Defuse the Bomb

A CSC 102 Project

Team: <Gimme a second…>

BOMB DEFUSAL

MANUAL

Version 1

Verification Code: <B24T73W91>

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 Pi[2] computer that combines a typical computer with the ability to interact with the outside world through sensors. The underlying software is written in Python[3] 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

[1]https://keeptalkinggame.com/

[2]https://www.raspberrypi.com/

[3]https://www.python.org/

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 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

Be careful with the toggles! Just because they light up red doesn't mean to randomly switch them…not every red switch is good!

The first thing to understand about toggles is each of them have a numeric value.

Binary Values	8	4	2	1

To defuse the toggles, you must switch them up in a certain order. To do this, look at the serial number on the bootup screen. Next, add all the numbers to get a target value for the toggles. Then, take the target value and convert the number to base 10.

To flip the toggles in the right order you will have to understand numbers in binary base 10. In binary base 10, this means it uses digital 0-9. It's important to remember binary values only to use 0s and 1s. To convert the number to binary, use the table above. The goal is to find the values in the table that add up to your target value. For the numbers you use, they are replaced with a 1. And for the numbers you did not use, replace them with a 0. The most significant number is on the left. Finally, the last digit corresponds with the left most toggle. If the toggle is a 0, flip it down and if the digit is a 1, flip it up.

Regarding the Button

The button is something to pay close attention to. It is a quick and easy step, but without the right timing, it can sneak up on you and result in a strike.

The button will have to be pressed at some point. Unfortunately, in our bomb there are no ways to skip steps, every phase must be completed. The first detail to pay attention to is the bomb can turn three different colors, red, blue, and green. The catch with the button is the bomb isn't defused when it's pressed, but rather when it's released. You can press the button at any point during the defuse process, but it all comes down to when you release it. The color of the button will determine when you should release the button.

Release the button according to the following instructions:

- Red = Press and release the button at any time.
- Blue = Look at the serial number. Press and release the button when the last digit of the serial number matches with one of the digits that shows in the seconds timer.
- Green = Look at the serial number. Press and release the button when you see the first digit of the serial number matches one of the digits that shows in the seconds on the timer.

Regarding the Keypad

Uh oh, a keypad can only mean one thing…it requires a keycode. Press the keys on the keypad very carefully to avoid getting a strike!

Figuring the correct combination to the keypad can first be determined by decrypting a keyword with a key using an alphabetic substitution cipher. Then looking at the table below to obtain the passphrase.

This substitution cipher with a numeric key represents a rotation in the alphabet. For example, for a key of 5, the alphabet is now shifted 5 places. In this case, A becomes F, B becomes G, etc.

To input the passphrase correctly, you will use the numeric combination on the keypad. Each digit on the keypad has three letters associated with it. With that, you must look at the keyword and locate the correct number to spell out the word. You will press the button on the keypad with the correct letter only once.

Keyword	**Passphrase**
BANDIT	RIVER
BUCKLE	FADED
CANOPY	FOXES
DEBATE	THROW
FIERCE	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

Time to "cut" the wires. Be careful with this step, one wrong wire cut is one step closer to the bomb exploding.

Right off the bat, it is important to note the color of the wires does **NOT** matter. There are different color wires, but that isn't what you're using to defuse. Instead, each wire is labeled A through E. Cutting the wires is based on the color of the button. See the tables below to know when and what wires to cut depending on the color of the button.

The wires are labeled as follows:

A = Red wire

B = Yellow wire

C = Green wire

D = Orange wire

E = Purple

"Cut" the wires is based off this list of instructions:

Button	Wires
Red	Look at the first 3 letters in the serial number. Keep the wires that corresponds to those letters plugged in.

Blue	Cut all wires except “B” and “E”.
Green	Keep “B” and “C” plugged in.