Smart Pet Door System Design

* Indicates required question

1. Email *

2. You are part of 4 engineer team working on a smart control system for a pet door. The door you are designing will only open for your pet but not critters or small children. Decide with your team which member will take each section and then click on your section below to begin your part. You will later be directed on how to combine your design with the other members of your team. * 1 point

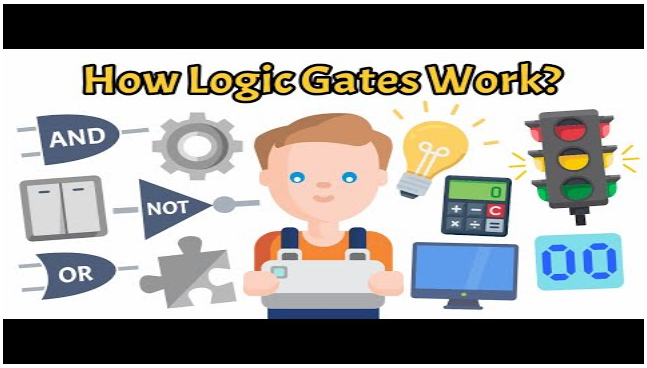
Mark only one oval.

- Pet verification system *Skip to question 3*
- Door safety control *Skip to question 6*
- Security mode design *Skip to question 9*
- System Integration specialist *Skip to question 12*

Pet Verification Sensors

3. Your task is to create a logic gate that will engage the pet door opening system (light the LED) when a proximity sensor gets a signal emitted from the pet's collar on either the interior of the house sensor or the exterior of the house sensor. What kind of logic gate will you build? Make sure you use all uppercase letters in your answer. * 1 point

Watch this video if you need more help understanding logic gates



http://youtube.com/watch?v=9kNO9iKgT1I

Truth Tables

A.

Input	Output
0	1
1	0

B.

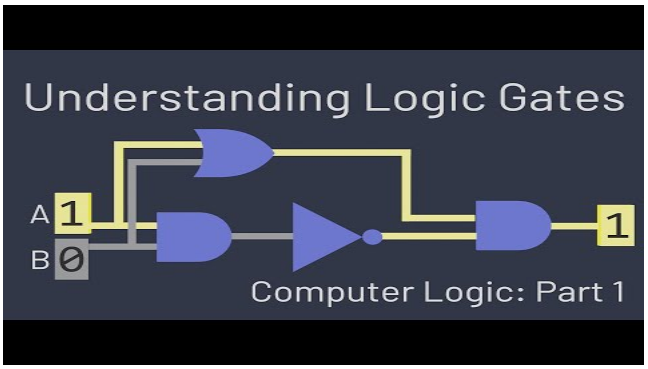
Input A	Input B	Output
0	0	0
1	0	0
0	1	0
1	1	1

C.

Input A	Input B	Output
0	0	0
1	0	1
0	1	1
1	1	1

4. Which truth table represents the logic gate that you are designing? * 1 point
Type your answer using an uppercase letter

Watch this video if you need more help understanding how truth tables relate to logic gates



http://youtube.com/watch?v=INEtYZqtjTo

5. Use your instructions and build your gate. Once you have built your gate and its outputs match your truth table click the "ready to move on" option below * 1 point

Mark only one oval.

- ◯ Ready to move on *Skip to question 15*
- ◯ I can't get my gate to work. *Skip to question 3*

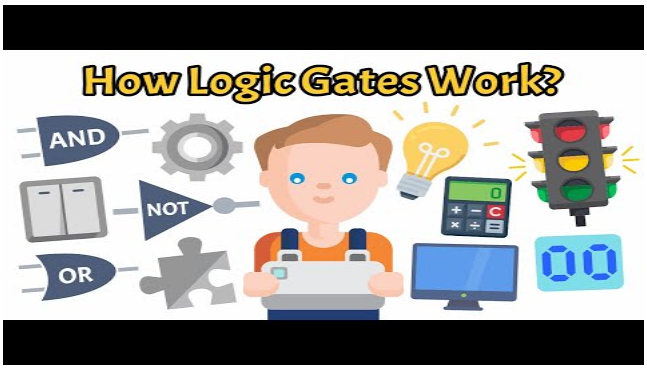
Skip to question 15

Door Safety Control

6. Your task is to create a logic gate that will engage the pet door to open (light the LED) when the proximity sensors on the other side of the door show that the space is clear (high input) and there is a high input coming from the pet verification system (your partner is working on this and you will integrate it later.) Having both of these inputs high opens the door while ensuring that your pet is the one triggering the system and that no people or pets on the other side of the door will be injured by the door swinging open. What kind of logic gate will you build? * 1 point

Type your answer using all uppercase letters

Watch this video if you need more help understanding logic gates



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Input A	Input B	Output
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1	0	1
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7. Which truth table represents the logic gate that you are designing? * 1 point

Type your answer using an uppercase letter

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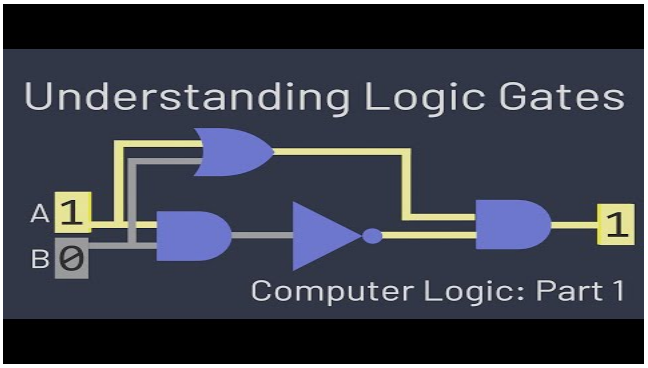


http://youtube.com/watch?v=INEtYZqtjTo

8. Use your instructions and build your gate. Once you have built your gate and its outputs match your truth table click the "ready to move on" option below * 1 point

Mark only one oval.

- ◯ Ready to move on
- ◯ I can't get my gate to work.

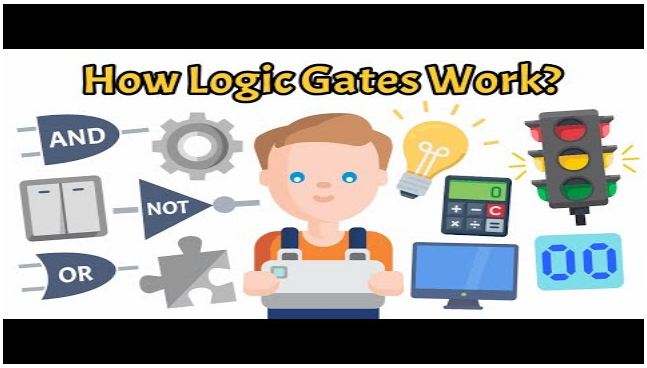
Skip to question 15

Security Mode Design

9. Your task is to create a gate that will give a high output as long as Security Mode is not turned on. When security mode is off, this gate has a low input, it will give a high output (LED on) and the door will work when the other conditions are met. However, if you want to prevent the door from working at night or when you are away, you can engage Security Mode. When Security Mode is on, the input on this gate is high, which gives a low output and shuts down the power to the rest of the system (LED off) which kind of gate will you build? * 1 point

Type your answer using all uppercase letters

Watch this video if you need more help understanding logic gates



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10. Which truth table represents the logic gate that you are designing? * 1 point

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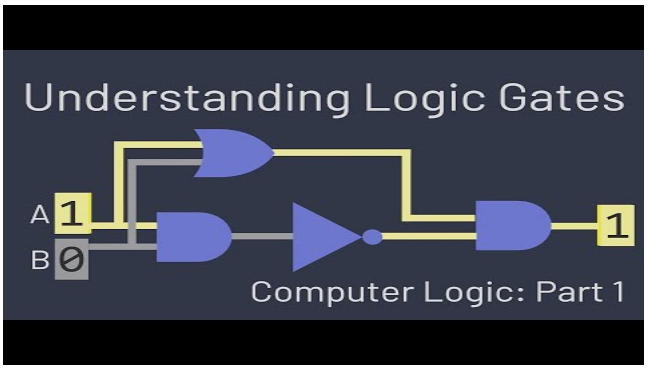

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11. Use your instructions and build your gate. Once you have built your gate and its outputs match your truth table click the "ready to move on" option below * 1 point

Mark only one oval.

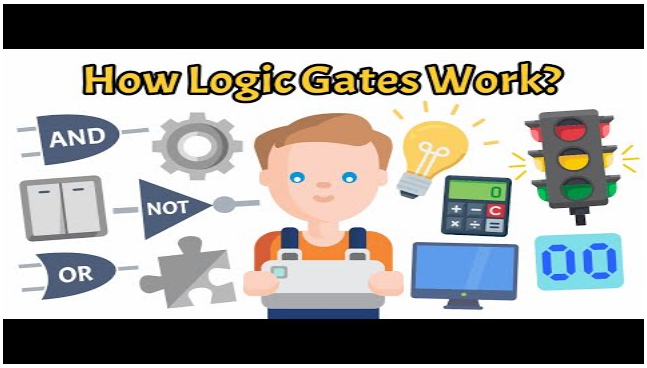
- Ready to move on
- I can't get my gate to work

Skip to question 15

System Integration Specialist

12. Your task is to create a gate that will integrate the inputs from the door safety control and the security mode design. Your gate needs to work when the door safety control is giving a high output and when security mode has not been engaged and is therefore giving a high output. However, if the security mode has been engaged, and is giving a low output, your gate should not allow the door to operate. What type of gate will you build? * 1 point
Type your answer using all uppercase letters

Watch this video if you need more help understanding logic gates



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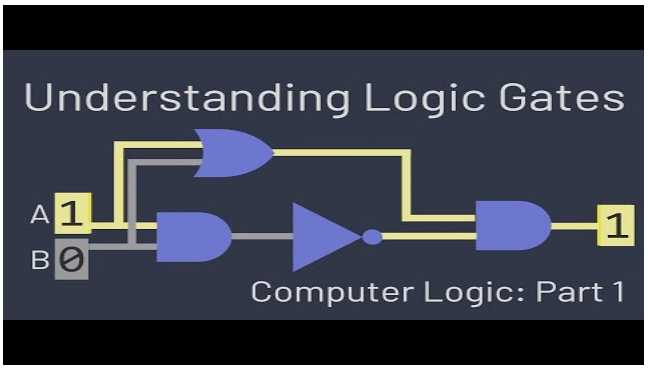
13. Which truth table represents the logic gate that you are designing? * 1 point

Watch this video if you need more help understanding how truth tables relate to logic gates



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14. Use your instructions and build your gate. Once you have built your gate and its outputs match your truth table click the "ready to move on" option below * 1 point

Mark only one oval.

- ◯ Ready to move on
- ◯ I can't get my gate to work

Skip to question 15

Final Design Integration

Here you will discuss with your teammates and use the information below to combine your logic gates into a final design for a smart pet door.

15. Your smart pet door should work when: * 1 point

-Security mode is not engaged

And

-The door safety control shows that the conditions are safe for the door to swing open

And

-The interior or exterior pet verification sensor receives a signal from the pet's collar.

Create a diagram on your worksheet using Boolean logic symbols to show how you can combine your gates to solve the problem.

On your worksheet, create truth tables for each gate to indicate how the gates work together to meet the design requirements.

Wire your gates together to create your final product.

Then call your instructor over to check your work.