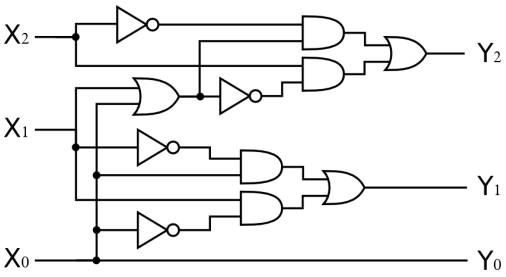
Started on	Tuesday, April 20, 2021, 10:43 AM
State	Finished
Completed on	Tuesday, April 20, 2021, 12:43 PM
Time taken	2 hours
Points	58.31/85.00
Grade	**68.60** out of 100.00

Question **1**

Correct

3.00 points out of 3.00

Consider the following digital circuit with three inputs (X_2, X_1, X_0) and three outputs (Y_2,Y_1,Y_0), both interpreted as 3-bit integers.



What outputs (Y_2, Y_1, Y_0) does this circuit generate for the inputs

X_2= 1, X_1= 0, X_0= 1?

a. Y_2=0 Y_1=1 Y_0=0

b. Y_2=1 Y_1=1 Y_0=0

c. Y_2=0 Y_1=1 Y_0=1 ✔

d. Y_2=1 Y_1=1 Y_0=0

Your answer is correct.

The correct answer is:

Y_2=0 Y_1=1 Y_0=1

Question **2**

Correct

3.00 points out of 3.00

Two 4-bit binary numbers (1011) and (1111) are applied to a 4-bit parallel adder. The carry input is 1. What are the values for the sum and carry output?

a. 0111, Cout = 0

b. 1100, Cout = 1

c. 1011, Cout = 1 ✔

d. 1111, Cout = 1

Your answer is correct.

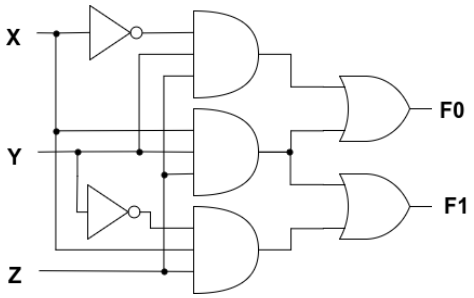
The correct answer is:
1011, Cout = 1

Question **3**

Correct

3.00 points out of 3.00

Consider the digital circuit with three inputs (X,Y,Z) and two outputs (F1,F0) below



What are algebraic expressions for the two outputs?

a. $F_1 = X'YZ + XYZ$ $F_0 = XY'Z + XYZ$

b. $F_1 = XY'Z + XYZ'$ $F_0 = XY'Z + XYZ'$

c. $F_1 = XZ$ $F_0 = YZ$

d. $F_1 = YZ$ $F_0 = XZ$

Your answer is correct.

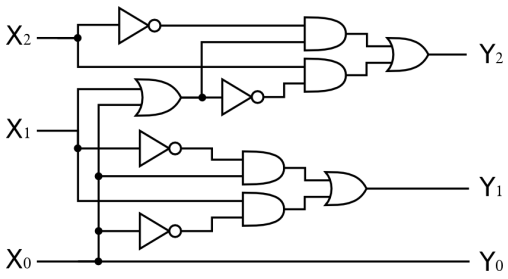
The correct answer is:
$F_1 = XZ$ $F_0 = YZ$

Question **4**

Correct

3.00 points out of 3.00

Consider the following digital circuit with three inputs (X_2, X_1, X_0) and three outputs (Y_2,Y_1,Y_0), both interpreted as 3-bit integers



What are the algebraic expressions for the output Y_2?

a. $Y_2 = (X_0 + X_1)\, X_2' + (X_0 + X_1)'\, X_2$

b. $Y_2 = (X_0 + X_1)\, X_2 + (X_0 + X_1)'\, X_2'$

c. $Y_2 = ((X_0 + X_1) + X_2)'$

d. $Y_2 = (X_0 + X_1)'\, X_2$

Your answer is correct.

The correct answer is:

$Y_2 = (X_0 + X_1)\, X_2' + (X_0 + X_1)'\, X_2$

Question **5**

Correct

3.00 points out of 3.00

Given two, 2-bit inputs find out what the operation defined by the following truth table is. Note that the first input number **A** is represented by A1A0 and can take values 0,1,2, whereas the second input number **B** is represented by B1B0 and can take the values 0,1,2,3. The output **M** is represented by a three bit number $M_2M_1M_0$.

A_1	A_0	B_1	B_0	M_2	M_1	M_0
0	0	0	0	0	0	0
0	0	0	1	0	0	0
0	0	1	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	0	0
0	1	0	1	0	0	1
0	1	1	0	0	1	0
0	1	1	1	0	1	1
1	0	0	0	0	0	0
1	0	0	1	0	1	0
1	0	1	0	1	0	0
1	0	1	1	1	1	0

What operation does this circuit perform?

a. **M** is the subtraction of **B** from **A**

b. **M** is the addition of **A** and **B**

c. **M** is the multiplication of **A** and **B** ✔

d. **M** is the subtraction of **A** from **B**

Your answer is correct.

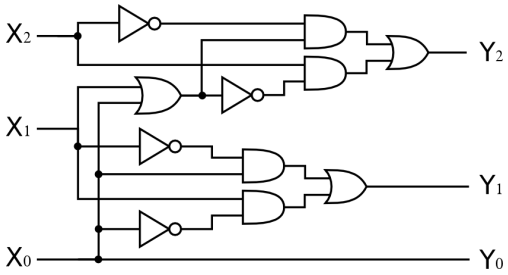
The correct answer is:
M is the multiplication of **A** and **B**

Question **6**

Correct

3.00 points out of 3.00

Consider the following digital circuit with three inputs (X_2, X_1, X_0) and three outputs (Y_2,Y_1,Y_0), both interpreted as 3-bit integers.



What are the algebraic expressions for the output Y_1?

a. $Y_1 = (X_0' X_1) + (X_0 X_1')$ ✔

b. $Y_1 = (X_0' + X_1') (X_0 + X_1)$

c. $Y_1 = (X_0 + X_1)' (X_0 + X_1)$

d. $Y_1 = (X_0 + X_1)'$

Your answer is correct.

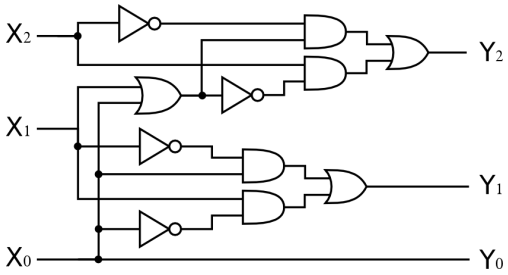
The correct answer is: $Y_1 = (X_0' X_1) + (X_0 X_1')$

Question **7**

Correct

3.00 points out of 3.00

Consider the following digital circuit with three inputs (X_2, X_1, X_0) and three outputs (Y_2,Y_1,Y_0), both interpreted as 3-bit integers.



How many rows and columns are there in the truth table?

a. 8 rows and 8 columns

b. 8 rows and 6 columns ✔

c. 6 rows and 8 columns

d. 6 rows and 6 columns

Your answer is correct.

The correct answer is:
8 rows and 6 columns

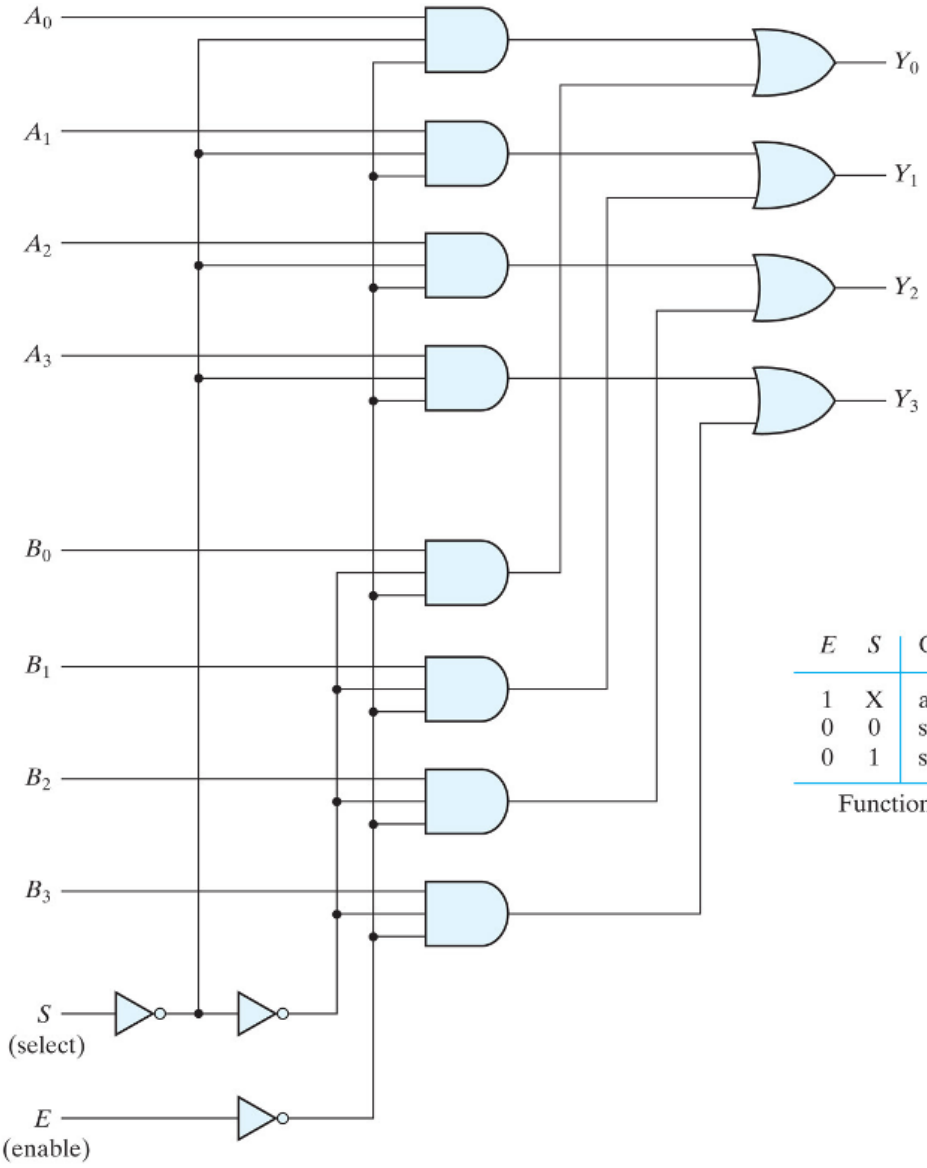
Question **8**

Incorrect

0.00 points out of 3.00

Consider the logic diagram of a quadruple 2-to-1 line multiplexer

If the circuit is described in a truth table, how many rows and columns would there be in the table?



E	S	Output Y
1	X	all 0's
0	0	select A
0	1	select B

Function table

a. 528 rows and 14 columns

b. 528 rows and 13 columns

c. 256 rows and 12 columns

d. 1024 rows and 14 columns

Your answer is incorrect.

The correct answer is:

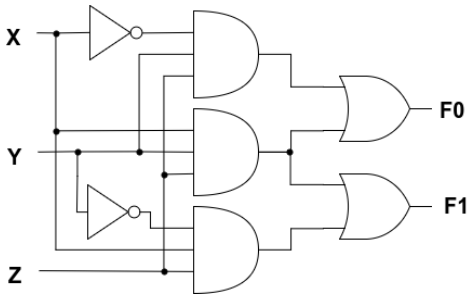
1024 rows and 14 columns

Question **9**

Correct

3.00 points out of 3.00

Consider the digital circuit with three inputs (X,Y,Z) and two outputs (F1,F0) below.



Which one is the truth table for this circuit.

a.

X	Y	Z	F1	F0
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	0	1
1	0	0	0	0
1	0	1	1	0
1	1	0	0	0
1	1	1	1	1

b.

X	Y	Z	F1	F0
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	1	0
1	0	0	0	0
1	0	1	0	1
1	1	0	0	0
1	1	1	1	1

c.

X	Y	Z	F1	F0
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	1	1

1	0	0	0	0
1	0	1	1	0
1	1	0	0	0
1	1	1	1	1

d.

X	Y	Z	F1	F0
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	1	1
1	0	0	0	0
1	0	1	1	1
1	1	0	0	0
1	1	1	1	1

Your answer is correct.

The correct answer is:

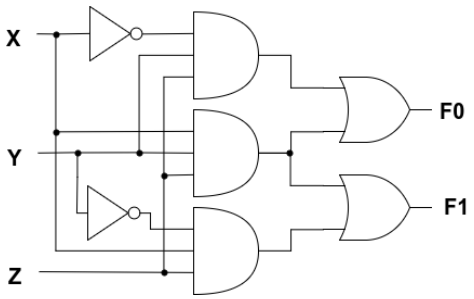
X	Y	Z	F1	F0
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	0	1
1	0	0	0	0
1	0	1	1	0
1	1	0	0	0
1	1	1	1	1

Question **10**

Incorrect

0.00 points out of 3.00

Consider the digital circuit with three inputs (X,Y,Z) and two outputs (F1,F0) below



Given the decimal values, $X=(9)_{10}$, $Y=(2)_{10}$ and $Z=(7)_{10}$, what are the outputs of the circuit in decimal, i.e. $(F_0)_{10}$ = ? and $(F_1)_{10}$ =?

a. $F_0= 2$ $F_1= 3$

b. $F_0= 1$ $F_1= 2$

c. $F_0= 3$ $F_1= 2$

d. $F_0= 2$ $F_1= 1$

Your answer is incorrect.

The correct answer is:
$F_0= 2$ $F_1= 1$

Question **11**

Correct

3.00 points out of 3.00

The Karnaugh map for a Boolean function is given as follows.

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	1	0	0
11	1	1	1	1
10	0	1	1	1

Which of the following is the simplified Boolean equation for the above Karnaugh map?

a. AB + AD + BC + AC'D

b. AB + AD + BC + ACD

c. AB + AC + AD + BC'D ✔

d. AB + AC + AD + BCD

Your answer is correct.

The correct answer is:
AB + AC + AD + BC'D

Question **12**

Correct

3.00 points out of 3.00

The most simplified form of the Boolean function, F(A, B, C, D) = ∑ (7, 8, 9, 10, 11, 12, 13, 14, 15) that is expressed in sum of minterms, is?

a. AB' + AC + AD' + BCD

b. A + BCD'

c. A + BCD ✔ A + BCD

d. AB' + AC + AD' + BCD'

Your answer is correct.

The correct answer is:
A + BCD

Question **13**

Correct

3.00 points out of 3.00

Which of the following correspond to F(A, B, C, D)=∑(1, 4, 5, 10, 11, 12)

a. BC'D' + A'C'D + AB'C ✔

b. BC'D' + A'C'D + AB'D

c. BCD' + ACD' + A'BC

d. B'C'D + ACD + AB'

Your answer is correct.

The correct answer is:

BC'D' + A'C'D + AB'C

Question **14**

Incorrect

0.00 points out of 3.00

Which of the following is the equation of simplification of the given Karnaugh map?

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

a. A'B' + B'C' + B'D'

b. B'D' + AB' + B'C'

c. AB' + B'CD' + A'B'C' ✖

d. AB' + A'B'D' + A'B'C'

Your answer is incorrect.

The correct answer is:
B'D' + AB' + B'C'

Question **15**

Correct

3.00 points out of 3.00

Simplify the following K-map F(A, B, C, D) = ∑ (0, 1, 2, 8, 9, 12, 13) and d(A, B, C, D) = ∑ (10, 11, 14, 15) where d stands for don't care condition.

- a. A + B'D' + B'C' ✔
- b. A + B'C'
- c. A + B'D' + BC
- d. A + B'D'

Your answer is correct.

The correct answer is:

A + B'D' + B'C'

Question **16**

Correct

3.00 points out of 3.00

Which statement below best describes a Karnaugh map?

- a. It is simply a rearranged truth table ✔
- b. The Karnaugh map eliminates the need for using NAND and NOR gates
- c. A Karnaugh map can be used to replace Boolean rules
- d. Variable complements can be eliminated by using Karnaugh maps

Your answer is correct.

The correct answer is:
It is simply a rearranged truth table

Question **17**

Incorrect

0.00 points out of 3.00

One of the essential characteristics of Karnaugh maps is that the input variable sequences are always arranged in Gray code sequence.

Select one:

- True
- False ✖

The correct answer is 'True'.

Question **18**

Correct

3.00 points out of 3.00

Which of the following combinations cannot be combined into K-map groups?

- a. Overlapping combinations
- b. Diagonal corners ✔
- c. Corners in the same row
- d. Corners in the same column

Your answer is correct.

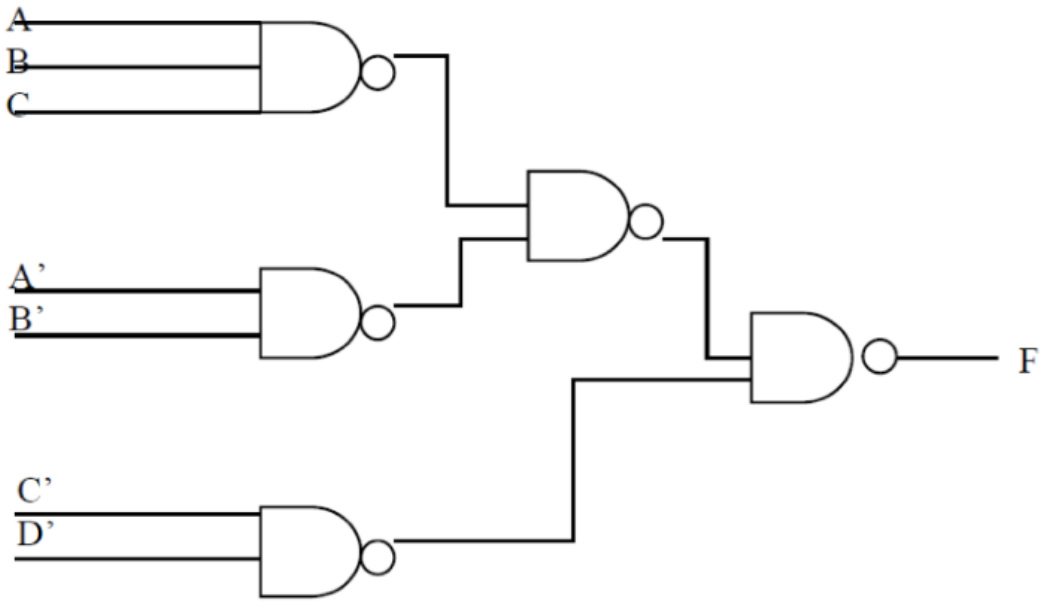
The correct answer is:
Diagonal corners

Question **19**

Correct

3.00 points out of 3.00

Determine the most simplified equation for the following NAND logic indicated below.



a. F(A,B,C,D) = (A B C + A' B') (C + D')

b. F(A,B,C,D) = (A B C + A' B') (C + D)

c. F(A,B,C,D) = (A B C + A' B') (C + D)'

d. F(A,B,C,D) = (A B C + A' B') (C' + D)

Your answer is correct.

The correct answer is:
F(A,B,C,D) = (A B C + A' B') (C + D)

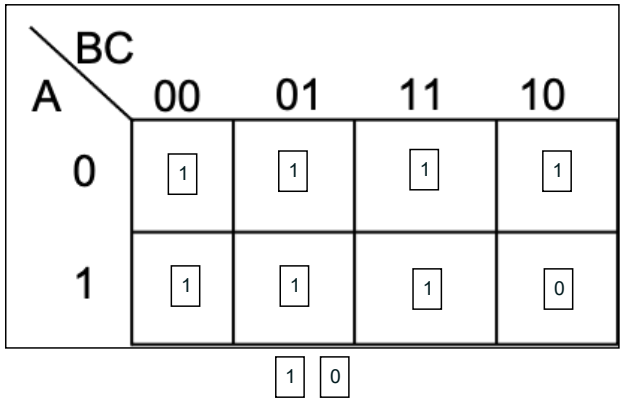
Comment:

Question **20**

Partially correct

2.25 points out of 3.00

Given the following Boolean function:
(A + BC + B'C') (ABC')'
Draw a Karnaugh map for the expression. (Just draw the Karnaugh map dragging the values 0 or 1 at the bottom of the image, don't use it to simplify the expression.)



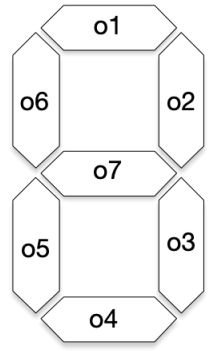
Your answer is partially correct.

You have correctly selected 6.

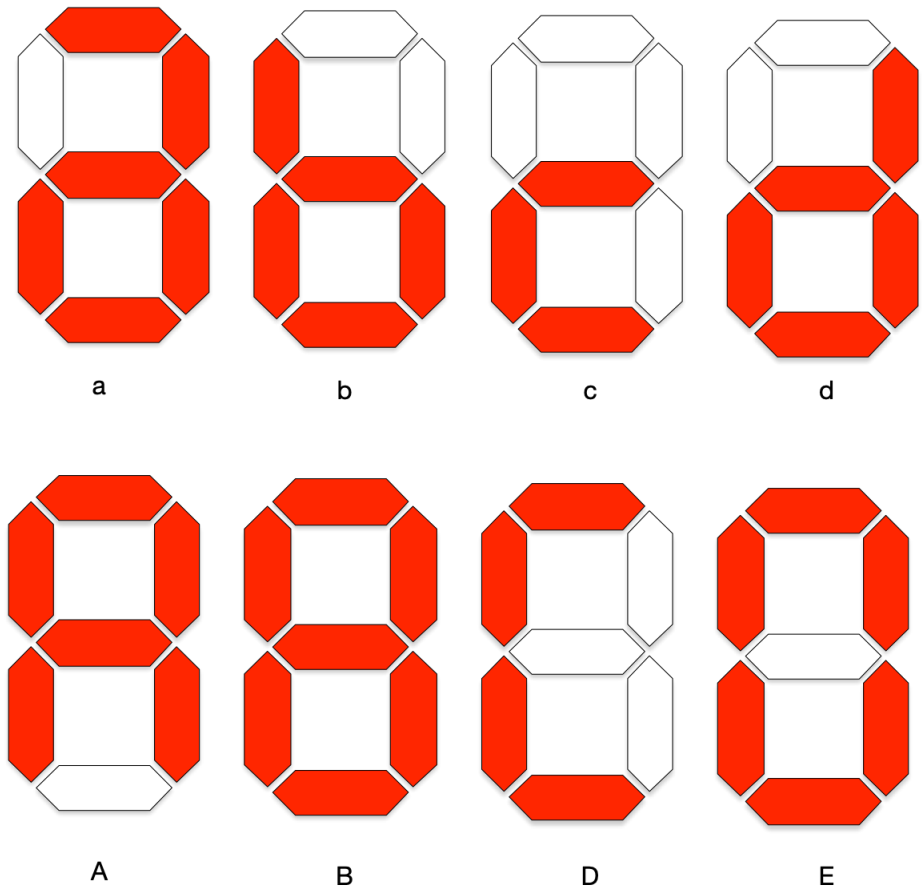
Question **21**

Partially correct

3.64 points out of 5.00



7-Segment Display

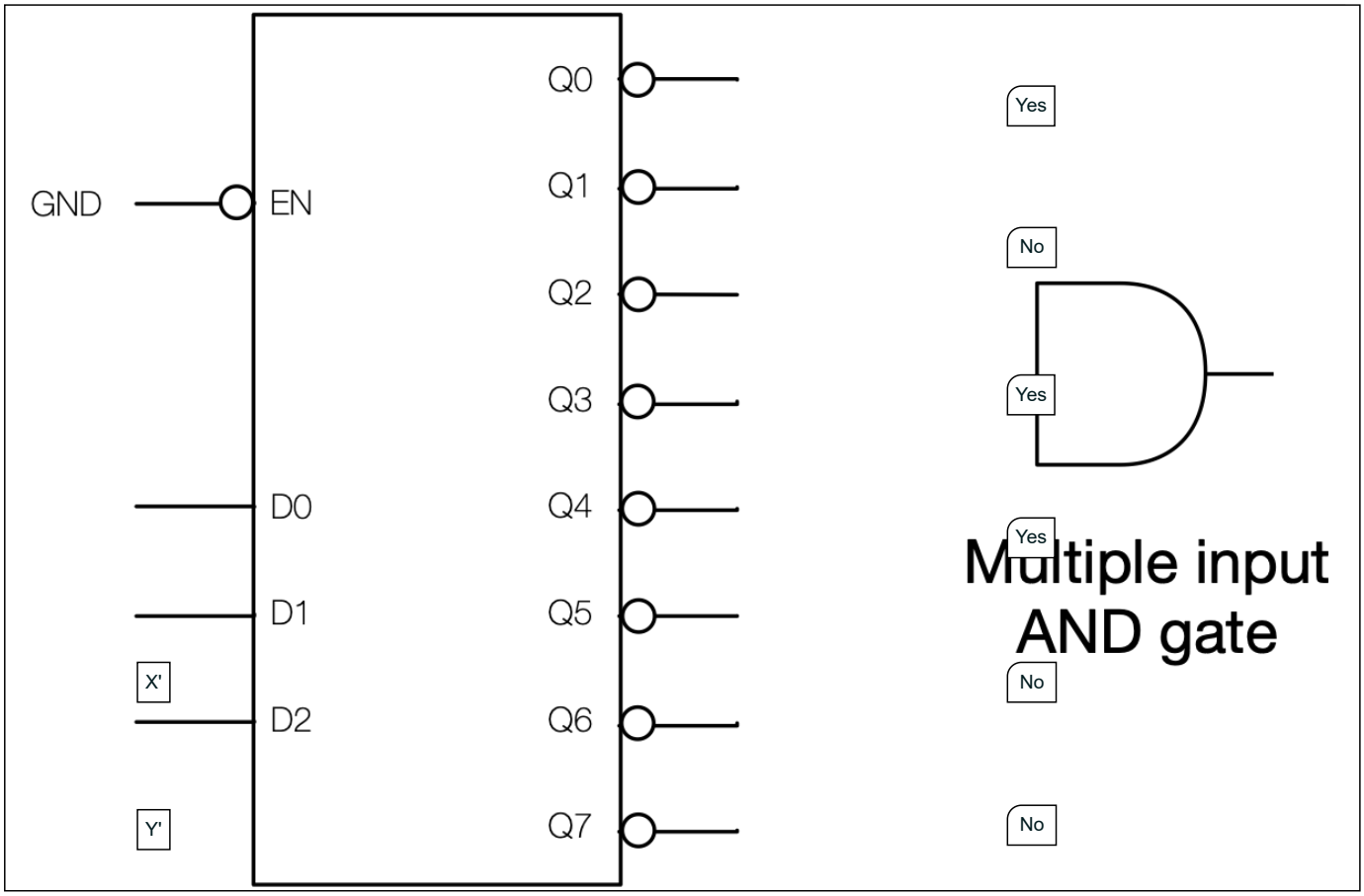


You are going to design a circuit to control the given 7-segment display device with led inputs o1 to o7 as depicted in the picture. The display will be used to display the first 4 characters of the alphabet. Depending on the value of the input bit **X** either the small letters or capital letters will appear. If **X = 0** then one of "a","b","c", or "d" will be displayed and if **X = 1** then one of "A","B","C", or "D" will be displayed depending on the other input values. The other inputs should be named as **Y** and **Z** and the binary ordering of the input controls should reflect the lexicographic ordering of the letters.

Design the led control **o6** using the following 3to8 active low decoder. Connect the inputs by dragging the items at the bottom of the image onto the correct places.

A multiple input AND gate is also provided. You should also state that which of the decoder outputs should be connected to that AND-gate. If an output pin should be connected to the AND gate, then you should drag 'Yes' to the box, otherwise you should drag 'No'.

Please note that you need to fill all of them with either 'Yes' or 'No'. Do not leave boxes unanswered.



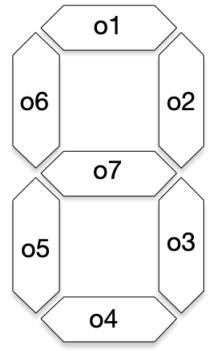
Your answer is partially correct.

You have correctly selected 8.

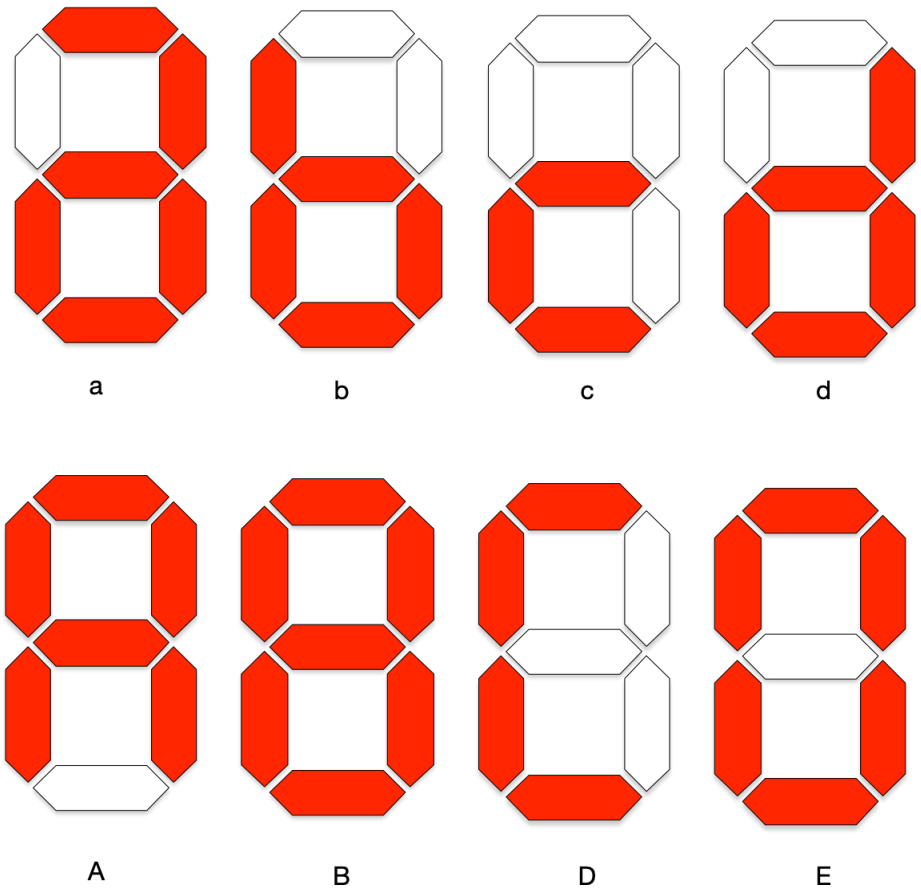
Question **22**

Partially correct

4.09 points out of 5.00



7-Segment Display

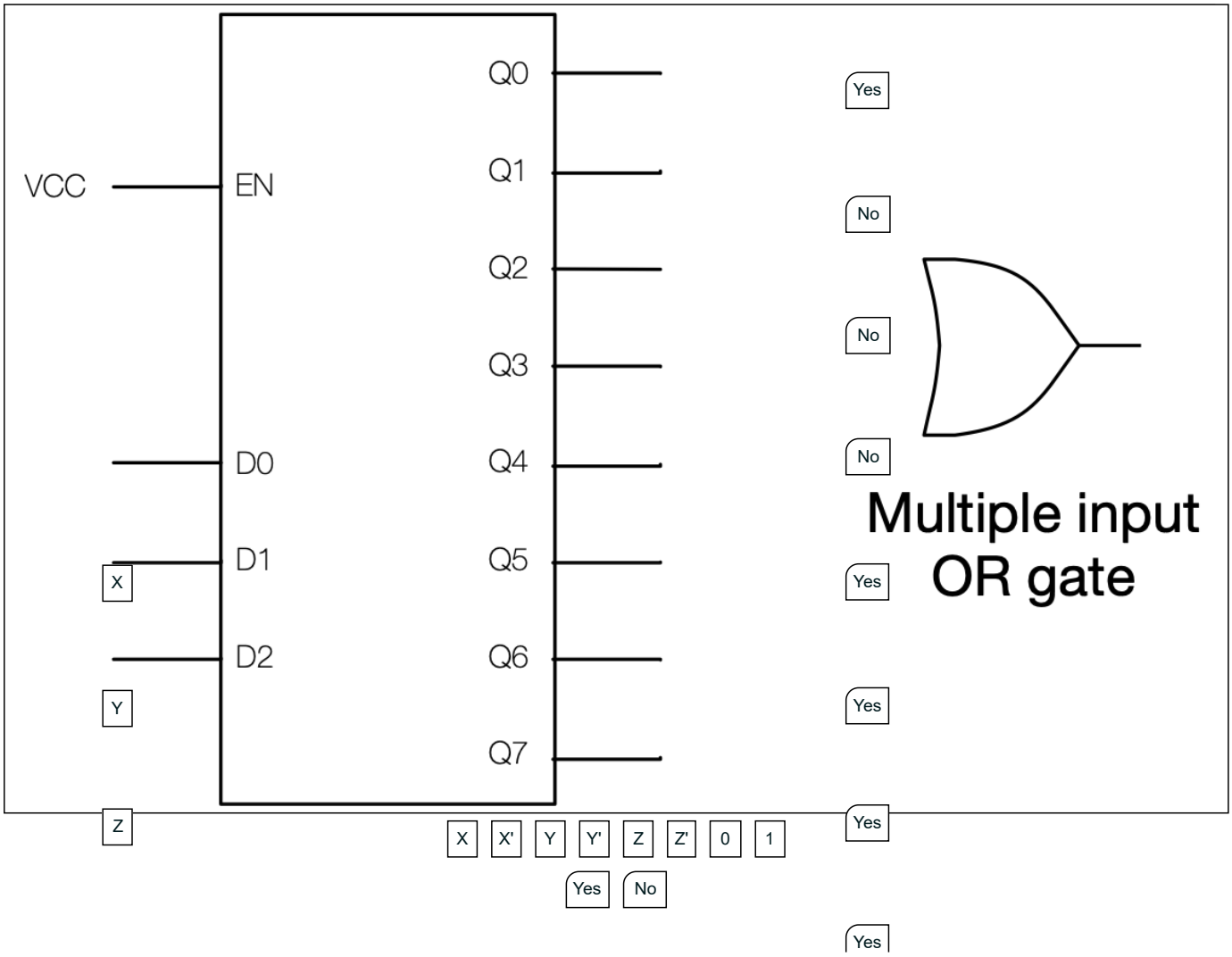


You are going to design a circuit to control the given 7-segment display device with led inputs o1 to o7 as depicted in the picture. The display will be used to display the first 4 characters of the alphabet. Depending on the value of the input bit **X** either the small letters or capital letters will appear. If **X = 0** then one of "a","b","c", or "d" will be displayed and if **X = 1** then one of "A","B","C", or "D" will be displayed depending on the other input values. The other inputs should be named as **Y** and **Z** and the binary ordering of the input controls should reflect the lexicographic ordering of the letters.

Design the led control **o1** using the following 3to8 decoder. Connect the inputs by dragging the items at the bottom of the image onto the correct places.

A multiple input OR gate is also provided. You should also state that which of the decoder outputs should be connected to that OR-gate. If an output pin should be connected to the OR gate, then you should drag 'Yes' to the box otherwise you should drag 'No'.

Please note that you need to fill all of them with either 'Yes' or 'No'. Do not leave boxes unanswered.



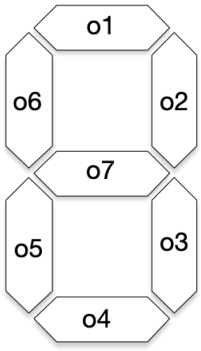
Your answer is partially correct.

You have correctly selected 9.

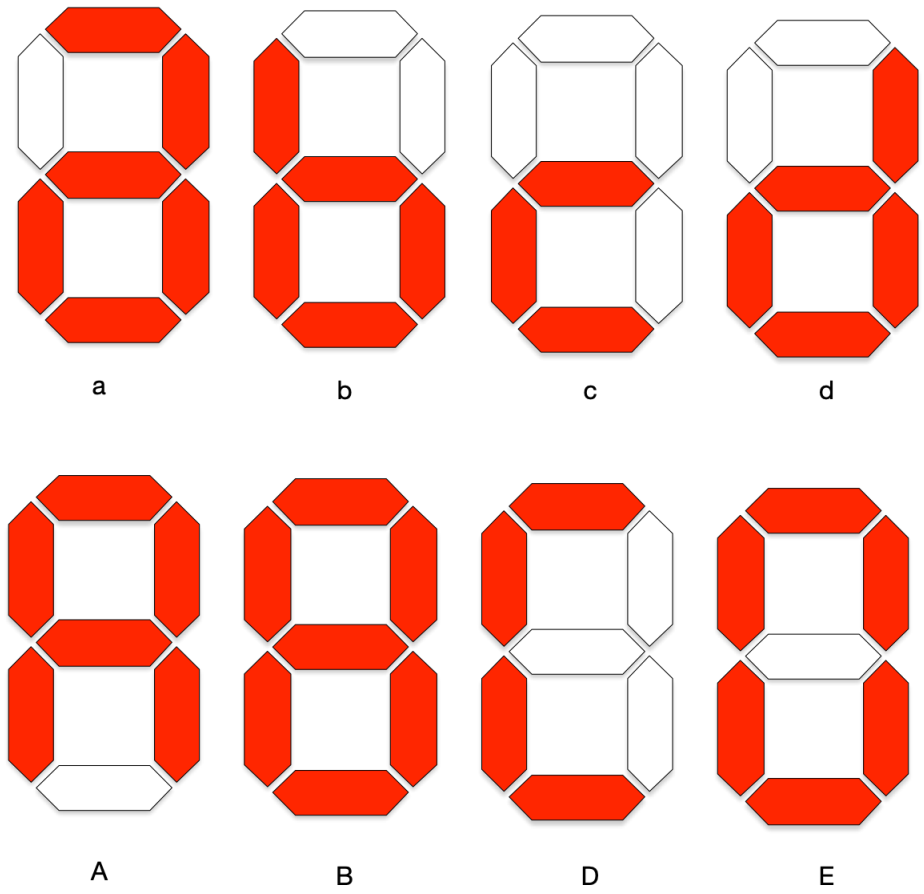
Question **23**

Partially correct

0.83 points out of 5.00



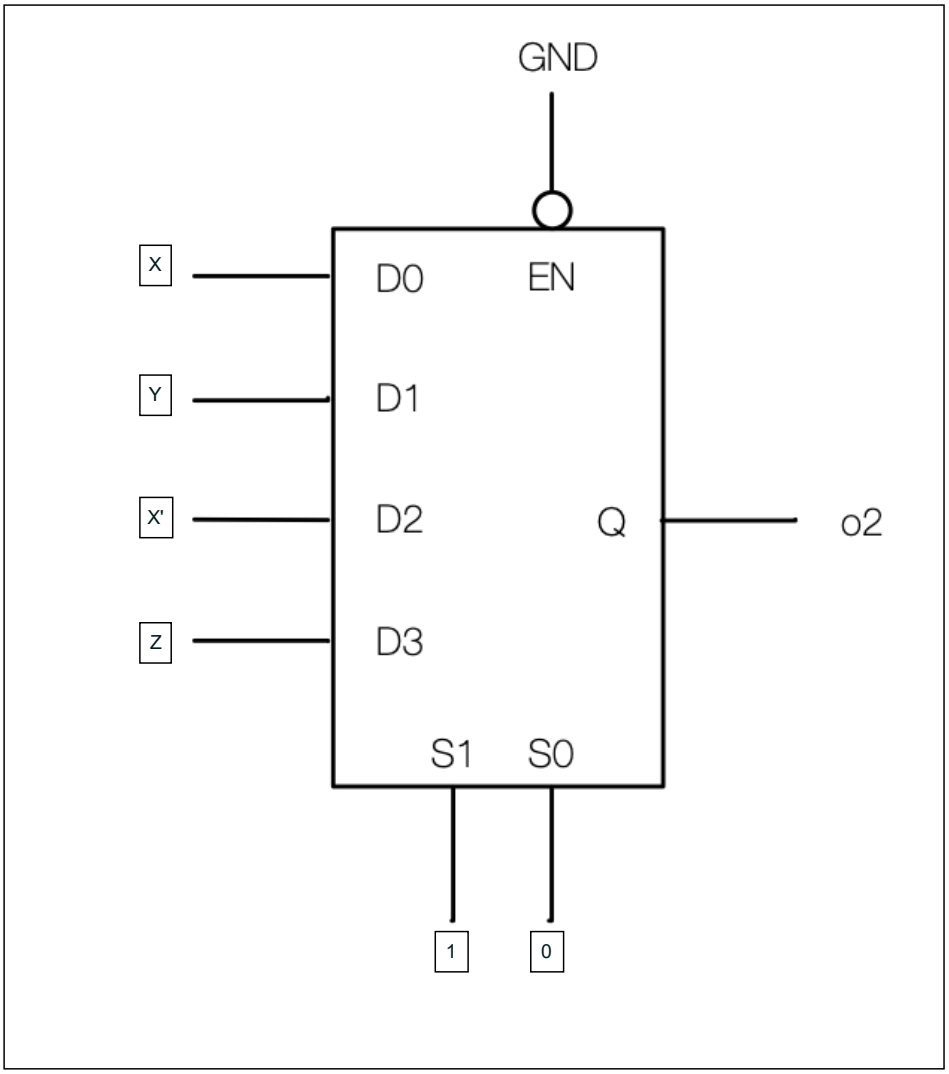
7-Segment Display



You are going to design a circuit to control the given 7-segment display device with led inputs o1 to o7 as depicted in the picture. The display will be used to display the first 4 characters of the alphabet. Depending on the value of the input bit **X** either the small letters or capital letters will appear. If **X = 0** then one of "a","b","c", or "d" will be displayed and if **X = 1** then one of "A","B","C", or "D" will be displayed depending on the other input values. The other inputs should be named as **Y** and **Z** and the binary ordering of the input controls should reflect the lexicographic ordering of the letters.

Design the led control **o2** using the following 4to1 multiplexer. Make sure you use X and Y as select controls. Connect the inputs by dragging the items at the bottom of the image onto the correct places.

Make sure you fill in all draggable places.



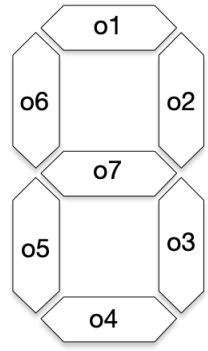
Your answer is partially correct.

You have correctly selected 1.

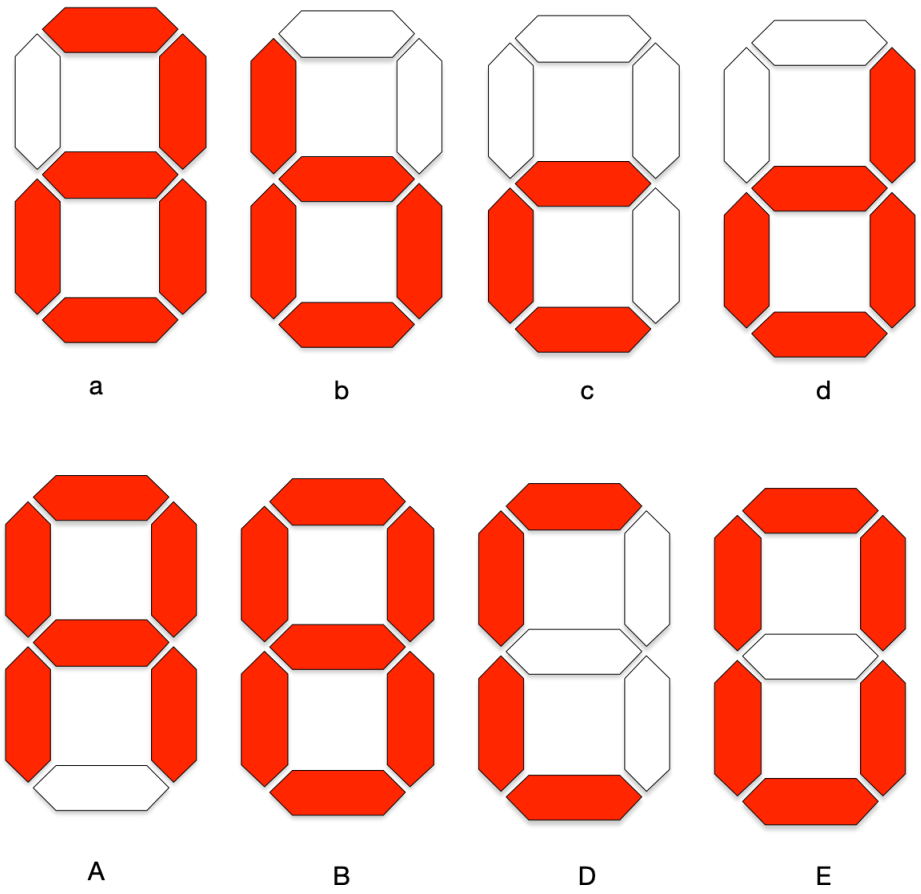
Question **24**

Partially correct

2.50 points out of 5.00



7-Segment Display

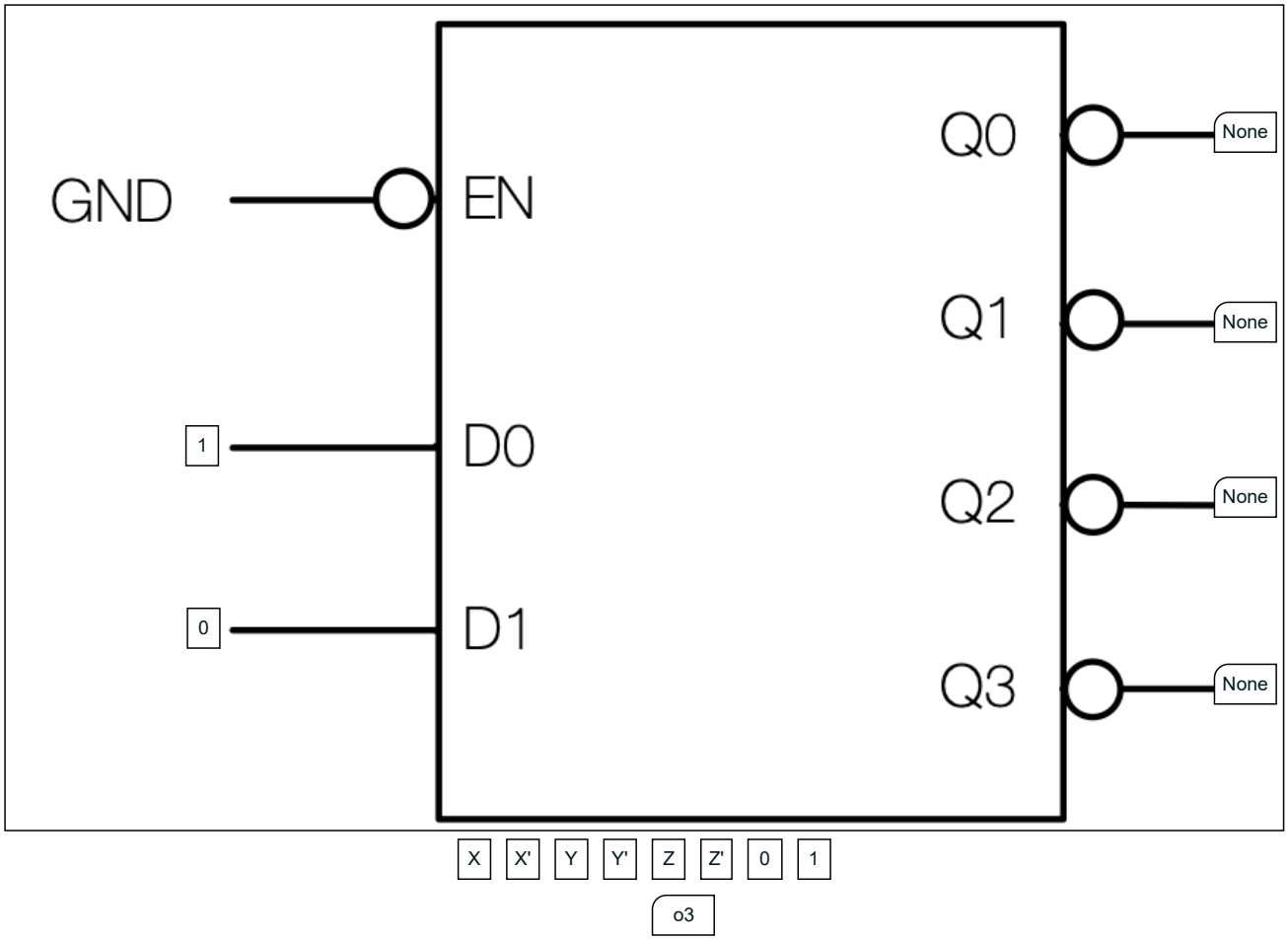


You are going to design a circuit to control the given 7-segment display device with led inputs o1 to o7 as depicted in the picture. The display will be used to display the first 4 characters of the alphabet. Depending on the value of the input bit **X** either the small letters or capital letters will appear. If **X = 0** then one of "a","b","c", or "d" will be displayed and if **X = 1** then one of "A","B","C", or "D" will be displayed depending on the other input values. The other inputs should be named as **Y** and **Z** and the binary ordering of the input controls should reflect the lexicographic ordering of the letters.

Design the led control **o3** using the following 2to4 active low decoder. Connect the inputs by dragging the items at the bottom of the image onto the correct places.

If an output pin is not used please drag 'None'.

Do not leave the draggable places empty.



Your answer is partially correct.

You have correctly selected 3.

Question **25**

Incorrect

0.00 points out of 5.00

An 8x1 multiplexer has inputs X,Y, and Z connected to the selection inputs S0, S1, and S2 respectively. The data inputs D0 to D7 are as follows:

D1=D2=1

D3=D7=0

D4=D5=T'

D0=D6=T

Determine the Boolean function f(X,Y,Z,T) = ∑m(1,4,5,6 ✖) that the multiplexer implements.

Just provide what should be written in the blanks with increasing numbers for the minterms and commas as separators. Make sure no other characters or whitespaces exists otherwise you cannot get any grade.

The correct answer is: 1,2,4,5,7,8,9,10

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