1	0	0	0	X
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	X

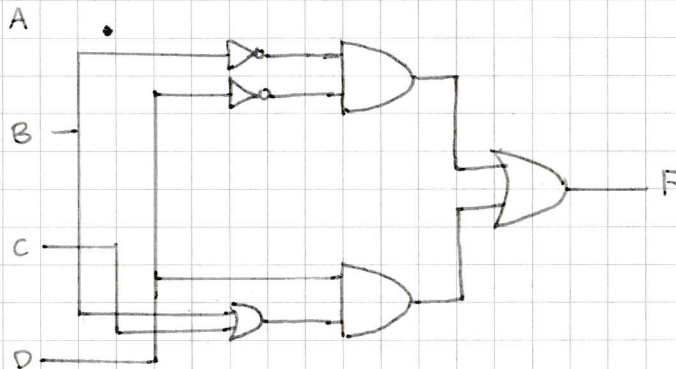
Optimization

	\bar{C}	C	
\bar{A}	1	0	\bar{B}
	0	X	\bar{B}
A	0	1	\bar{B}
	X	0	\bar{B}
	\bar{D}	D	\bar{D}

$$F = CD + BD + \bar{B}\bar{D}$$

$$= D(C+B) + \bar{B}\bar{D}$$

Technological Mapping



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b. Formulation

A	B	C	D	F
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	X
0	1	1	0	X
0	1	1	1	0

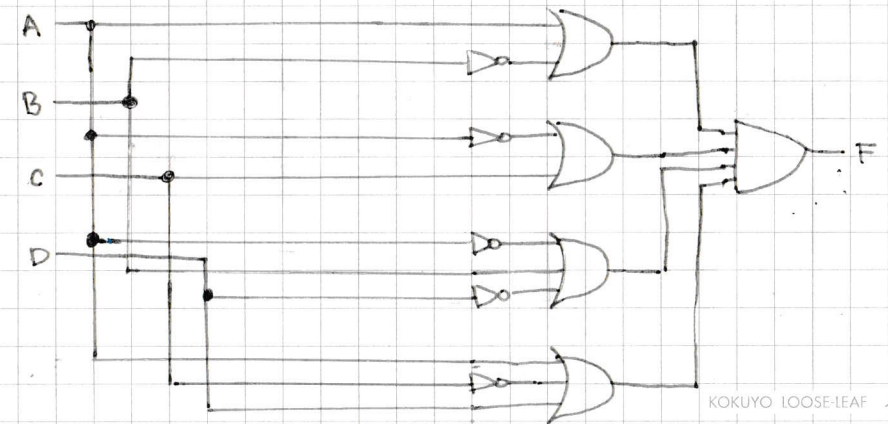
A	B	C	D	F
1	0	0	0	0
1	0	0	1	X
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	X
1	1	1	1	1


Optimization

	C	\bar{C}	
\bar{A}	1	1	\bar{B}
	0	X	\bar{B}
\bar{A}	0	0	\bar{B}
	0	X	\bar{B}
	\bar{D}	D	\bar{D}

$$F = (A+B)(\bar{A}+C)(\bar{A}+B+\bar{D})(A+\bar{C}+D)$$

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③ Formulation

A	B	C	D	F
0	0	0	0	X
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	X

A	B	C	D	F
1	0	0	0	X
1	0	0	1	0
1	0	1	0	X
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	X
1	1	1	1	1

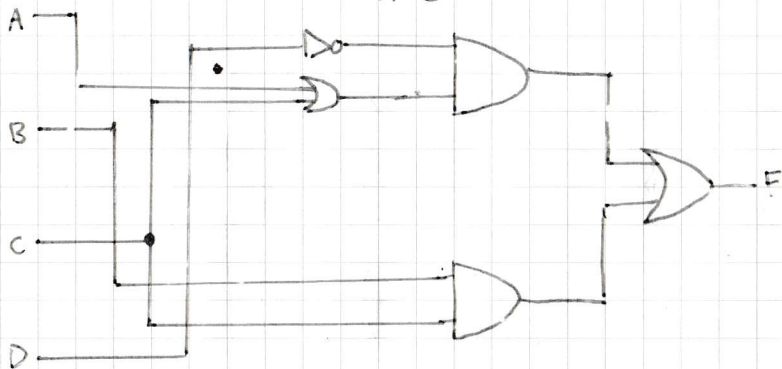
Optimization

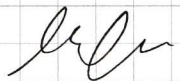
	\bar{C}	C	
\bar{A}	X	0	0
A	0	0	X
	1	0	1
	X	0	0
	\bar{D}	D	\bar{D}

$$F = C\bar{D} + BC + AD$$

$$= \bar{D}(A+C) + BC$$

Technological Mapping




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④ (i) Specification : 6-variable Priority Encoder

(ii) Formulation

T_5	T_4	T_3	T_2	T_1	T_0	A	B	C	V
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	1
0	0	0	0	1	X	0	0	1	1
0	0	0	1	X	X	0	1	0	1
0	0	1	X	X	X	0	1	1	1
0	1	X	X	X	X	1	0	0	1
1	X	X	X	X	X	1	0	1	1

(iii) Optimization

$$V = T_0 + T_1 + T_2 + T_3 + T_4 + T_5$$

$$A = T_5 + T_5' T_4 = T_5 + T_5' T_4'$$

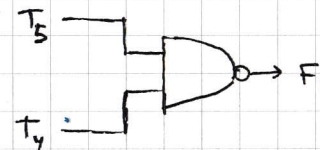
$$B = T_5' T_4' T_3 + T_5' T_4' T_3' T_2 = F_1 T_3 + F_1 T_3' T_2$$

$$C = T_5' T_4' T_3' T_2' T_1' T_0 + T_5' T_4' T_3 + T_5 = T_5 + F_1 T_3' T_2' T_1' T_0 + F_1 T_3$$

$$F_1 = T_5' + T_4' = (T_5 T_4)'$$

(iv) Technological Mapping

① F_1

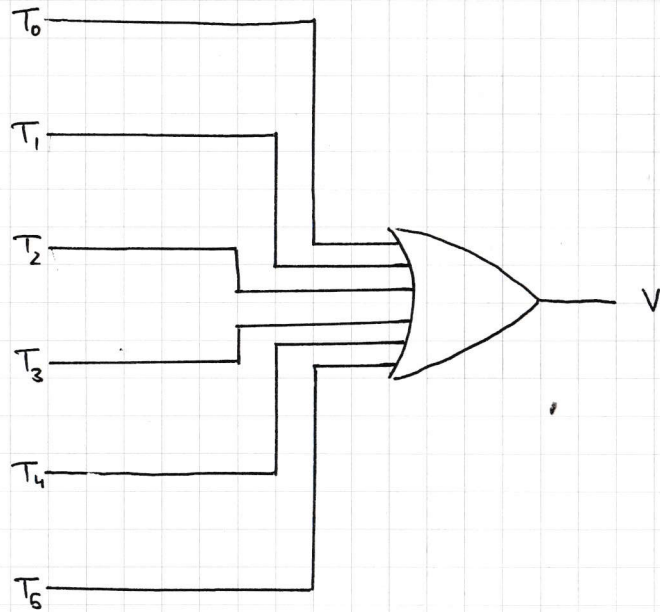


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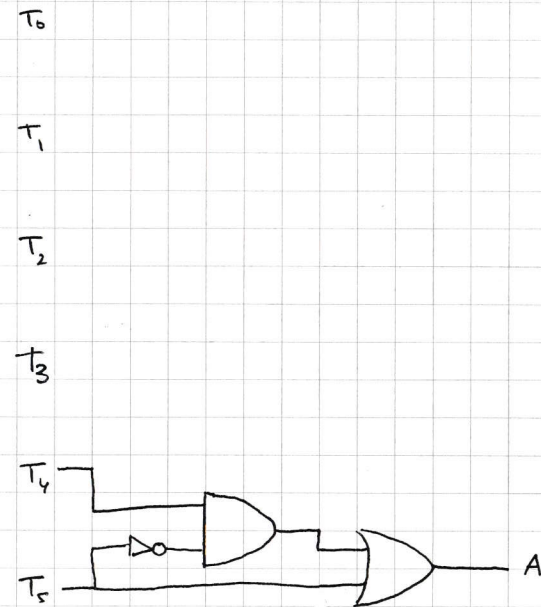
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② V



③ A



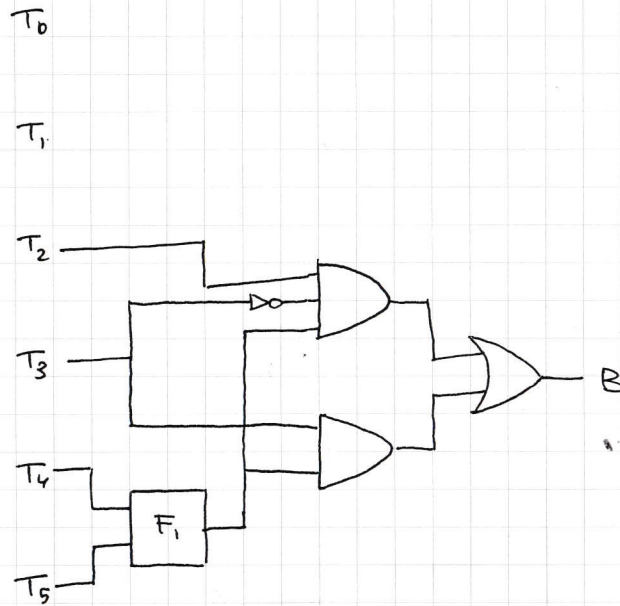
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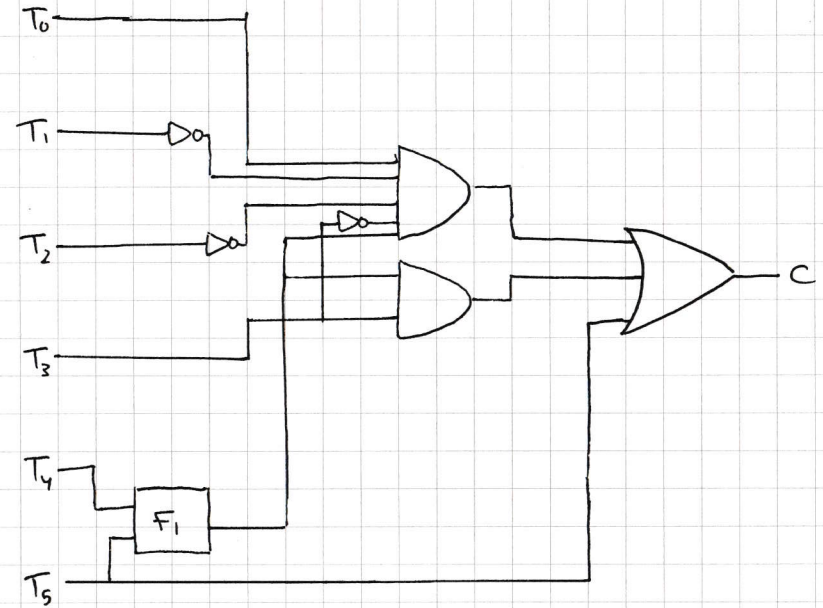
④ B



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⑤ C



⑥ Final, V menunjukkan ada tugas yang belum dikerjakan

