

Keep Talking And No One Gets Electrocuted

Group 10 Bomb Defusal Manual

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Introduction

Your bomb will explode once the countdown reaches zero or when 3 strikes have been earned by missing the correct answer in a module. You must successfully answer all questions in each module to disarm the bomb.

Modules

Each bomb will have modules which need to be disarmed. The modules can be solved in any order. Not all the information needed will be present in each module, so this manual and the information module will need to be used to correctly solve the problems presented.

Strikes

If you fail to properly answer one of the modules, a strike will be added to your total. If three strikes are earned, the bomb will immediately explode.

Timer

A five-minute timer will start as soon as you open the bomb. If this timer reaches zero, the bomb will explode. Complete the defusal process before this happens.

Info Module

This module gives you basic information about the bomb like the time remaining, serial number, manufacturer, and the number of batteries.

Modules

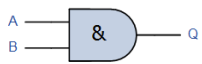
Conversion:

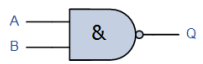
The Conversion module is characterized by a 16-key keypad, a back button and an enter button. Above the keypad, there is a string of characters in white font. Reference the batteries. If there is one battery, the string of characters is a hexadecimal number. Convert it to a 16-digit binary number and input it using the keypad then press enter. If there are two batteries, the string is a decimal number. Convert it to a 16-digit binary number and input it using the keypad then press enter. If there are three batteries, the string is a decimal number. Convert it to a hexadecimal number and input it using the keypad and press enter. Incorrect entries are a strike. The input area will turn green when the module has been defused and is complete.

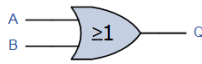
Digital Logic:

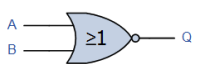
The Digital Logic module is a mini game with 4 logic gates and 4 mystery boxes that you will have to figure out what logic gate it is. The game has 2 buttons that represent inputs and there is an LED that flashes between black and white. Black led means the light is off and when there is a white light the light is on. Use this information to determine what logic gate is for each circuit. When you have an idea of what the logic gate is then click the mystery box with your choice and click the submit button to check your work.

Use these diagrams to help your teammate see what logic gate each circuit is

Symbol	Truth Table		
 2-input AND Gate	A	B	Q
	0	0	0
	0	1	0
	1	0	0
	1	1	1
Boolean Expression $Q = A \cdot B$		Read as A AND B gives Q	

Symbol	Truth Table		
 2-input NAND Gate	A	B	Q
	0	0	1
	0	1	1
	1	0	1
	1	1	0
Boolean Expression $Q = \overline{A \cdot B}$		Read as A AND B gives NOT-Q	

Symbol	Truth Table		
 2-input OR Gate	A	B	Q
	0	0	0
	0	1	1
	1	0	1
	1	1	1
Boolean Expression $Q = A + B$		Read as A OR B gives Q	

Symbol	Truth Table		
 2-input NOR Gate	A	B	Q
	0	0	1
	0	1	0
	1	0	0
	1	1	0
Boolean Expression $Q = \overline{A + B}$		Read as A OR B gives NOT-Q	

Missing Component:

The missing component module contains a switch, labeled amperage, a slot for a resistor, 2 resistors, and indicator lights. To solve this module included in this game, you must discover the voltage and plug in the correct resistor to complete the formula $V=IR$. The voltage will be 1 volt for 1 battery, 2 volts for 2 batteries, and 3 volts for 3 batteries. The indicator lights will light up red for each strike that happens and will turn green when the module is solved.

KVL KCL:

The KVL module is a circuit that contains a diagram of a circuit and a number pad. The player will have to solve through KVL to solve the amperage of the circuit. The voltage of the battery will be modified depending on the starting number of batteries (Ones not associated with the module). With this information the user has to calculate the amperage of the circuit to 5th decimal point rounded up. When a correct answer is detected the module background will turn black.

Here is a formula for the number of batteries and their modifiers:

1 Battery : The voltage is not modified

2 Batteries : The voltage is modified by a multiple of 2

3 Batteries : The voltage is modified by a multiple of -2

Here are some formulas that you may find helpful:

Calculating resistance of two resistors

Parallel

$$R_{12} = 1 / ((1/R_1) + (1/R_2))$$

Series

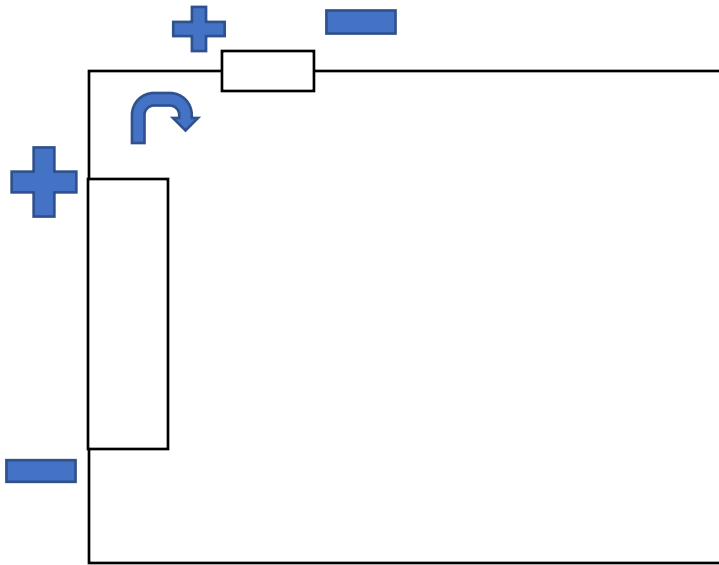
$$R_1 + R_2 = R_{12}$$

Calculating voltage

$$V = iR$$

Calculating KVL

$$v_1 +/ - v_2 \dots = 0$$



Current flows clockwise, when it flows into a device on a positive terminal the device's voltage will be positive. And vice versa, when current flows into a device through a negative terminal the voltage will be negative.