Midterm Project: A Brain Game

Due: Sun Oct 27, 2024 11:59pm

Details

Background

Brain training (also called cognitive training) is a program of regular activities purported to maintain or improve one's cognitive abilities. The phrase "cognitive ability" usually refers to components of fluid intelligence such as executive function and working memory. Cognitive training reflects a hypothesis that cognitive abilities can be maintained or improved by exercising the brain, analogous to the way physical fitness is improved by exercising the body. Cognitive training activities can take place in numerous modalities such as cardiovascular fitness training, playing online games or completing cognitive tasks in alignment with a training regimen, playing video games that require visuospatial reasoning, and engaging in novel activities such as dance, art, and music.

Businesses that design and develop grain games to allow player to practice memory, attention, flexibility, processing speed, problem solving skills, such as:

- Lumosity
- Cognifit

Requirements

The midterm project is to develop this math brain game https://www.cognifit.com/aplicaciones/html5/brain/game/math-subtraction/l/en. using techniques that have been covered in the course. Projects must be an application built in Unity. Students will work individually for the project.

The midterm project is intended to be individual efforts. You are encouraged to discuss approaches with other students but your code and your project must be your own. If you decide use external assets or libraries, cite the source and reach out to discuss if there is any question.

In this game, a player shoots down the crates falling from the sky by subtracting the values to zero. A player has a limited number of bullets to shoot, and needs to aim at the box and add up the right number of points. The game is intended to address:

- Processing speed: the ability to perform easy or overlearned tasks
- Working memory: temporary storage and manipulation of the information necessary for complex cognitive tasks
- Shifting: ability to adapt behavior and thoughts to new, changing or unexpected circumstances.

Basic Game Mechanics

1. Cannon rotation direction is controlled by the mouse movement
2. A key click (S,D, and F) fires a bullet with a value (1,2 and 3) in the direction the cannon points at
3. Spawn crates with random values at random positions from the top of the screen at certain time intervals.
4. When the bullet collides with the crate, the bullet's value is subtracted from the one on the crate. The goal is to substract the crate number to a zero.
5. When the crate's number equals zero, points will be awarded and the crate is destroyed.
6. If the crate's number becomes less than zero, points will be deducted and the crate is destroyed.
7. As long as the crate's number is greater than zero, the crate will continue to move down the screen. When the crate goes below the bottom of the screen, it will be destroyed and the points will be deducted.

Level Design

1. Design three or more levels. In each level, you may decide the number of crates and time allowed to complete the level.
2. Each player is give 50 '1's, '2's and '3's to start the game. Players will be moved up a a level if they complete the current level successfully; they will be move down a level if they could not complete the level successfully.
3. Include a start scene, where you can include a brief introduction how the game is played, a start button, developer info.
4. Include an end scene, where you can report the final score, the highest score, and a button to restart the game. You can include acknowledgement for any assets used in the end scene.
5. Include a timer that allow the player to play i.e. 3 minutes.

Other Features

1. UI: Proper UI elements to represent

- current level
- current points score
- remaining time
- remaining bullets and crates
- number on the crate

2. Bonus:

- audio and graphics when level up and down (2pts)
- audio and graphics when a crate is destroyed successfully (equals 0, points awarded) (2pts)
- audio and graphics when a crate value is <0 (points lost) (2pts)
- audio on/off button to turn on/off audio (2pts)
- pause button to pause the game (2pts)
- variation in the balloon's movement (2pts)