Injury Prevention System for a Mechanical Press

* Indicates required question

1. Email *

2. You are part of 4 engineer team working on a smart control system for an automated mechanical press that creates 500 tons of force. If an operator got in the way of the press while it was operating, they could easily be maimed or killed. Your job is to prevent the operation of the press unless several safety conditions are met to ensure the operator is protected. * 1 point

   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.

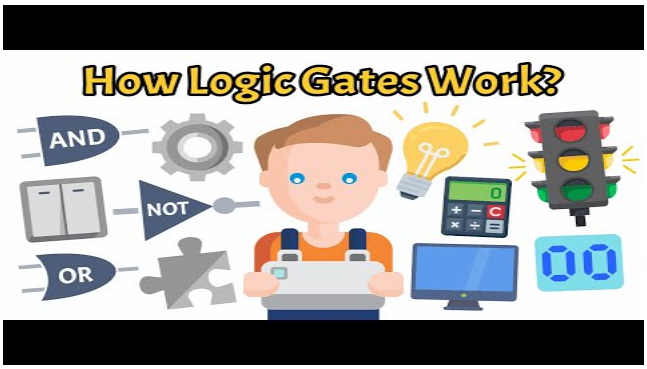
   Mark only one oval.

   - Safety shield operation *Skip to question 3*
   - Authorized user verification *Skip to question 6*
   - Emergency stop system *Skip to question 9*
   - Integration specialist *Skip to question 12*

Safety Shield Operation

3. Your task is to create a logic gate that will only allow the press to run if the safety shield is down, and the authorized user verification system that your teammate is building also give a high output. (You will integrate the two systems later, but for now, just worry about using two inputs to get a high output). What kind of logic gate will you build? **Type your answer using all uppercase letters** * 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.

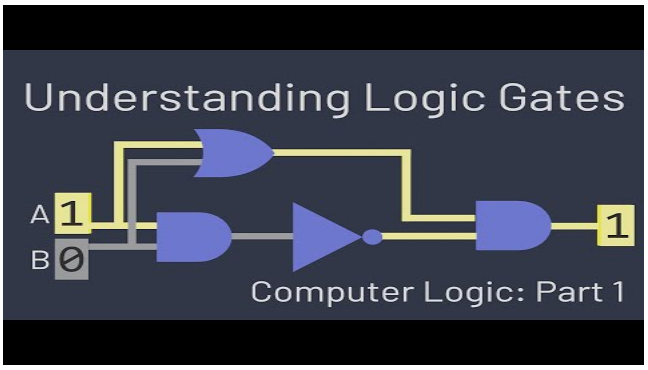
Input A	Input B	Output
0	0	0
1	0	0
0	1	0
1	1	1

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? **Type your answer using an uppercase letter** * 1 point

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 build 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

Authorized User Verification

6. Your task is to create a logic gate that will prevent the press from working unless an authorized user either scans their badge (creating a high input) or inserts and turns a key which only authorized users are given access to. Which type of gate will you build? **Type your answer using all uppercase letters** * 1 point

_____

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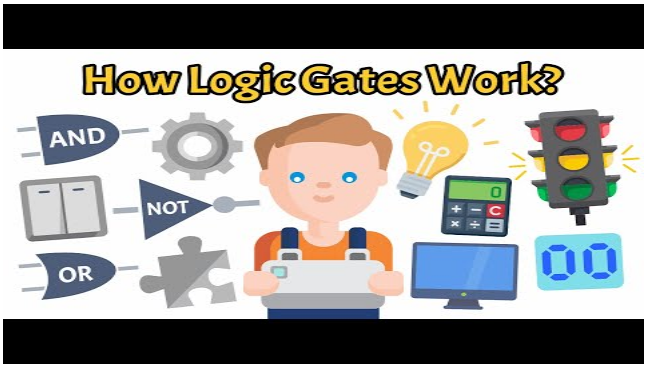


http://youtube.com/watch?v=9kNO9iKgT1I

TRUTH TABLES

A.

Input	Output
0	1
1	0

B.

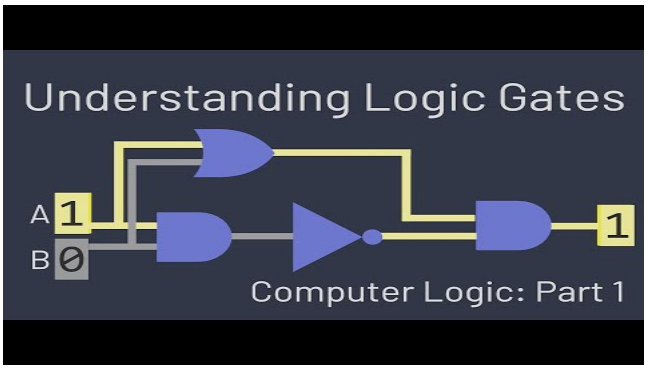
Input A	Input B	Output
0	0	0
1	0	0
0	1	0
1	1	1

C.

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

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

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



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

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

Mark only one oval.

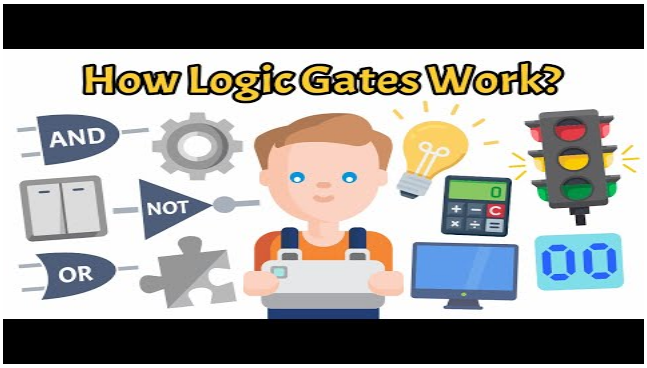
- ◯ Ready to move on
- ◯ I can't get my gate to work.

Skip to question 15

Emergency Stop System

9. Your task is to create a gate that will give a high output and allow the press to run unless the emergency stop button is pressed. Pressing the button acts as a high input and stops the electricity from flowing to the press. Which type of gate will you build? **Type your answer using all uppercase letters** * 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.

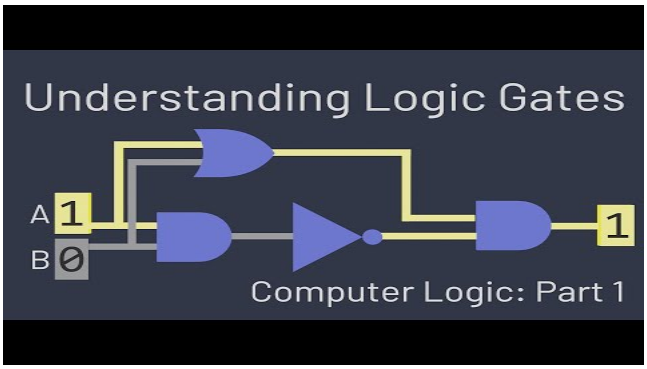
Input A	Input B	Output
0	0	0
1	0	0
0	1	0
1	1	1

C.

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

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

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



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

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

Mark only one oval.

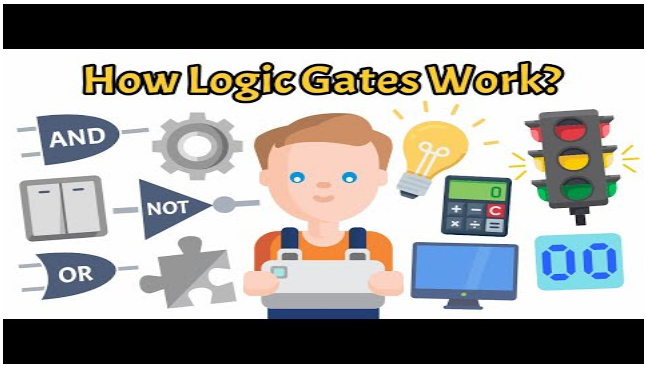
- ◯ Ready to move on
- ◯ I can't get my gate to work

Skip to question 15

Design Integration Specialist

12. Your task is to create a gate that will integrate the inputs from the safety shield and the emergency stop button. Your gate needs to work when the safety shield gate is giving a high output and when the emergency stop button has not been pressed and is therefore giving a high output. However, if the emergency safety button has been pressed, and is giving a low output, your gate should not allow the press to operate. What type of gate will you build? **Type your answer using all uppercase letters** * 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.

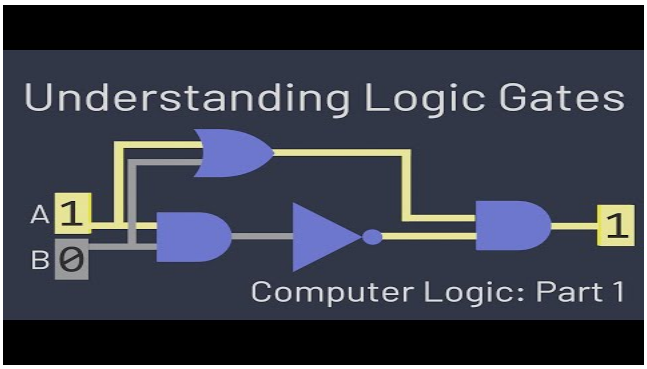
Input A	Input B	Output
0	0	0
1	0	0
0	1	0
1	1	1

C.

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

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

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



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

14. Use your instructions and build your gate. Once you have build 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 injury prevention system for a mechanical press.

15. Your smart injury prevention system should only allow the press to run when: * 1 point
-The safety shield is down
and
-The authorized user has either scanned their badge or inserted and turned a physical key
but
-Not when the button has been pressed to engage the emergency stop system.

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.