Defuse the Bomb Write Up

A CSC 102 Project

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Github: https://github.com/megandowdell/Defuse-the-Bomb-Project

Team individualization

What did you tweak to the design provided by your instructor that makes it different from the other teams? In other words, what did you do to make your version of the "bomb" unique?

- We completely redesigned how the bomb works and made it based on four mini-games. These mini-games are the most popular games from our childhood which makes each game very special. To defuse the bomb, these four mini-games must be successfully completed, otherwise the bomb will explode. The . We incorporated each of the bomb's hardware components to correspond with each game. For example, the keypad is used for Tic Tac Toe, the wires are used for Simon Says, the toggles are used for Hopscotch, and the button is used for Red Light, Green Light. We kept a simple 10 minute timer, which causes the bomb to explode if it runs out of time.

Future development plans

If you were to continue working on this project, what would you do? Where could you go from here to make it better, more interesting, more fun? What could be done to increase the project's broader impact (e.g., to make it marketable)?

- Specifically in the Hopscotch game, a potential development idea is to make there be a pattern or puzzle to figure out which tile should be selected. Currently, it is a game of luck for the user to select the correct tile with a 50% success rate. For the game Simon says, an idea to make the game more competitive and more in depth, I would have the game include all the components of the bomb. I would have included the button, toggles, and the keypad into the list of possible commands. I think by incorporating these components the player would have more of a variety instead of just working with the wires throughout the entire game. For the game tic tac toe, an idea to make the game more competitive would be the usage of the different components for each round of the tic tac toe game. For instance, one round could have involved the usage of the keypad, another round could have involved the usage of the toggles, or another round could have involved the wires. By incorporating other components of the bomb structure it would have challenged the player to figure out the placement of "X's and "O"'s to be the computer. For Red Light Green Light, the concept of additional players may have added additional fun, as in the Netflix series, the central goal of the players is to the the sole survivor out of the 456 players. Additionally the concept of further running down the field could be implemented, rather than the distance just being displayed on the screen.

Lessons learned

What did you learn by working on the project throughout the course? In your opinion, did it relate to *The Science of Computing* curriculum (and, if so, how)? How was the experience beneficial to problem solving in general? What did you learn that will benefit you in future courses in the Computer Science curriculum?

While working on the project throughout the course, everyone within our group learned different skills:

- Khalil: Throughout this project, I have learned how to work with threading and make the execution of running the code created more efficient when working on the project. Another thing I learned is how to program hardware which was super fun, getting to incorporate fun ideas into projects. My experience was super beneficial to problem solving because it challenged me to change my way of thinking to figure out the problems I was not familiar with. Overall, I learned that giving myself the space to struggle through challenges, made me appreciate the hard lessons learned a little bit more.
- Megan: Working on this project throughout this semester helped me connect everything I have learned in CSC101 and 102 to a real, hands on outcome. Before this class specifically, the coding I had done was just small snippets and homeworks, I never had a physical hardware project to show for it. This project combined all of the knowledge I gained in this course along with a lot of new information about hardware, user interfaces, multiple phases, etc. The most complicated part of this project for me was just how much you always had to be thinking about the bigger picture and how the component or file you are working

on relates and works with the rest of the project. This project was a great representation of what we learned in The Science of Computing Textbook; even on this final project, we were using skills from very early last semester, such as conditional statements, importing libraries, modules, etc. This project really helped my problem solving skills because not only did I have to consult with other group members to make sure my work works with theirs, but I had to figure out how to fix my own work and solve mysterious bugs in my own code. I had to test each piece one at a time, which requires a lot of patience and is a skill I will definitely carry into my future CS classes.

- Matthew: During the project, I was able to see how all of the various topics that we learned throughout the past year were implemented into an interactive, tangible device. All in all, this project really made me become resourceful, and use resources in ways that I never would have. From having to find AI voice models that allowed us to generate the Squid Game announcer voice, to using DALLE AI to generate images that were used in the game. I also enjoyed learning how to structure my logic better, as there always is a more efficient way to do something. Additionally, I was able to develop my problem solving skills, as my code resulted in a lot of errors that had to be fixed through trial and error. Although I am graduating this semester and will likely never take another computer science class in my life, all of the skills that I developed during this project will allow me to better succeed in the future.
- Christa: Through working on this project, I gained a deeper understanding of what happens behind the scenes in the creation of a visual and interactive interface. It was incredibly satisfying to see my code tangibly come to life, making the development process more rewarding. Throughout the project, I consistently applied concepts from *The Science of Computing*

curriculum, most notably principles such as inheritance and modularization, which strengthened my understanding of how different components of a program interact. From a front-end development perspective, this project helped sharpen my problem-solving skills, especially when working through uncertainty. There were several moments when I wasn’t completely sure what to do, but that challenge pushed me to quickly absorb new concepts and adapt. One of the most enjoyable aspects of the project was the collaborative and multidimensional nature of GUI design. It required me to think holistically about the project and understand how all parts should come together to form a cohesive game. For the future, this project has boosted my confidence in my programming abilities while also revealing areas where I can continue to improve. I believe the skills developed will be beneficial as I progress to more difficult courses.