

SADMAN SAKIB
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Syntax : LECLerC

	a	b	c	d	e	f	g	W	X	Y
L	0	0	0	1	1	1	0	0	0	0
E	1	0	0	1	1	1	1	0	0	1
C	1	0	0	1	1	1	0	0	1	0
L	0	0	0	1	1	1	0	0	1	1
E	1	0	0	1	1	1	1	1	0	0
r	0	0	0	0	1	0	1	1	0	1
C	1	0	0	1	1	1	0	1	1	0
XXXXX	-	-	-	-	-	-	-	1	1	1

Common Costings :

7 Segment display : $1 \times 20 = 20$ BDT

3 switches : $3 \times 6 = 18$ BDT

Resistors : 40 BDT Approx

Wires : Jumper Wire M to M : 100 BDT Approx

7476 JK Flip Flop IC : $2 \times 35 = 70$ BDT

555 Clock : 30 BDT

Price Collected from : <https://robodocbd.com/>

Minterms:

$$a = m_1 + m_2 + m_4 + m_6$$

$$= w'x'y + w'xy' + wx'y' + wxy'$$

$$\sum (1, 2, 4, 6)$$

$$b = 0$$

$$c = 0$$

$$d = m_0 + m_1 + m_2 + m_3 + m_4 + m_6$$

$$= w'x'y' + w'x'y + w'xy' + w'xy + wx'y' + wxy'$$

$$\sum(0, 1, 2, 3, 4, 6)$$

$$e = m_0 + m_1 + m_2 + m_3 + m_4 + m_5 + m_6$$

$$= w'x'y' + w'x'y + w'xy' + w'xy + wx'y' + wx'y + wxy'$$

$$\sum(0, 1, 2, 3, 4, 5, 6)$$

$$f = m_0 + m_1 + m_2 + m_3 + m_4 + m_6$$

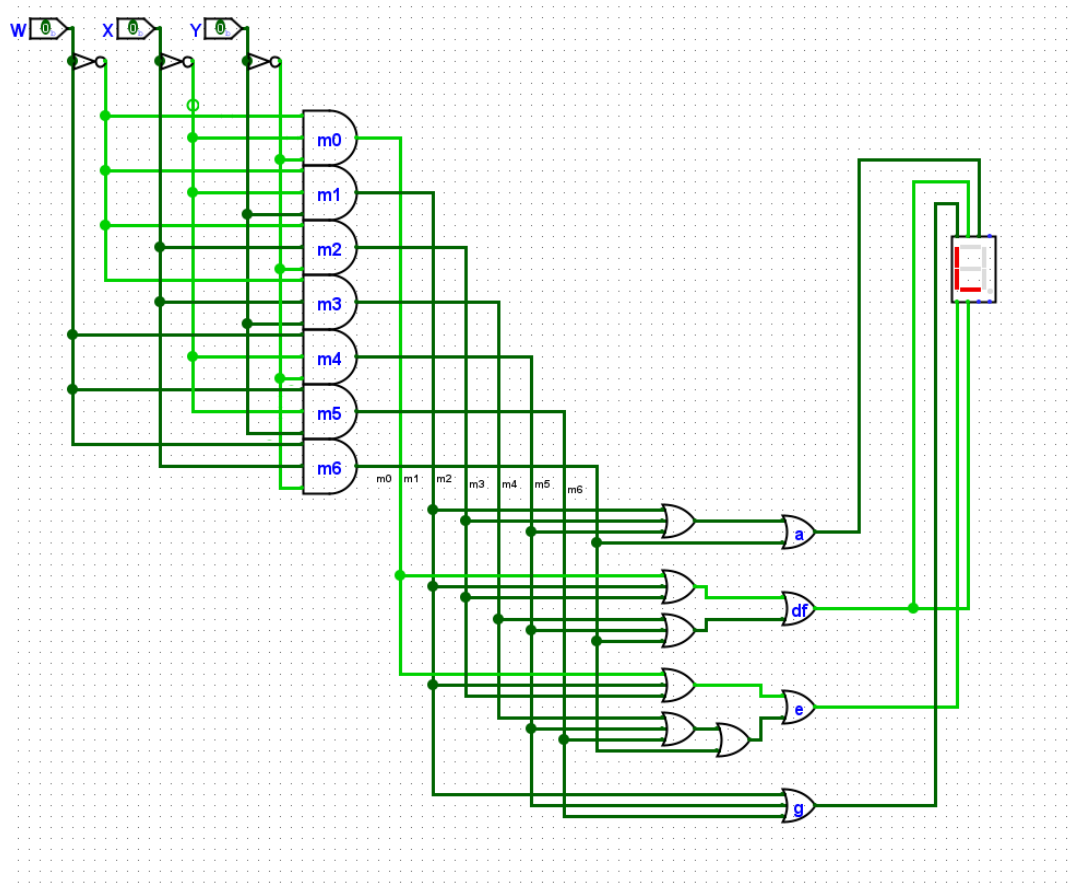
$$= w'x'y' + w'x'y + w'xy' + w'xy + wx'y' + wxy'$$

$$\sum(0, 1, 2, 3, 4, 6)$$

$$g = m_1 + m_4 + m_5$$

$$= w'x'y + wx'y' + wx'y$$

$$\sum(1, 4, 5)$$



COST:

Hex Inverter IC : 7404 :

1*28=28 BDT

3 Input AND IC : 7411 :

3*30=90 BDT

3 Input OR IC : 4075 :

3*40=120 bdt

2 Input OR IC : 7432 :

1*30=30 BDT

Total : 270 BDT

Maxterms:

a= M0.M3.M5

= (W+X+Y) . (W+X'+Y') . (W'+X+Y')

$\prod(0,3,5)$

b= M0.M1.M2.M3.M4.M5.M6

= (W+X+Y) . (W+X+Y') . (W+X'+Y) . (W+X'+Y') . (W'+X+Y) . (W'+X+Y') . (W'+X'+Y)

$\prod(0,1,2,3,4,5,6)$

c= M0.M1.M2.M3.M4.M5.M6

= (W+X+Y) . (W+X+Y') . (W+X'+Y) . (W+X'+Y') . (W'+X+Y) . (W'+X+Y') . (W'+X'+Y)

$\prod(0,1,2,3,4,5,6)$

d=M5

= (W'+X+Y')

$\prod(5)$

e=1

f=M5

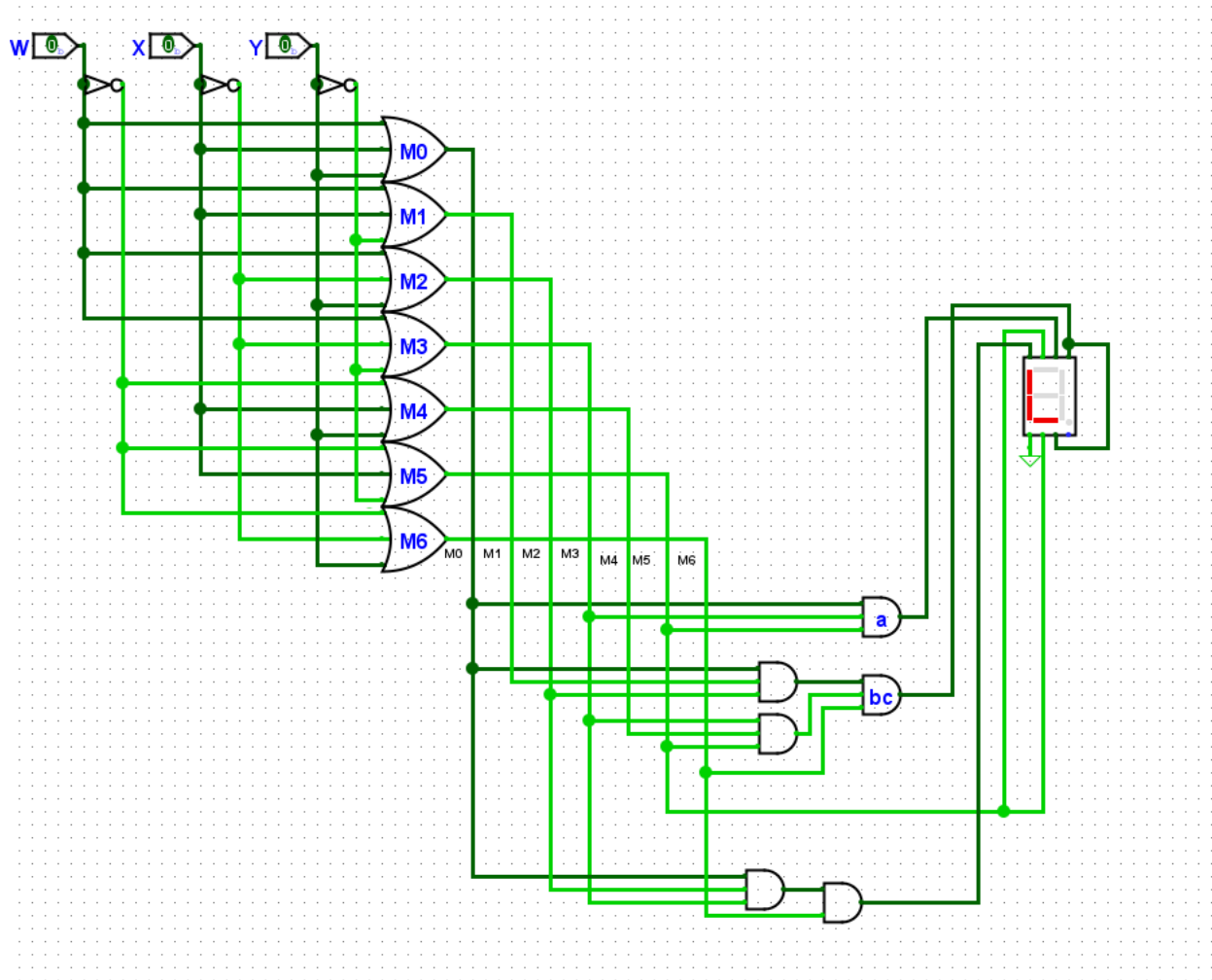
= (W'+X+Y')

$\prod(5)$

g=M0.M2.M3.M6

(W+X+Y) . (W+X'+Y) . (W+X'+Y') . (W'+X'+Y)

$\Pi(0,2,3,6)$



COST :

Hex Inverter 7404:

1*28=28 BDT

3 input OR IC : 4075 :

3*40=120 BDT

3 Input AND IC : 7411 :

2*30=60 BDT

2 input AND IC : 7408 :

1*25=25 BDT (not mandatory if 3 input fully used)

Total : 235 BDT

K-Maps:

Minimal first can:

a:

W \ XY	00	01	11	10
0	0	1	0	1
1	1	0	x	1

$$\text{Eqn : } W'X'Y + XY' + WY'$$

b:

W \ XY	00	01	11	10
0	0	0	0	0
1	0	0	x	0

$$\text{Eqn : } 0$$

c:

W \ XY	00	01	11	10
0	0	0	0	0
1	0	0	x	0

$$\text{EqN : } 0$$

d:

W \ XY	00	01	11	10
0	1	1	1	1
1	1	0	x	1

$$\text{Eqn : } W' + Y'$$

e:

W \ XY	00	01	11	10
0	1	1	1	1
1	1	1	x	1

Eqn : 1

f:

W \ XY	00	01	11	10
0	1	1	1	1
1	1	0	x	1

Eqn : $W' + Y'$

g:

W \ XY	00	01	11	10
0	0	1	0	0
1	1	1	x	0

Eqn : $X'Y + WX'$

Eqn : $(W+X+Y) \cdot (W+X'+Y') \cdot (W'+X+Y')$

b:

W \ XY	00	01	11	10
0	0	0	0	0
1	0	0	x	0

Eqn : 0

c:

W \ XY	00	01	11	10
0	0	0	0	0
1	0	0	x	0

Eqn : 0

d:

W \ XY	00	01	11	10
0	1	1	1	1
1	1	0	x	1

Eqn : $W' + Y'$

e:

W \ XY	00	01	11	10
0	1	1	1	1
1	1	1	x	1

Eqn : 1

f:

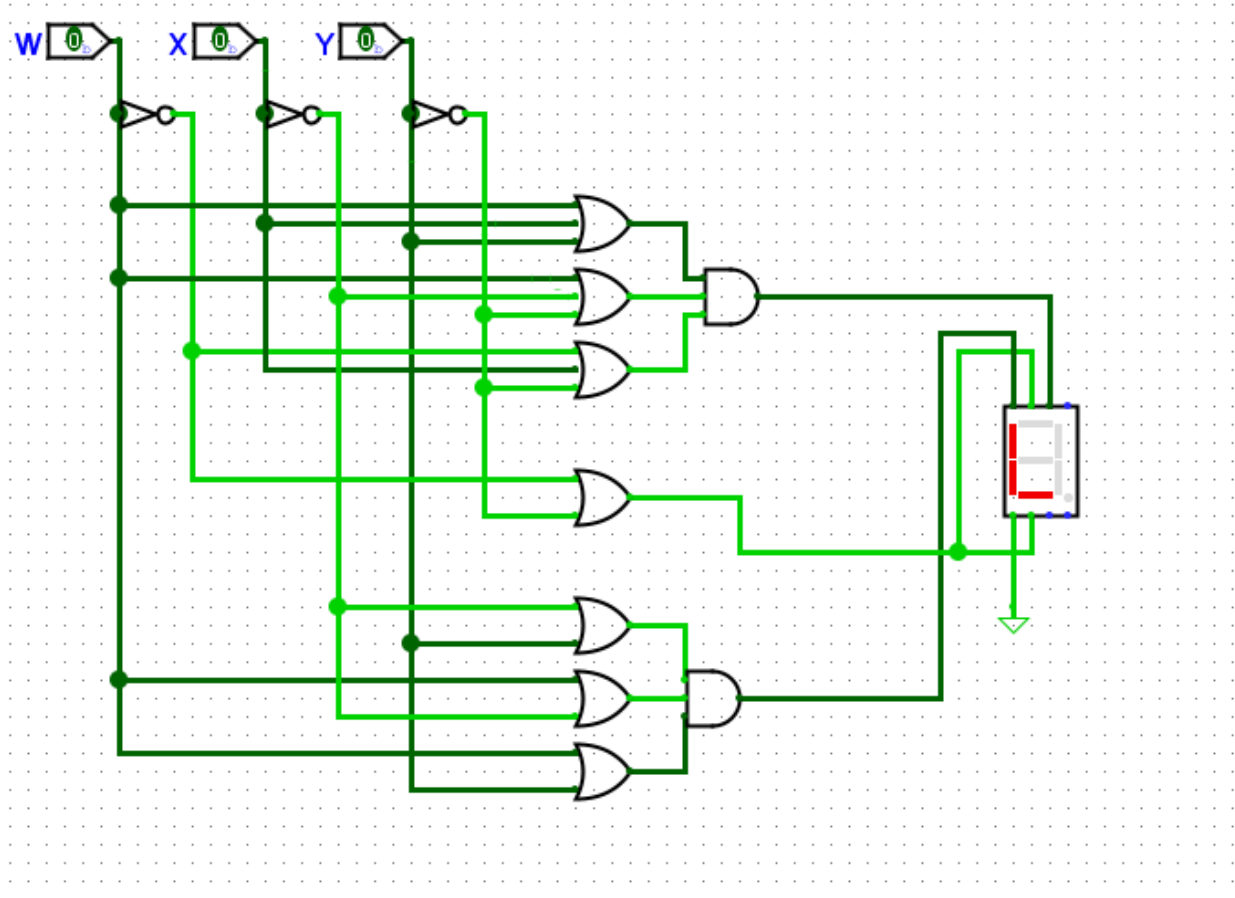
W \ XY	00	01	11	10
0	1	1	1	1
1	1	0	x	1

Eqn : $W' + Y'$

g:

W \ XY	00	01	11	10
0	0	1	0	0
1	1	1	x	0

Eqn : $(X' + Y) \cdot (W + X') \cdot (W + Y)$



Cost:

Hex Inverter 7404 :

$1 \times 28 = 28$ BDT

3 Input OR Gate 4075:

$1 \times 40 = 40$ BDT

2 Input OR Gate 7432:

$1 \times 30 = 30$ BDT

3 Input AND 7411:

$1 \times 30 = 30$ BDT

Total : 130 BDT

NAND :

$$a = (W' X' Y)' \cdot (XY)' \cdot (WY)'$$

$$b = 0$$

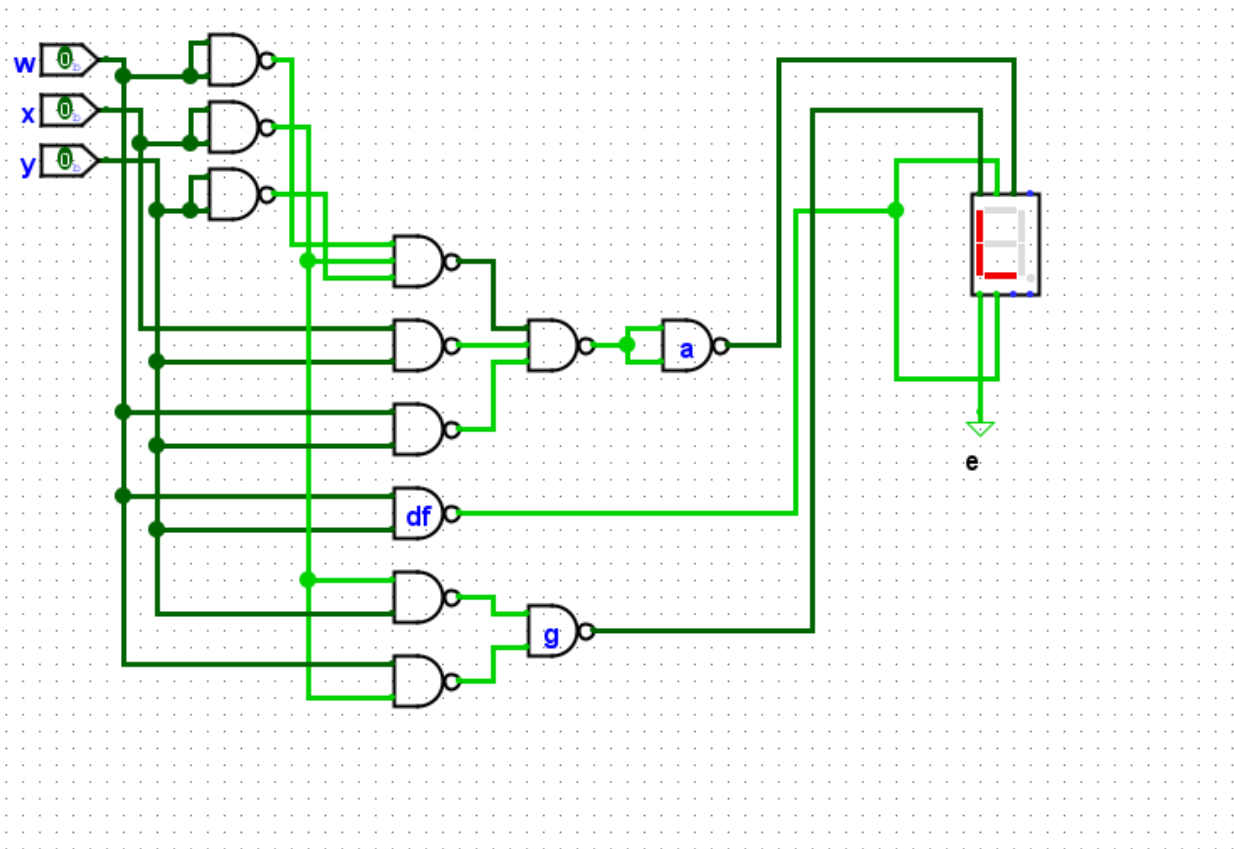
$$c = 0$$

$$d = (WY)'$$

$$e = 1$$

$$f = (WY)'$$

$$g = (W' Y)' \cdot (WX)'$$



COST:

2 Input NAND 7400:

$$3 \times 20 = 60 \text{ BDT}$$

3 Input NAND 7410:

$$1 \times 35 = 35 \text{ BDT}$$

Total : 95 BDT

NOR:

$$a = (W+X+Y)' + (W+X'+Y') + (W'+X+Y')$$

$$b = 0$$

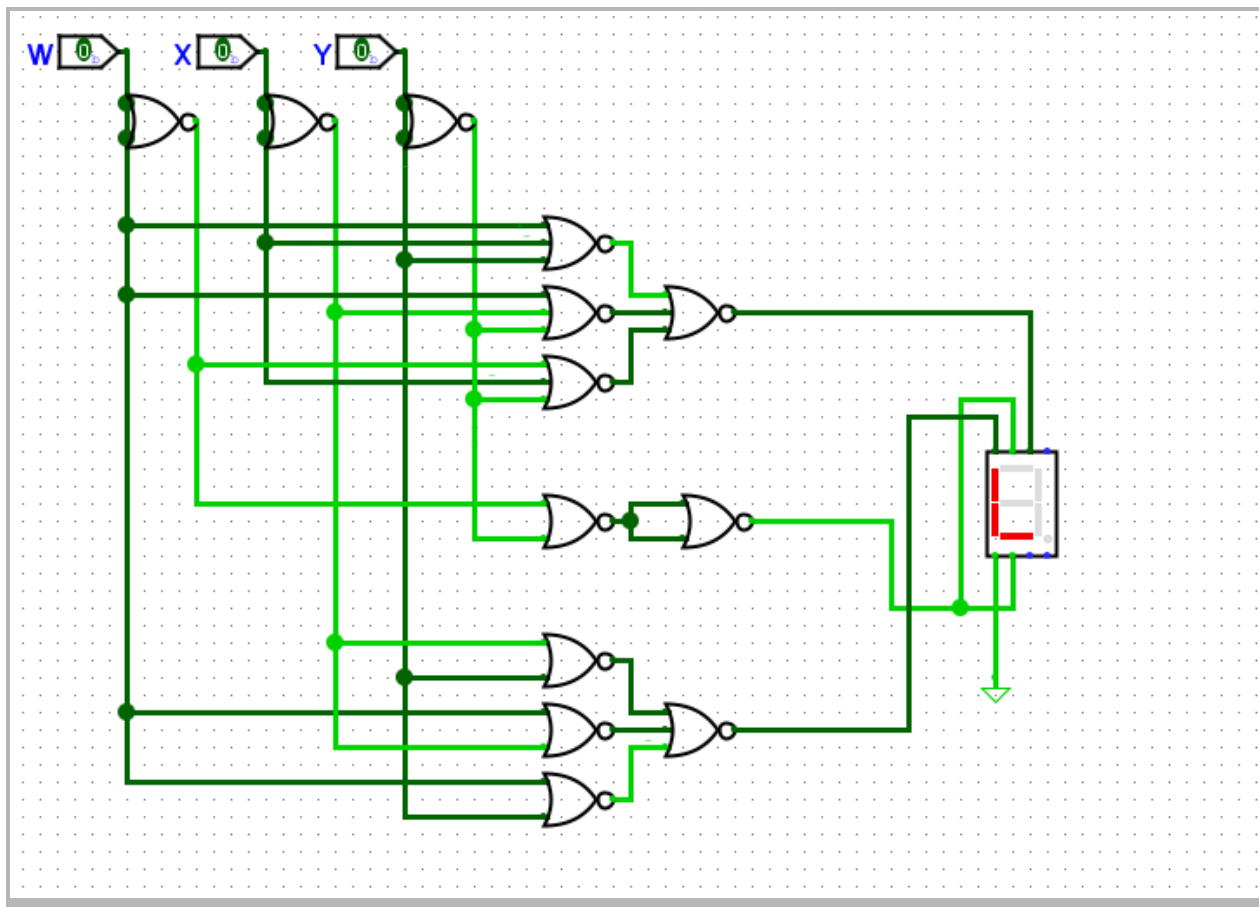
$$c = 0$$

$$d = ((W' + Y')')'$$

$$e = 1$$

$$f = ((W' + Y')')'$$

$$g = (X' + Y)' + (W+X')' + (W+Y)'$$



COST:

2 Input NOR 7402:

$$3 \times 25 = 75 \text{ BDT}$$

3 Input NOR 7427:

$$2 \times 35 = 70 \text{ BDT}$$

Total : 145 BDT

MUX :

s1=W

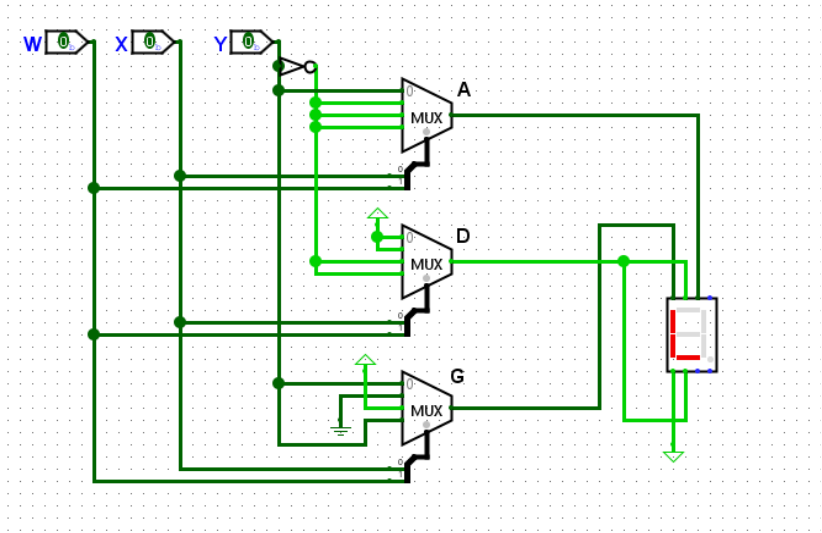
s0=X

W	X	Y	a	W	X	Y	b	W	X	Y	c	W	X	Y	d
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	1
0	1	0	1	0	1	0	0	0	1	0	0	0	1	0	1
0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1
1	0	0	1	1	0	0	0	1	0	0	0	1	0	0	1
1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
1	1	0	1	1	1	0	0	1	1	0	0	1	1	0	1
1	1	1	x	1	1	1	x	1	1	1	x	1	1	1	x

	a		b		c		d
i0	y	i0	0	i0	0	i0	1
i1	y'	i1	0	i1	0	i1	1
i2	y'	i2	0	i2	0	i2	y'
i3	y'	i3	0	i3	0	i3	y'

W	X	Y	e	W	X	Y	f	W	X	Y	g	W	X	Y	.
0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	x
0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	x
0	1	0	1	0	1	0	1	0	1	0	0	0	1	0	x
0	1	1	1	0	1	1	1	0	1	1	0	0	1	1	x
1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	x
1	0	1	1	1	0	1	0	1	0	1	1	1	0	1	x
1	1	0	1	1	1	0	1	1	1	0	0	1	1	0	x
1	1	1	x	1	1	1	x	1	1	1	x	1	1	1	x

	e		f		g		.
i0	1	i0	1	i0	y	i0	
i1	1	i1	1	i1	0	i1	
i2	1	i2	y'	i2	1	i2	
i3	1	i3	y'	i3	y	i3	



Cost :

4:1 74143 IC:

2*35=70 BDT

DEC :

$A = D1 + D2 + D4 + D6$

$B = 0$

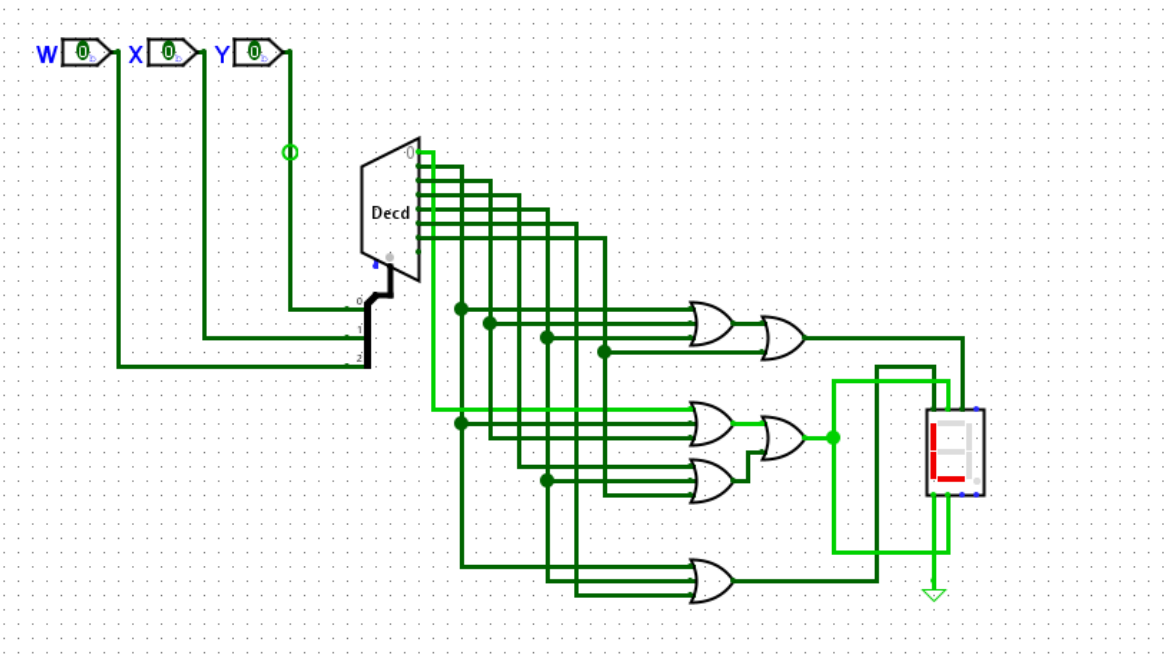
$C = 0$

$D = D0 + D1 + D2 + D3 + D4 + D6$

$E = D0 + D1 + D2 + D3 + D4 + D5 + D6 = 1$

$F = D0 + D1 + D2 + D3 + D4 + D6$

$G = D1 + D4 + D5$



Cost:

3:8 Decoder 74138:

1*40=40 BDT

3 input OR 4075 :

2*40=80 BDT

2 input OR 7432:

1*30=30 BDT

Total : 150 BDT