BOMB DEFUSAL MANUAL

A CSC 102 Project

Created by Dr. Gourd, Jamil, Luke, and Zach

The Game

This project is based on the game Keep Talking and Nobody Explodes, a cooperative bomb defusing party game. As the game designers put it, ‘‘You are alone in a room with a bomb. Your friends, the 'Experts', have the manual needed to defuse it. But there is a catch: the Experts can not 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 computer that combines a typical computer with the ability to interact with the outside world through sensors. The underlying software is written in Python 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 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’’.

The Phases

Regarding the Toggles

Converting to Binary

To defuse this phase, you'll have to convert a number from base-ten to binary. Binary is a base-2 numbering system that uses only two digits, 0 and 1, to represent numbers. Converting numbers from base ten to binary is easy, and here's how to do it:

Step1: Start with the base ten number that you want to convert. For example, let's use the number 8.

Step 2: Divide the number by 2, and write down the remainder. For example, when you divide 8 by 2, the remainder is 0, so write down a "0".

Step 3: Divide the quotient by 2, and write down the remainder. Keep doing this until the quotient is 0. For example, when you divide 4 (the quotient from the previous step) by 2, the remainder is 0, so write down another "0". When you divide 2 by 2, the remainder is 0, so write down another "0". When you divide 1 by 2, the remainder is 1, so write down a "1". Finally, when you divide 0 by 2, the quotient is 0, so you're done.

Step 4: Write down the remainders in reverse order. In this example, the remainders are 1000, so the binary representation of 8 is 1000.

Congratulations, you have successfully converted a number from base ten to binary!

In summary, converting numbers from base ten to binary is a simple process of dividing the number by 2 and writing down the remainders until the quotient is 0. Write down the remainders in reverse order to get the binary representation of the number. Good luck!

Finding The Number

To get the correct base-ten number to convert into binary, you'll need to press the button. Simply press and release the button a single time, and make sure to take note of the time on the clock when the button is pressed. The number you need to convert is the sum of the digits on the clock, however, if the sum is greater than 15, you will need to press the button again and get a sum smaller than 15. To defuse this phase, you must convert this sum into a four-bit binary number.

Once you have converted the sum into a four-bit binary number, flip the corresponding toggles. For example, if the sum is 6, which in binary is 0110, you would flip the second and third toggles.

Once the correct binary number is entered, the phase will be defused.

Regarding the Button

The button phase will work in tandem with the toggles phase. Pressing the button will pause the clock and allow you to find the sum you will need to convert to binary and enter with the toggles. Be careful of when you press the button, as the toggle phase can only be defused when the sum of the digits on the clock is less than 15. Once the correct code is entered with the toggles, both the button and the toggles phases will be defused.

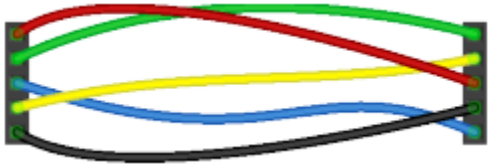
Regarding the Keypad

A key word for the keypad can be acquired by analyzing the bomb's bootup text. To determine the correct combination for the keypad, you'll have to ''jump the five'' for every letter in the keyword.

To ''jump the five'', first locate the number that corresponds to the first letter of the key word. Then, press the key that lies directly across the five from the number that corresponds to the first letter of the key word. For instance, if your key word starts with a

‘‘T’’, you’ll locate which number the ‘‘T’’ corresponds to on the keypad. For the letter ‘‘T’’, the corresponding number is an eight. You will then ‘‘jump the five’’ and enter a two. Do this for every letter of the key word to diffuse the keypad phase.

Regarding the Wires



Which wires should you "cut" to avoid getting one step closer to an "explosion" with every wrong snip?

For the wires phase, you will have to utilize your remaining strikes and reasoning skills to eliminate the incorrect wires one by one until you find the correct solution. Be sure to save some strikes for this phase! GOOD LUCK!