Defuse the Bomb

A CSC 102 Project

Team: Team Hexabinary

BOMB DEFUSAL MANUAL

Version 1

Verification Code: code

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.

[1]https://keeptalkinggame.com/

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

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

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

Strikes

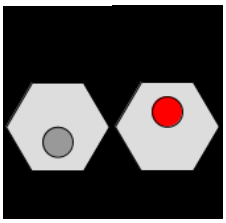
A mistake in disarming a phase results in a strike. Get too many strikes, and the bomb "explodes". Sometimes, the remaining countdown time will be decreased and/or go by faster when a certain number of strikes has occurred.

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.

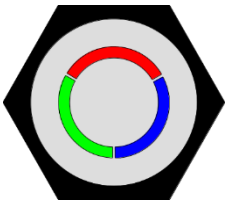
Regarding the Toggles



You will encounter one hexadecimal prompt phase. Convert this value to a 4-digit binary number. Toggle the switches to represent the binary number.

Converting a number to binary (base 2) can be done by placing a 1 in the appropriate powers of two represented by the columns of the table below that, when added together, sum to the value. A 0 is placed in the remaining columns. The left-most digit of the binary number is the most significant bit, while the right-most digit is the least significant bit. The LED on a toggle switch lights up to represent a binary 1 and off to represent a binary 0.

Regarding the Button



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 red, green, or blue. Release the button according to the following instructions:

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 anywhere in the seconds of the countdown timer.
Blue	Release the button when the last numeric digit found in the bomb's serial number appears anywhere in the seconds of the countdown timer.
Other	Here's to hoping that you never run across this case...

Regarding the Keypad

Important 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.

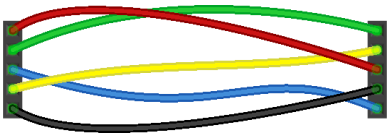
A substitution cipher with a numeric key represents a rotation of the alphabet. For a key of 5, for example, the alphabet is shifted five places such that A becomes F, B becomes G, …, and Z becomes E. Using this shift, for example, the word “THEY” encrypts to “YMJD”. Decrypting “YMJD” back to “THEY” is merely doing the reverse, effectively “subtracting” five positions from each letter.

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	**Paraphrase**
BINARY	CLOUD
RAM	COMPUTER
HEX	CTRL
ALT	DEL

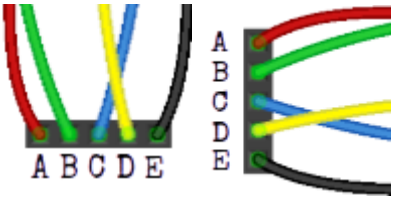
NVIDIA	AMD
FAANG	JOBLESS
INTERNET	HTML
GOOGLE	MICROSOFT
RTX	RAYTRACING
FPS	FRAMERATE
HZ	REFRESHRATE
EVGA	MSI
PYTHON	INTERPRETER
LORIJAQUES	JEANGOURD
CPU	INTEL
QWERTY	AZERTY

Regarding the Wires



The correct wires to “cut” are based on the color displayed on the GUI.

The wires are labeled as follows, depending on their orientation on your bomb:



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

1. Breathe
2. Analyze the various colors
3. Contemplate which color combination that appears on WIRES PHASE: achieves the desired color.
4. Pull the blue wire.