

Feedback — Quiz_week1

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You submitted this quiz on **Tue 20 Jan 2015 10:07 AM PST**. You got a score of **13.00** out of **15.00**. You can [attempt again](#), if you'd like.

Question 1

As her Christmas gift, Joyce received a toy doll with a small computer chip embedded. When she presses the tummy of the doll, it says "Hello, Joyce!"; when she presses again, it says "Merry Christmas!"; on the next press, it says "I love you!"; and whenever Joyce presses twice quickly, it says "Good-bye!". Which of the following statements about the doll are correct? Check all that apply.

Your Answer	Score	Explanation
<input type="checkbox"/> the chip is a synchronous system	✓ 0.50	the system responses at the press any time
<input type="checkbox"/> the chip is a combinational system	✓ 0.50	on the same press, it may have different outputs
<input checked="" type="checkbox"/> the chip contains memory elements	✓ 0.50	otherwise, it cannot give different outputs on the same single press



the chip can recongize two different
inputs



0.50

at least single press and double press

Total

2.00 /
2.00

Question 2

Bob is designing a digital system to implement the multiplication table. When two single-digit integers (0-9), e.g. 4 and 7, are entered, the system will output their product (28 in this case). The system should have x bits as input, y bits as output, and z input combinations as don't care conditions. What are the values of (x, y, z)?

You entered:

8, 7, 2

Your Answer		Score	Explanation
8	✓	0.50	8-bit input, 4-bit for each input 0-9
7	✓	0.50	7-bit output for values 0-81
2	✗	0.00	
Total		1.00 / 2.00	

Question 3

Which of the following gate(s) are universal? Check all that apply. hint: A universal gate should be able to implement {AND,

OR, NOT}

Your Answer		Score	Explanation
<input type="checkbox"/> XOR	✓	0.50	
<input checked="" type="checkbox"/> {OR, NOT}	✓	0.50	
<input checked="" type="checkbox"/> NAND	✓	0.50	
<input type="checkbox"/> {AND, OR}	✓	0.50	
Total		2.00 / 2.00	

Question 4

For the 3-input gate $f(x,y,z) = x'yz + xy' + y'z$ defined in slide "More on Universal Gate", what is the value of $f(x,0,1)$?

Your Answer	Score	Explanation
<input type="radio"/> x'		
<input type="radio"/> 0		
<input type="radio"/> x		

☐ none of the others

☒ 1 ✓ 1.00

Total 1.00 / 1.00

Question 5

Slide "Design Example: An Encoder" gives two different implementations of signals a and b as functions of input x, y, z. Including these two, how many different implementations can we have? (hint: when the values of a and b on each don't care conditions are given, the implementation becomes unique.)

You entered:

2

Your Answer		Score	Explanation
2	✗	0.00	
Total		0.00 / 1.00	

Question 6

For the four 2-input logic gates (NAND, NOR, XOR, XNOR) defined in the slide "Example: System Implementation", which of the following statements about observability don't care (ODC) are true? Check all that apply.

Your Answer	Score	Explanation
<input checked="" type="checkbox"/> there is no ODC for XNOR gate	✓ 0.50	
<input type="checkbox"/> when $y=0$, x input is ODC for XOR gate	✓ 0.50	
<input checked="" type="checkbox"/> when $y=0$, x input is ODC for NAND gate	✓ 0.50	
<input type="checkbox"/> when $x=0$, y input is ODC for NOR gate	✓ 0.50	
Total	2.00 / 2.00	

Question 7

Consider the circuit on slide "Example: System Implementation" where the two output signals S and C are defined on three inputs x, y, z as $S(x,y,z) = x\$y\z , $C(x,y,z) = xy + z(x\$y)$, where $\$$ represents the XOR gate. Which of the following conditions are satisfiability don't cares? Check all that apply.

Your Answer		Score	Explanation
<input type="checkbox"/> x=1, y=1, z=0, C=1	✓	0.50	
<input checked="" type="checkbox"/> x=0, y=0, z=1, S=0	✓	0.50	
<input checked="" type="checkbox"/> x=0, z=0, C=1	✓	0.50	
<input type="checkbox"/> x=1, y=1, z=1, S=1	✓	0.50	
Total		2.00 / 2.00	

Question 8

In the slide "Example: Design Vulnerabilities", for the optimal design, $a=z'$ and $b=y'$, there is a backdoor for the output to be 01. To enter this backdoor, what should be the input values for (x,y,z)? (enter your answer in the format of 0 1 0 or 0, 1, 0)

You entered:

1 0 1

Your Answer		Score	Explanation
1	✓	0.34	

0	✓	0.33
1	✓	0.33
Total		1.00 / 1.00

Question 9

In the slide "Finding the Backdoors", suppose that we start from state 11, on input 0, we move to state xx; then on input 0, we move to state yy; then on input 1, we move to state zz. What are these states (xx, yy, zz)?

You entered:

10, 10, 00

Your Answer		Score	Explanation
10	✓	0.34	
10	✓	0.33	
00	✓	0.33	
Total		1.00 / 1.00	

Question 10

In the slide "HW Trojan and Countermeasure", suppose that we start from state 11 in the FSM with countermeasures, on input 0, we move to state xx; then on input 0, we move to state yy; then on input 1, we move to state zz. What are these states (xx, yy, zz)?

You entered:

10, 10, 10

Your Answer		Score	Explanation
10	✓	0.34	
10	✓	0.33	
10	✓	0.33	
Total		1.00 / 1.00	

