Concept of Operations

Breakout & Pong like Arcade Game

COP 4331, Spring 2017

Team Name: Project Group 9
Team Members:
Joseph Freeman
Matthew Carlino
Peter Tran
Peter Nguyen
William Murphy
Austin Dragone

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The Current System

Currently there are video games, such as Breakout and Pong, that involve controlling a paddle on a one-dimensional track to bounce a ball in desired locations (at bricks in Breakout and past the opponent in Pong). This is usually done in a rectangular field or playing surface. In Pong, players try to knock the ball past their opponent to score a point. In Breakout, the player tries to keep the ball from slipping past the paddle while also trying to make it hit bricks positioned above the paddle until they all break.

Our idea is essentially a combined experience between these two style of games. It will involve a Breakout style of gameplay and extend into a Pong style of gameplay as the game progresses. Our game will contain a single player mode with artificial intelligence and progressive levels, a local multiplayer mode, difficulty selection, point system, power-up system, and the ability to pause.

The Proposed System: Motivation

Our main goal is to create a game for entertainment purposes that will be fun for all ages. While there are constantly new arcade games being pushed to the market, we haven't found any with a similar idea to ours. Ours will bring a new, interesting style, be free to play (unlike some games), available on computer, and will include pleasing visuals and audio.

Color Switch was a game with a simple design and basic in-game goal, yet it still became very popular in the United States. Games like this attract people because they are intuitive and easy to pick up and play for short amounts of time. With it slowly falling out of popularity - either because people beat the game or they grew tired of it - our game plans on providing a new experience for people to latch onto, like they did for Color Switch.

The Proposed System: Users and Modes of Operation

There will only be one class of user, who will have access to all modes and features.

As for modes, we intend to have both singleplayer and multiplayer aspects to our game.
The single-player mode will allow one user, while using the keyboard, to progress through levels of increasing difficulty against artificial intelligence or play another user locally, both using the same keyboard. The multiplayer mode is at least planned for a single local machine where users share a keyboard to control their own paddle in the selected multiplayer game mode. However, we'd like to have an online aspect to our game, where we're able to play against each other over an internet connection. These modes are planned to be score-based competition.

The Proposed System: Operational Scenarios

As previously stated, the game will serve as entertainment. Our game will consist of a rectangular arena with paddles on the left and right sides of the screen that move on a vertical axis. These paddles will be separated by a pattern of bricks that must be struck by balls that the player(s) bounces off of their paddle. Once the majority of the bricks have been broken, the game shifts to more of a pong style game, where the main objective is to get their ball past the opponent's paddle. Players earn points by both breaking bricks and scoring on their opponent; however, bricks will earn players less points to encourage competition between the players. Also, various types of items will occasionally drop, which players will try to grab or avoid, depending on what the item does.

In the singleplayer mode, the user will try to beat an A.I. to unlock more levels and proceed through a determined series of levels to beat the game's campaign mode. The A.I. or arena will get more difficult the further one goes. In multiplayer mode, the two players battle against each other to see who can score more points.

There won't be a large number of inputs, so incorrect inputs wouldn't cause an issue, other than the user doing poorly in the game. If we can implement an online component, when there's a loss of internet connection for any user, they will promptly be removed from the game (with a pop-up letting them know), and brought back to the title screen, where they can try to reconnect to the server. If a user leaves the game on their own accord, the remaining user will be announced the winner, and their score will be posted.

The Proposed System: Operational Features

Must Have:

- Two modes of gameplay:
  - Single Player played against an A.I.
  - Multiplayer played on a local machine
- Difficulty selection: (set the speed of the ball and size of the paddle)
  - Easy: large paddle size, slow ball speed
  - Medium: average paddle size, average ball speed
  - Hard: small paddle size, fast ball speed
- Various level designs with increasing difficulty as you progress through single player.
- Items and power-ups (Modifiers to either ball or paddle)
- Background Music playing as the game is being played
- Sound Effects on ball collisions, power-up consumption, and scoring on opponent.
- Pause button feature to pause mid-game and resume where you left off.

Would Like to Have:

- Ability to create your own levels with a text file
- Online multi-player

Music creation game mode

The Proposed System: Analysis

Right now the language we're looking at is Java to develop the game and using free source background music and sound samples for sound effects. The game will only be playable on desktops or laptops as a java application, so the machine must have some form of java installed. We are not planning a mobile component so to reduce the risk of compatibility issues, we will disallow use from a mobile device.

An alternative option that we decided against would be to create a mobile game, instead of a desktop one. The main reason we didn't do this is because we each have different phone brands (iOS vs. Android). Developing for both sides could cause time restraints, and developing for one would mean that testing would be difficult for some of us. Also, developing the game for our phones could mean that we'd need to constantly update the game to our phone, which could also take time. Instead, we all have easy access to computers, where we could quickly update and play the current version.

There's a bit of a learning curve for our team. None of us have too much knowledge about game development, and the majority of our knowledge about coding comes from classes taken at UCF. None of our other courses have really prepared us for a project this large, so we'll need to focus time on getting a full understanding of the material.

The system will be developed using GitHub to share a common code source which can be updated, refined, and peer reviewed by the different developers. In addition, Google Drive may be utilized to share the music and visual files needed for the game to operate. Each developer will be assigned a different task for the game (visual/graphics, coding, music, etc.) and will collaborate together on how to best connect the different aspects of the game into one, whole working game that meets the requirements discussed in the client meeting.

The language we will be developing in is Java for the actual game component. Since this game will not carry a need for an internet connection, we do not anticipate needing to integrate any other technologies or languages.

Since this is a standalone desktop application written in Java, any computer with Java Virtual Machine (JVM) will be able to run our game. This means that our game will run on all popular operating systems: Windows, OS X, and Linux.

Upon our initial meeting to discuss this project, we came to the conclusion that Java was a strong language that all developers shared and would require the least amount of a learning period compared to the other proposed language, Javascript. By developing our game for desktop usage with Java at its core, there is less maintenance involved in keeping the game

updated with evolving Operating Systems. This is a strong aspect as to why we avoided developing the game for mobile systems (iOS and Android) as those systems evolve drastically approximately once a year, requiring yearly maintenance and updates to the game.

During our client meeting, it was settled that the game would be primarily single-player with a local multiplayer aspect. It was advised that the game should be online multiplayer as to make it enjoyable to multiple people and distant friends (or enemies) but was not made a requirement. As such, an internet connection is not required but will be if the online multiplayer aspect is implemented.