



## **Project Report**

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Character	w	x	y	A	B	C	D	E	F	G	DP
C	0	0	0	1	0	0	1	1	1	0	0
H	0	0	1	0	1	1	0	1	1	1	0
E	0	1	0	1	0	0	1	1	1	1	0
A	0	1	1	1	1	1	0	1	1	1	0
P	1	0	0	1	1	0	0	1	1	1	0
E	1	0	1	1	0	0	1	1	1	1	0
r	1	1	0	0	0	0	0	1	0	1	0
.	1	1	1	0	0	0	0	0	0	0	1

### **Task 1:**

The sum of minterm:

$$A = F(0, 2, 3, 4, 5)$$

$$A = M_0 + M_2 + M_3 + M_4 + M_5$$

$$A = W'X'Y' + W'XY' + W'XY + WX'Y' + WX'Y$$

$$B = F(1, 3, 4)$$

$$B = M_1 + M_3 + M_4$$

$$B = W'X'Y + W'XY + WX'Y'$$

$$C = F(1, 3)$$

$$C = M_1 + M_3$$

$$C = W'X'Y + W'XY$$

$$D=F(0,2,5)$$

$$D= M0+M2+M5$$

$$D= W'X'Y'+W'XY'+WX'Y$$

$$E=F(0,1,2,3,4,5,6)$$

$$E= M0+M1+M2+M3+M4+M5+M6$$

$$E= W'X'Y'+W'X'Y+W'XY'+W'XY+WX'Y'+WX'Y+WXY'$$

$$F=F(0,1,2,3,4,5)$$

$$E=M0+M1+M2+M3+M4+M5$$

$$F= W'X'Y'+W'X'Y+W'XY'+W'XY+WX'Y'+WX'Y$$

$$G=F(1,2,3,4,5,6)$$

$$G=M1+M2+M3+M4+M5+M6$$

$$G= W'X'Y+W'XY'+W'XY+WX'Y'+WX'Y+WXY'$$

$$DP=F(7)$$

$$DP= M7$$

$$DP= WXY$$

Total Pricing:

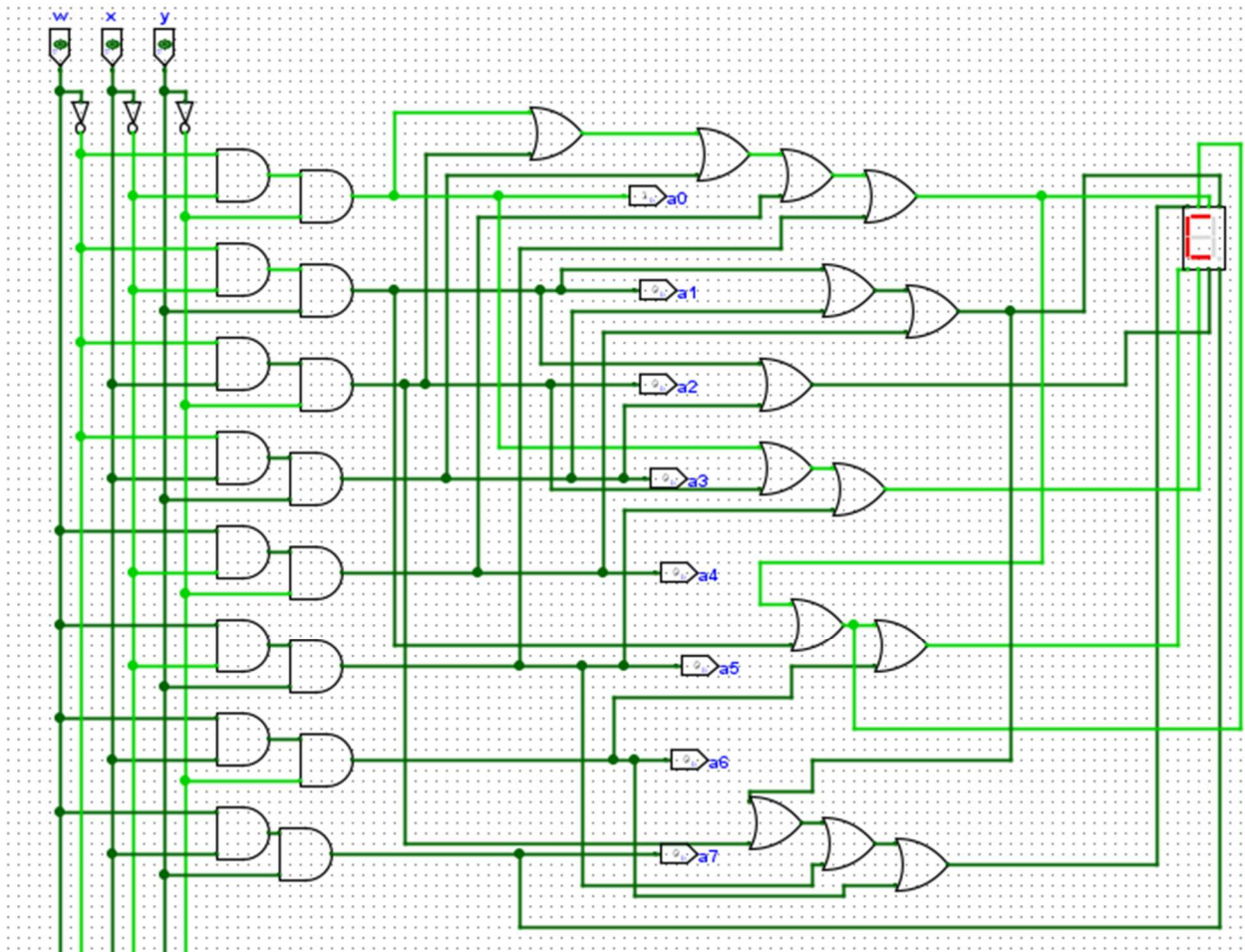
Total NOT gate 3(1 **IC7404**)(20tk)

Total AND gate 16(4 **IC7408**)(25tk)

Total OR gate 14(4 **IC7432**)(25tk)

**Price** = (25x4)+(25x4)=**220tk**

Circuit:



## Task 2:

Product of maxterm:

$$A = F(1, 6, 7)$$

$$A = M_1 \cdot M_6 \cdot M_7$$

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

$$B = F(0, 2, 5, 6, 7)$$

$$B = M_0 \cdot M_2 \cdot M_5 \cdot M_6 \cdot M_7$$

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

$$C=F(0,2,4,5,6,7)$$

$$C=M0.M2.M4.M5.M6.M7$$

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

$$D=F(1,3,4,6,7)$$

$$C=M1.M3.M4.M6.M7$$

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

$$E=F(7)$$

$$E= M7$$

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

$$F=F(6,7)$$

$$F= M6.M7$$

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

$$G=F(0,7)$$

$$G=M0.M7$$

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

$$DP=F(0,1,2,3,4,5,6)$$

$$DP=M0.M1.M2.M3.M4.M5.M6$$

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

Total Pricing:

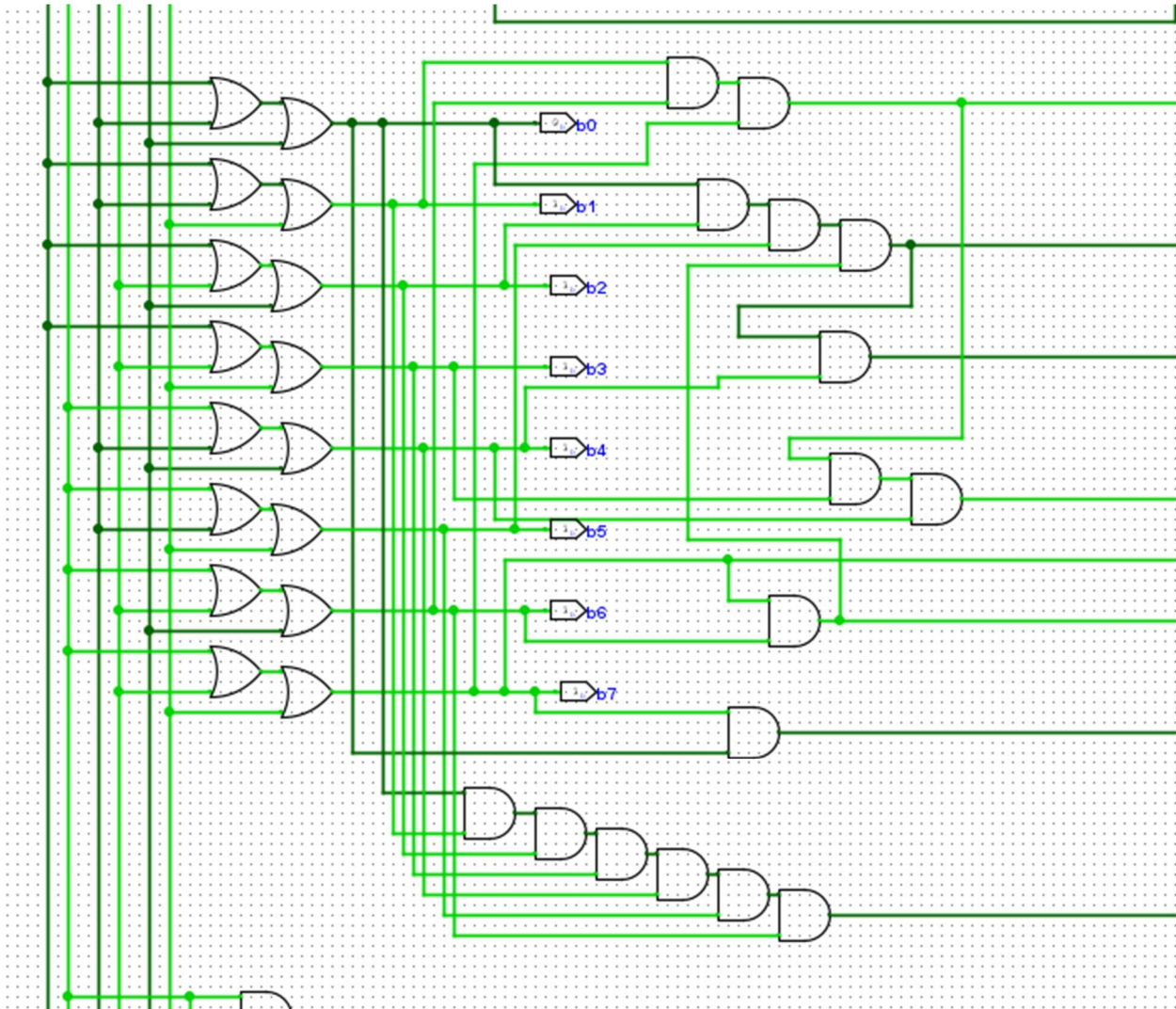
NOT gate: 3(1 **IC7404**)(20tk)

OR gate: 16(4 **IC7432**)(25tk)

AND gate :16(4 IC7408)(25tk)

**Total Price: 220tk**

Circuit:



### Task 3:

Using K-Map, SOP functions are given below:-

	Y	
WX	0	1
00	1	0
01	1	1
11	0	0
10	1	1

$$A = W'X + W'Y' + WX'$$

	Y	
WX	0	1
00	0	1
01	0	1
11	0	0
10	1	0

$$B = W'Y + WX'Y'$$

	Y	
WX	0	1
00	0	1
01	0	1
11	0	0
10	0	0

$$C = W'Y$$

	Y	
WX	0	1
00	1	0
01	1	0
11	0	0
10	0	1

$$D=W'Y'+WX'Y$$

	Y	
WX	0	1
00	1	1
01	1	1
11	1	0
10	1	1

$$E=W'+X'+Y'$$

	Y	
WX	0	1
00	1	1
01	1	1
11	0	0
10	1	1

$$F=W'+X'$$



	Y	
WX	0	1
00	0	1
01	1	1
11	1	0
10	1	1

$$G=W'Y+XY'+WX'$$

	Y	
WX	0	1
00	0	0
01	0	0
11	0	1
10	0	0

$$DP=WCY$$

Total Pricing:

NOT gate: 3(1 **IC7404**)(20tk)

AND gate: 15(4 **IC7408**)(25tk)

OR gate: 9(3 **IC7432**)(25tk)

**Total Price:** 100+75+20=**195tk**



	Y	
WX	0	1
00	1	0
01	1	1
11	0	0
10	1	1

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

	Y	
WX	0	1
00	0	1
01	0	1
11	0	0
10	1	0

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

	Y	
WX	0	1
00	0	1
01	0	1
11	0	0
10	0	0

$$C = W'Y$$

	Y	
WX	0	1
00	1	0
01	1	0
11	0	0
10	0	1

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

	Y	
WX	0	1
00	1	1
01	1	1
11	1	0
10	1	1

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

	Y	
WX	0	1
00	1	1
01	1	1
11	0	0
10	1	1

$$F = (W' + X')$$

	Y	
WX	0	1
00	0	1
01	1	1
11	1	0
10	1	1

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

	Y	
WX	0	1
00	0	0
01	0	0
11	0	1
10	0	0

$$DP=WXY$$

Total Pricing:

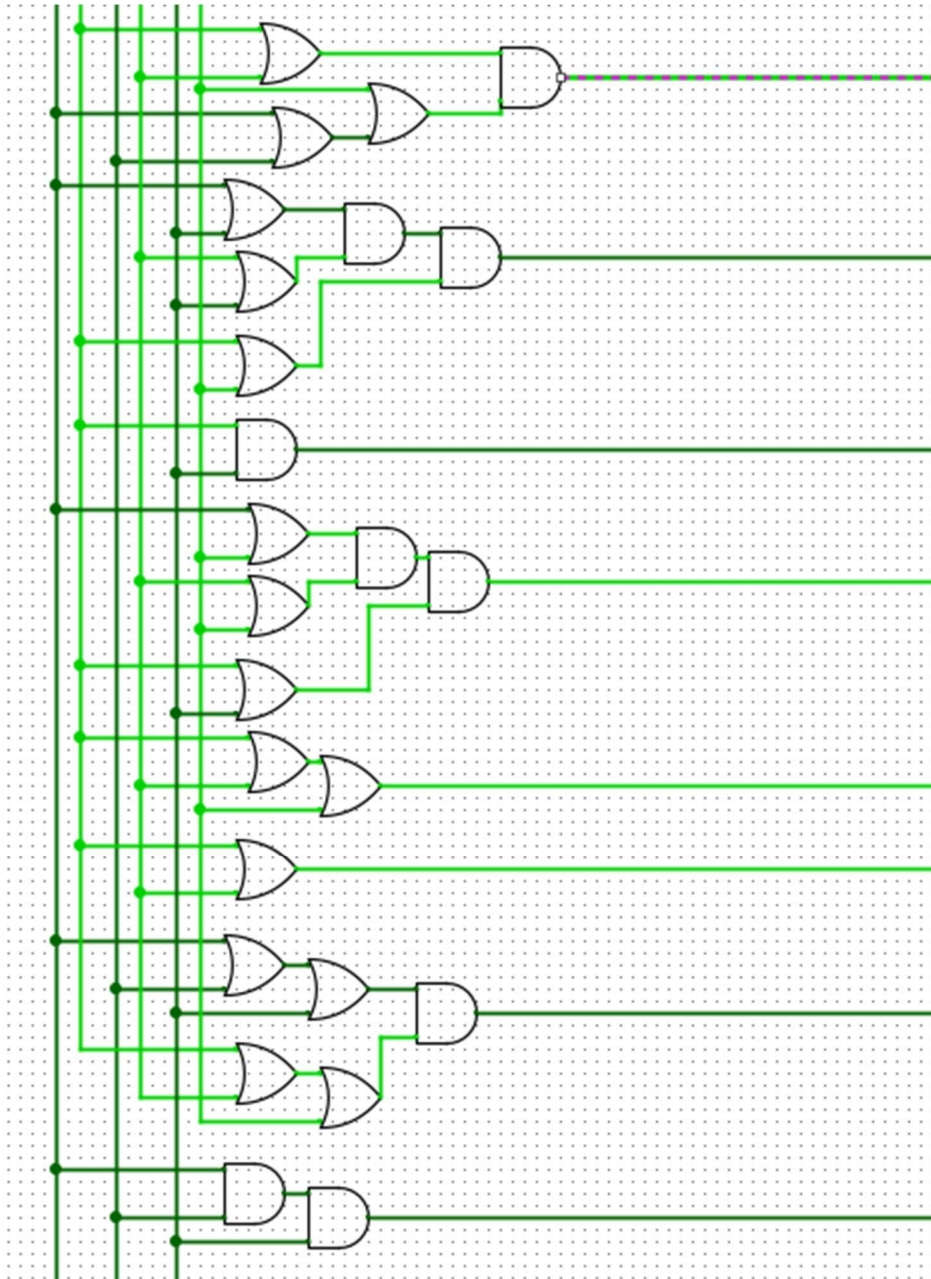
NOT gate: 3(1 **IC7404**)(20tk)

OR gate: 16(4 **IC7432**)(25tk)

AND gate:9(3 **IC7408**)(25tk)

**Price: 195tk**

Circuit:



**Task 5:** SOP using NAND gates:

$$A = ((W'X)' (W'Y)')' (WX')'$$

$$B = ((W'Y)' (WX'Y'))'$$

$$C = ((W'Y)')'$$

$$D = ((W'Y)' (WX'Y'))'$$

$$E = (WXY)'$$

$$F = (WX)'$$

$$G = ((W'Y)'(XY)')(WX')'$$

$$DP = ((WXY)')$$

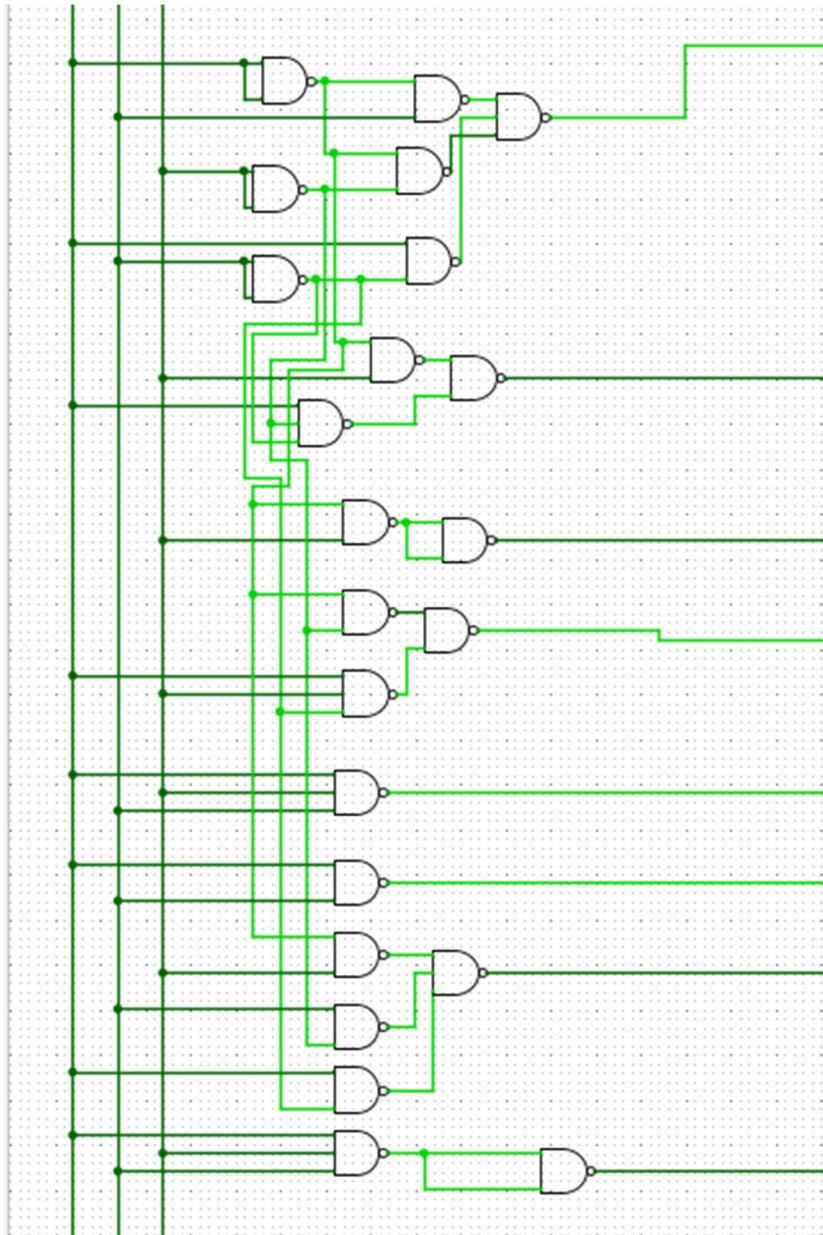
Total Pricing:

2 input NAND gate: 17(5 **IC7400**)(20tk)

3 input NAND gate: 6(2 **IC7410**)(35tk)

**Price:** 100+70= **170tk**

Circuit:



**Task 6:** POS using nor gates:

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

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

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

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

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

$$F = ((W' + X')')$$

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

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

Total Pricing:

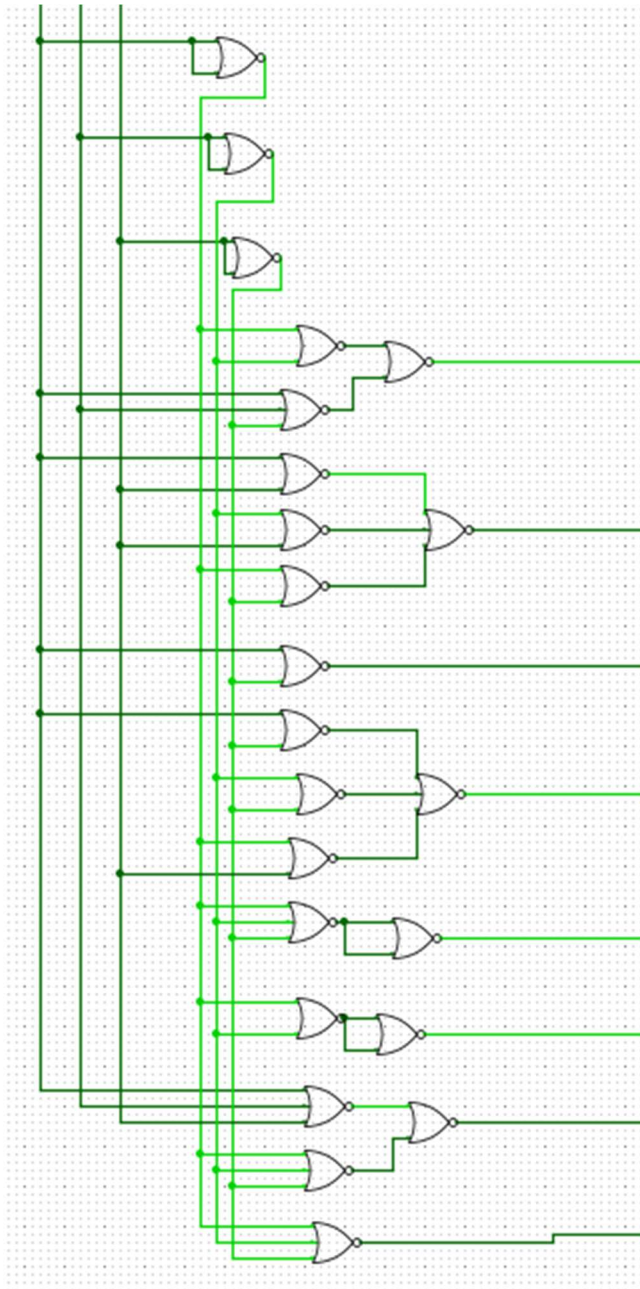
2 input NOR gate : 16(4 **IC7402**)(25tk)

3 input NOR gate: 7(2 **IC7427**)(45tk)

**Total: 190tk**

Circuit:





**Task 7:** Using 4:1 MUX,

$A = Y'$	$B = Y$	$C = Y$	$D = Y'$	$E = 1$	$F = 1$	$G = Y$	$DP = 0$
1	Y	Y	$Y'$	1	1	1	0
1	$Y'$	0	Y	1	1	1	0
0	0	0	0	$Y'$	0	$Y'$	Y

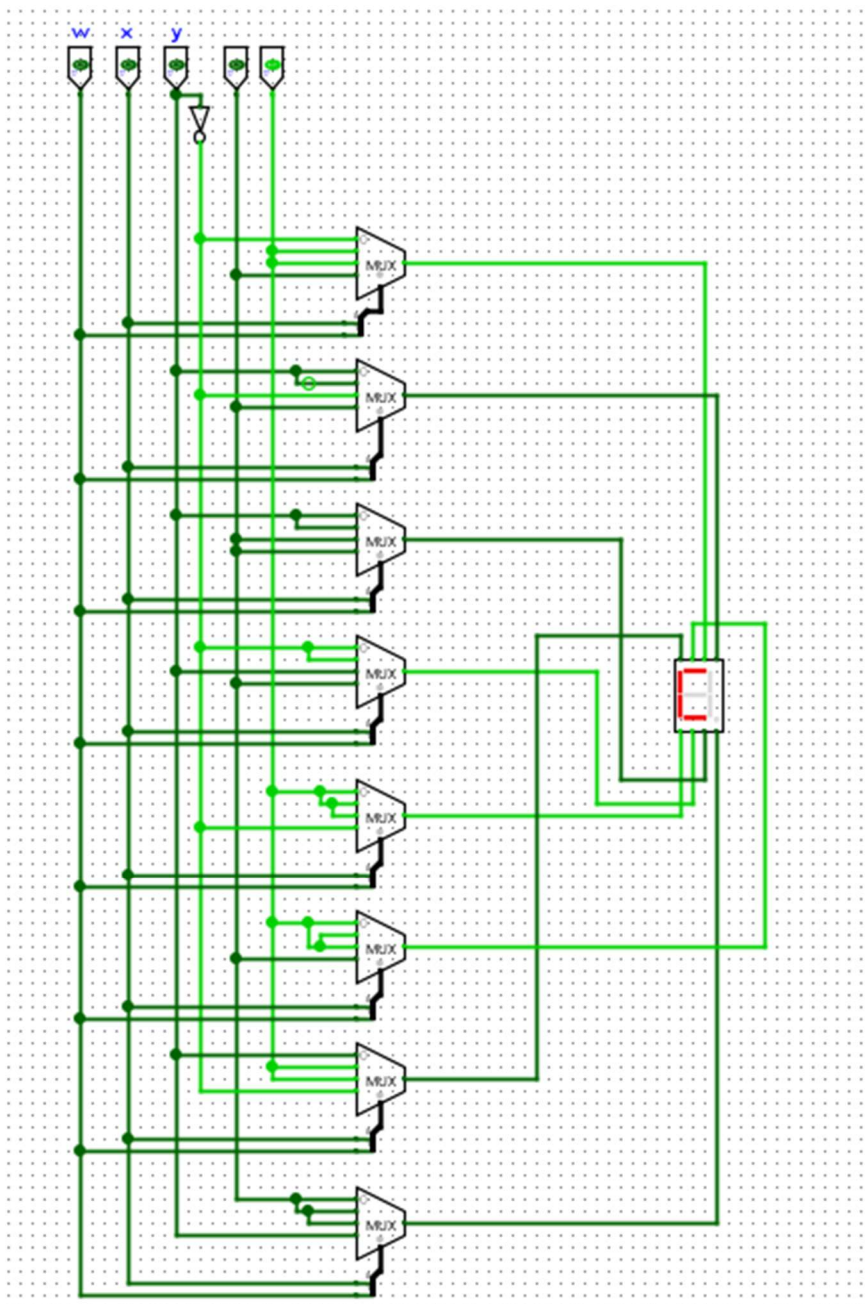
### Pricing:

NOT gate price: 20tk Needed: 1 **IC7404**

4:1 MUX price: 35tk Needed:4 **IC74151**

TOTAL PRICING: **160tk**

### Circuit:



**Task 8:** Using a decoder

$$A = D_0 + D_2 + D_3 + D_4 + D_5$$

$$B = D_1 + D_3 + D_4$$

$$C = D_1 + D_3$$

$$D = D_0 + D_2 + D_5$$

$$E = D_0 + D_1 + D_2 + D_3 + D_4 + D_5 + D_6$$

$$F = D_0 + D_1 + D_2 + D_3 + D_4 + D_5$$

$$G = D_1 + D_2 + D_3 + D_4 + D_5 + D_6$$

$$DP = D_7$$

Total **OR IC7432** needed: 3 IC (total gate 12)(25tk)

Decoder 3 to 8: 1 **IC74138** (40tk)

Total Price: 75+40= **115tk**

Circuit:

