

Defuse the Bomb
A CSC 102 Project

Team: Gourd

**BOMB DEFUSAL
MANUAL**

Version 1
Verification Code: 0xDEADBEEF

The Game

This project is based on the game **Keep Talking and Nobody Explodes**¹, a cooperative bomb defusing party game. As the game designers put it, “You’re alone in a room with a bomb. Your friends, the ‘Experts’, have the manual needed to defuse it. But there’s a catch: the Experts can’t see the bomb, so everyone will need to talk it out – fast! Put your puzzle-solving and communication skills to the test as you and your friends race to defuse bombs quickly before time runs out!”

Their version is a software game. Our version takes the idea and realizes it as a physical device with buttons, switches, and more! Although our version can be played just like theirs, players can interact with both the bomb and this document at the same time (i.e., players can both defuse the bomb and serve as the “Experts”, using this document to help disarm the phases).

The backend of our version of the game is a Raspberry Pi² computer that combines a typical computer with the ability to interact with the outside world through sensors. The underlying software is written in Python³ and is the result of a final group-based project in CSC 102 (The Science of Computing II) in the Computer Science Program at the University of Tampa.

Defusing Bombs

The bomb will “explode” when its countdown reaches 0:00 or when too many strikes have occurred. You defuse the bomb by disarming all of its “phases” before the countdown expires.

Phases

The bomb has four phases, each of which must be disarmed to defuse the bomb. The phases can be disarmed in any order. Once a phase is disarmed, it

1 <https://keeptalkinggame.com/>

2 <https://www.raspberrypi.com/>

3 <https://www.python.org/>

becomes inactive and changing it doesn't affect the bomb. Instructions for disarming the phases are provided in this document.

Strikes

A mistake in disarming a phase results in a strike. Get too many strikes, and the bomb "explodes". Sometimes, the remaining countdown time will be decreased and/or go by faster when a certain number of strikes has occurred.

Information

A different version of the bomb is randomly presented each time it is "booted". There are 6,720 unique versions of the bomb with a whopping 1,176,000 possible variations!

Disarming some phases will require specific information about the bomb. Pay close attention to the "bootup" text on the bomb's screen.

Regarding the Toggles

It's so tempting to just toggle the switches over and over with those bright red LEDs and cool switch covers that you can flip. But one wrong toggle gets you one step closer to...BOOM!

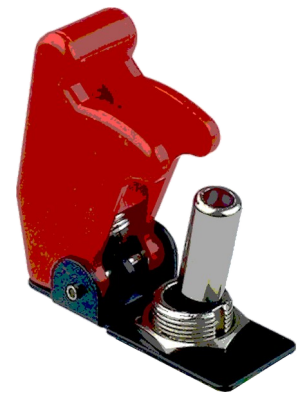
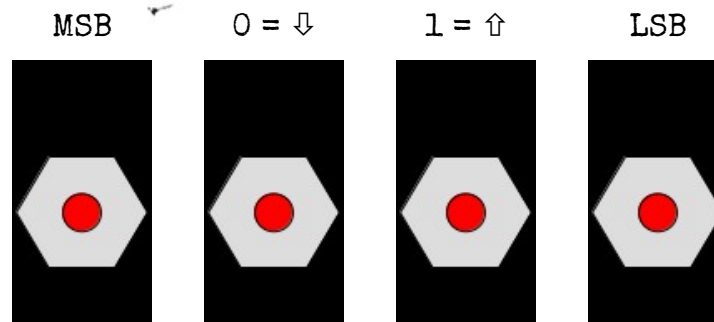
The correct state of each toggle switch is based on the bomb's serial number.

You must first sum the numeric digits in the serial number to obtain a target value. Convert this target value to a 4-digit binary number. Toggle the switches appropriately to represent the binary value.

Converting a number from decimal (base 10) to binary (base 2) can be done by placing a 1 in the appropriate powers of 2 represented by the column(s) of the table below that, when added together, sum to the number. A 0 is placed in the remaining columns. The left-most digit (or bit) of the binary number is known as the MSB (most significant bit), while the right-most digit is known as the LSB (least significant bit).

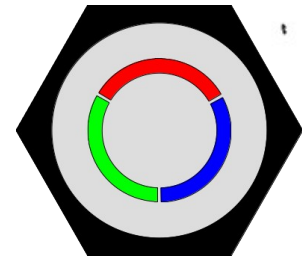
2^3	2^2	2^1	2^0
8	4	2	1

The left-most toggle switch represents the MSB; the right-most toggle switch represents the LSB. The LED on a toggle switch lights up to represent a binary 1. Use the diagram below to assist you.



Regarding the Button

The button behaves in unpredictable ways. Follow the instructions below closely to avoid a strike!



At some point, you will need to press the button.

However, releasing it is the hard part. The button has a lighted ring around it that can be either red, green, or blue. Release the button according to the following instructions:

Button color	Release instructions
Red	Release the button at any time.
Green	Release the button when the first numeric digit found in the bomb's serial number appears in the seconds of the countdown timer.
Blue	Release the button when the last numeric digit found in the bomb's serial number appears in the seconds of the countdown timer.
Other	Here's to hoping that you never run across this case...

Regarding the Keypad

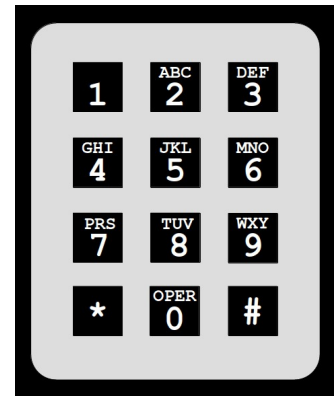
Oooh, an encrypted phase! Press the correct keys on the keypad carefully to avoid a strike. Try to avoid calling the “operator”.

Information about the keypad is provided in the bomb's “bootup” text.

The correct combination can be determined by first decrypting a keyword with a key using an alphabetic substitution cipher – and then looking up the result in the table below to obtain a passphrase.

A substitution cipher with a numeric key represents a rotation of the alphabet. For a key of 5, for example, the alphabet is shifted five places such that A becomes F, B becomes G, and so on. Using this shift, for example, the word “THE” becomes “YMJ”. Decrypting “YMJ” back to “THE” is merely doing the reverse.

To enter the passphrase correctly, you must enter its numeric combination on the keypad. To do so, press each button on the keypad with the required letter only once.



Keyword	Passphrase
BANDIT	RIVER
BUCKLE	FADED
CANOPY	FOXES
DEBATE	THROW
FERCE	TRICK
GIFTED	CYCLE
IMPACT	STOLE
LONELY	TOADY

Keyword	Passphrase
MIGHTY	ALOOF
NATURE	CARVE
REBORN	CLIMB
RECALL	FEIGN
SYSTEM	LEAVE
TAKING	SPINY
WIDELY	BOUND
ZAGGED	YACHT

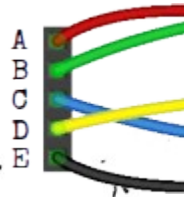
Regarding the Wires

Which wires should you “cut”? One wrong snip leads you one step closer to an “explosion”!



The correct wires to “cut” is based on the color of the button and, in some cases, the bomb's serial number.

The wires are labeled as follows:



Note that the actual color of the wires doesn't matter, and the color of the wires on your bomb may be different than those in this document.

“Cut” the wires based on the color of the button according to the following instructions:

Button color	“Cut” instructions
Red	The first three letters in the serial number represent the wires that must remain connected. The rest of the wires must be “cut”.
Green	“Cut” the wires labeled B and D.
Blue	“Cut” all wires except those labeled B, C, and D.