





Intro to Engineering Project: Bomb Defusal Simulator



Section 11, Group 2
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Overall Design Statement

Create an interactive game which allows the user to defuse a randomly generated bomb, along with three algorithms aimed at simulating the game to find the fastest and most accurate solving method.



Figure 1. Screenshot of bomb from *Keep Talking and Nobody Explodes*¹

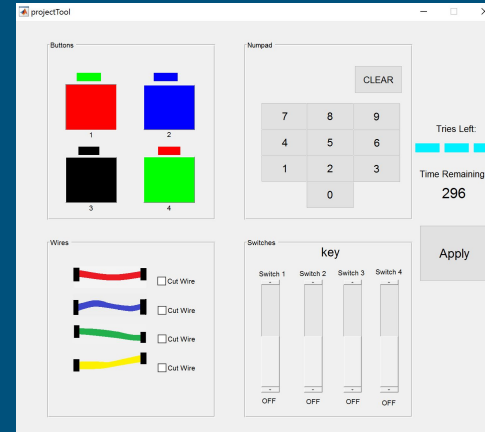


Figure 2. Screenshot of Bomb Defusal Simulator

Method

1. Created a list of rules needed to solve a randomly generated bomb
2. Created a GUI to allow a user to interact with the bomb and be able to play the game
3. Created three unique algorithms to solve the bomb
 - Brute force
 - Randomization
 - Rule abider
4. Created a GUI to run and display results of three algorithms solving a desired amount of bombs

Prediction

- Expected Rule Abider to have the shortest computational & simulated time
- Expected Brute Force and Randomization to have similar simulated times and failed attempts

Graph and Data

- Rule abider fastest comp speed by 2 orders of magnitude
- Randomization slowest comp speed by 2 orders of magnitude
- Randomization has 40% more failures compared to brute force
- Brute force fastest 'human' simulated time

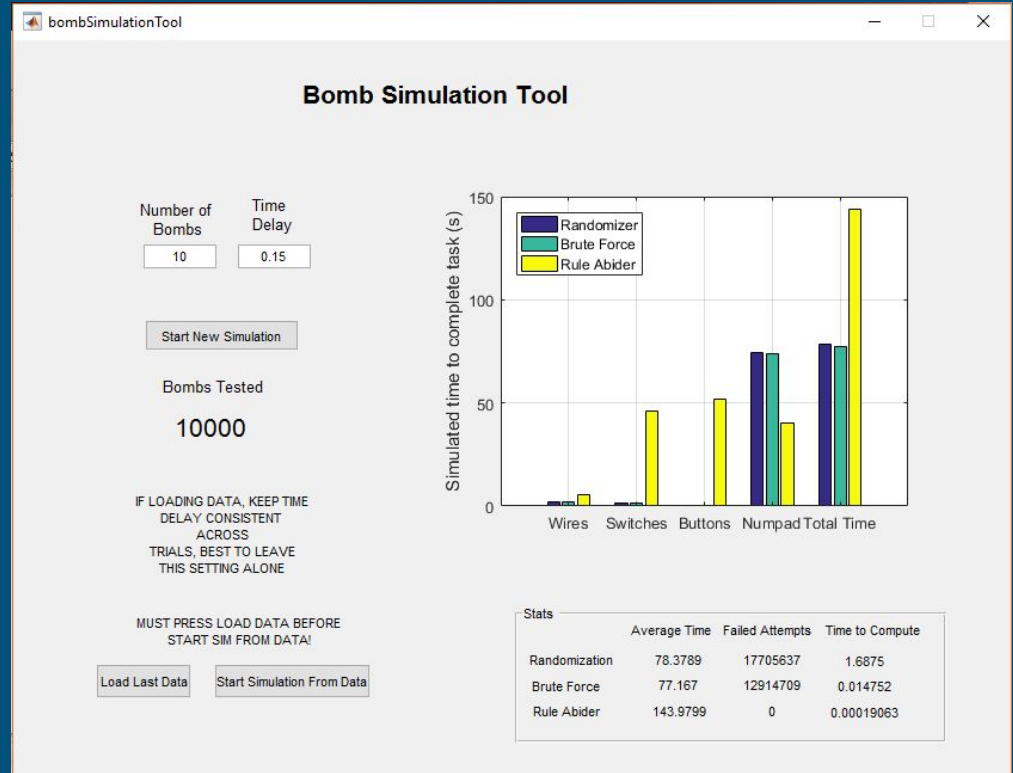


Figure 3. Screenshot of Simulation Tool

Conclusions and Evaluation

- If one knows the rules, rule abider would be better
 - Never fails
 - Fastest computational time
- If one doesn't know the rules of the bomb, the brute force algorithm would be better
 - Fails fewer times
 - Faster computational time than randomization
- Major assumptions:
 - Bomb is able to “fail” attempts without losing game
 - Results are not transferable to a real game situation outside of our GUI
 - Rules always apply and do not change