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Computer Science 1

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Tau Design

**Objective**: To create a visually appealing, minimalist game based on the concepts of multitasking, completeness, and competition.

**Game objective**: To defeat the opponent, human or AI, in a game of round pong, where side walls don’t exist and all deflections are done by the paddle. There will be many power-ups/items/power-downs that will jeopardize the results a bit and increase the ease in which a beginner can enter the game. With the human vs. AI play, we might add achievements or high scores to increase incentive. A score will be assigned to each single-player game, which will be a composite score based on both wins achieved and time survived.

**Aesthetics:** We plan to create a minimalist aesthetic that is entirely 2D, but we may add particle effects or other fancy visuals in order to increase the visual appeal. We will utilize both bright and dark colors in order to contrast between in-focus objects and out-of-focus objects. We will also include multiple unlockable game modes that modify the aesthetics (e.g. MLG mode, retro mode, super-minimalist mode, extra-particle mode). In addition, we will create a beautiful main menu that incorporates the objective of the entire game and allows access to game settings and high scores.

**Audio:** We plan to incorporate competitive music that will match the minimalist aesthetic style. There will also be many sound effects that will match the style of the music we choose. For each aesthetical mode, we will conjure separate audio files that match each mode.

**Technologies**: The game will be programmed with a strictly object-oriented focus, utilizing technologies such as C++, Qt, and image anti-aliasing to maintain both performance and aesthetic appeal. We will also attempt to incorporate audio-sensing technologies such as fast-Fourier- transform to ensure that certain visuals sync with the background audio.

**What we will learn:** Through the process of creating Tau, we will primarily focus on learning Qt and advanced 2D graphics. We will also learn a few C++ features, such as audio, advanced math, and object-orientation. In addition, we will both learn the basics of collaborative programming through version control software such as Git, and the basics of fully readable, beautiful code. With such a humongous project comes more responsibility, such as comments/documentation, organization, and coding conventions. With C++ we will also learn how manual garbage collection will work, in addition to other concepts such as preprocessor programming.

**Design**: Users will first see a main menu that contains a large play button, settings button, login button, and high-score board. There will also be a few small settings such as single-player/multi-player. In the settings menu, there will be other, more advanced settings such as key-bindings, multi-player difficulty, and frequency of items. The high-score board will only apply to the single-player mode and will contain scores; the usernames will be created with a complete login system accessed via the login button in the main menu. Users will be prompted to create a username the first time they decide to play a single player game. When users press the oversized play button, the menu will smoothly transition into the playing field, and first-time players are walked through a picture tutorial. The playing field will consist of a large circle in the center, with arc-shaped paddles along the circumference. A ball will go in a random direction from the its starting point, the center, and players will have to move their paddle with a keyboard-type input device in order to keep the ball from exiting the circle on their side of the circle. Items will appear randomly on the field, and players will use the ball to hit and activate the items. Items will usually apply to whoever hits the ball into the item ball. NOTE: single player mode will be incorporated if time allows.

**Items:** Here is an uncomprehensive list of the items we plan to incorporate into the game.

* Wobble: the ball’s velocity angle changes slightly with each frame.
* Speed paddle: each time the benefitting player hits the ball, the ball’s speed increases. It returns to normal when it hits the opponent’s paddle.
* Big ball: the ball gets bigger
* Small ball: the ball gets smaller
* Warp ball: the ball regularly toggles between fast and slow states.
* Multi-ball: the ball splits into two balls, each of which is worth a point. (will only be incorporated if time allows).