IOWA STATE UNIVERSITY

AEROSPACE ENGINEERING DEPARTMENT
COMPUTATIONAL TECHNIQUES FOR AEROSPACE DESIGN
AERE 361

PROJECT PROPOSAL
BLEACHER CREATURES FROM MARS

Team Member Names :
Stumpf, Blake
Andrew, Dresen
Kaden, Kotvis
Casey, Kolbeck
Samuel, Burchett

Contents

I ABSTRACT

The purpose of this project is to develop a game in C that is not only fun to play but also measures the reaction time of players. The game will be modeled after the 1976 hit game Breakout using the following materials: an Adafruit Clue, two buttons or a keyboard, a USB cable, and AAA battery holder. Users will control the paddle with two buttons to eliminate as many blocks as possible while the program measures time elapsed, and the number of successful collisions with the paddle. The code for this program will be based on a version of the game that runs on Python and converted to C. If possible, the program will be improved upon with a steady increase of ball velocity, new lines of blocks to eliminate, and other challenges to make the game more fun and exciting for users. The components will be self contained in a frame for durability and ease of play. While such a program lacks the sophistication of more advanced reaction time experiments, it will provide a basic overview of the reaction time of participants and their improvement over time. Participants may be randomly assigned handicaps to measure the difference in reaction times compared to a control group. After a series of game playthroughs, the data will be collected for analysis.

II INTRODUCTION

Reaction time slowly demises as a person gets older. This can be detrimental as daily life becomes harder and harder. As a way to practice reaction time and test a person's reaction, our team, The Bleacher Creatures from Mars, are developing a fun game. The game known as Bleacher Creatures Destroy Features will be similar to the classical game breakout!

The game will be created and tested on an Adafruit Clue board. Using buttons, sensors, and the display we will recreate a game like Breakout. In the game a person will control a moving platform, which will go back and forth across the screen. There will then be a ball bouncing around which can break blocks at the top. The person must use the platform to bounce the ball to break all the blocks to win. This game will be fun for all ages and will be great practice for a person's reaction time.

III FEATURES

The project shall include the following three features:

1. The game shall be contained in a user-friendly frame with minimal component exposure.

2. The game shall measure and record the reaction time of participants, time elapsed, and the total number of successful collisions with the paddle.

3. The game shall be interfaced by the user through two buttons.

Part List	
Part Description	Quantity
Adafruit Clue	1
AAA Battery Holder	1
USB Cable	1
Need 1 of the Items Below	
Buttons	2
Keyboard	1

Table 1: The bill of materials for this project.

IV PROBLEM STATEMENT

There is a great demand for video game entertainment. The video game market in the United States alone is estimated to be 96.6 billion dollars (Clement). While the majority of this market share no longer includes arcade games, the classics are still popular. Breakout is second only to Pong for arcade commercial success (McFerran). However, such a game may not only satisfy a need for entertainment but also serve as a valuable tool for measuring reaction time. Whether it is driving, working, or reacting to danger, promptly reacting to stimuli is vital to everyday life. Factors such as fitness level, level of fatigue, age, alcohol, etc. affect this ability (Balakrishnan). However, while there are inherent factors, practice and behavior can mitigate the loss of or even improve reaction times. For example, a practiced behavior like regularly playing table tennis or badminton produces better response times. For best results accurate measurement and testing is required. Without tests and measurements, the rate and level of improvement will remain unknown.

V PROBLEM SOLUTION

One of the most enjoyable ways to increase someones reaction time is games. That is why our solution is a take on a fun and simple game, breakout. The display will be on an Adafruit Clue board and the controller will be a pair of buttons if possible otherwise it will interface with a computer keyboard. Figure 1 shows the screen of the game. As one can see a circle bounces off the walls around the screen and the green paddle at the bottom of the screen. The buttons then allow the user to move the paddle back and forth and try to hit the blocks. When a block is hit, it disappears. The goal of the game is to clear all the blocks from the screen. The parts needed for the game are listed in table 1.

VI CONCLUSION

Testing and practicing reflexes can be very important to those who have seen a decline in that action. To help test and improve reflexes our team decided a game would be a great test, not to mention fun so we have decided to base our game off of one of the classics, breakout. Even more convenient, our game will be portable so our users can improve their
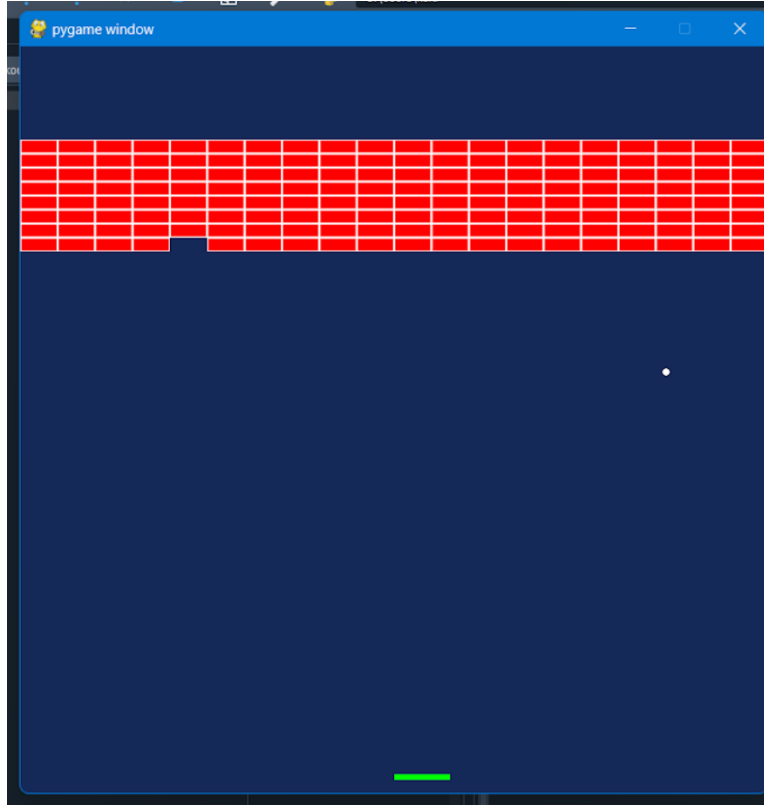
Figure 1: Example breakout game running.

reflexes whenever they have a free moment.

Our project will be programmed on the Adafruit Clue board and will utilize the screen and take user input through the buttons on the board. An important thing to ensure is that the game runs at the correct speed so that our main goal of improving and testing reflexes is effective. Overall our game will be an effective way of improving and testing reflexes, and will present challenges for our group in utilizing the screen, button inputs, and ensuring the game runs smoothly using the low power processor.

VII   REFERENCES

1. Balakrishnan, Grrishma, et al. "A Comparative Study on Visual Choice Reaction Time for Different Colors in Females." Neurology Research International, U.S. National Library of Medicine, 2014, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4280496/.

2. Clement, J. "Video Games Industry in the U.S. 2023." Stat ista, 16 Jan. 2023, https://www.statista.com/statistics/246892/value-of-the-video-game-market-in-the-us/.

3. McFerran, Damien. "Breakout Is 40 -nbsp;You Need to Know How It Came to Be." Digital Spy, Digital Spy, 11 Nov. 2018, https://www.digitalspy.com/videogames/a790432/atari-breakout-40-today-all-gamers-need-to-know-how-it-came-to-be/.