Carissa Gadson and Annie Abay
6.S08
04-05-2016

Maze Game – Project Proposal

I. Overview:

Our final project is centered on the idea of an interactive maze. Users will be able to use the Teensy to scroll and select their kerberos, along with their choice in level, which will correspond to difficulty. Once selected, the player will appear as a dot at the starting point of a maze on the OLED screen. There will be a timer at the top of the OLED screen, measuring how long it takes the user to pass through the maze to the end point. Throughout the maze, there will be time chests that, when the user object runs into them, will subtract time from the total time to complete the maze. Travel in this maze is controlled by the turns and steps physically made by the user. The walls of the maze will stop the user's dot on the screen, not allowing it to go through walls. Once the user navigates through the maze, a scoreboard will appear, displaying the kerberos and time of the five fastest players of the level. If the current player beats the time of a top five player, their kerberos and time will appear on the scoreboard.

II. Intended functionality:

- OLED:
  The screen will display the kerberos usernames of the class, from which the user will select theirs. Additionally, the OLED will display the maze itself and the user object that moves through the maze according to the user's movements. The final scoreboard too will appear on the OLED at the end of the game; this scoreboard will list the top five players of the level, defined as the five fastest players.

- Button:
  The user will use a button to select their Kerberos and level at the beginning of the game.

- IMU:
  The IMU will be used to read cardinal directions in which the user can travel, translating to forward, backward, left and right. The acceleration of a user's step, which will be measured by the IMU, will influence the distance that the user travels on the OLED screen.

- Teensy/Server Interaction:
  At the end of a game, the user's time is sent to the server. The server stores all of the times of the various users that have played the games thus far, and sends the five lowest times per level to the Teensy, which will display said times on the OLED screen at the end of the game.

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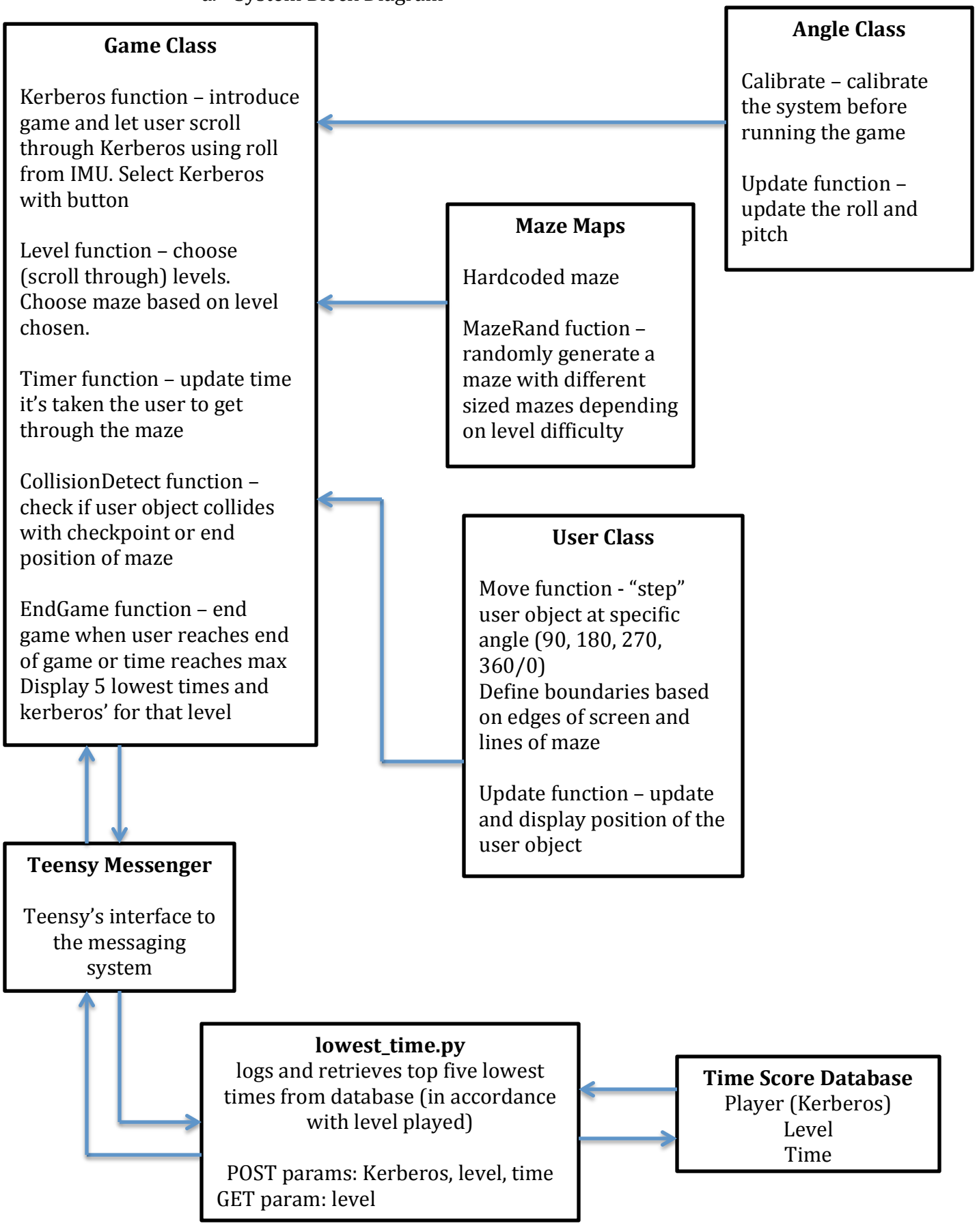
a. System Block Diagram



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III. Potential Technical Challenges:

- Ensuring that a randomized maze will still hold the qualities of a hard-coded maze, namely that a user cannot walk through walls
- Writing code that will randomly generate mazes to display properly on our OLED
- Designing functionality that will recognize if user is taking extra-large steps and adjust steps on OLED screen accordingly

IV. Milestones:

Week #	Description of Milestone
Week 1: Due Thursday 04/07	Sketch three mazes that we will end up coding for.
Week 2: Due Thursday 04/14	Write teensy-side code for reading steps at specific angles, demonstrate ability to have user object move on screen depending on physical movement. Create database to store kerberos, level, time. Write Python file to log and retrieve Kerberos, level, time from database.
Week 3: Due Thursday 04/21	Write teensy-side code for the 3 mazes. Hard code an array of arrays for pixels being 0 or 1 to map maze. Write teensy-side code for start game screen and user select functionality. Demonstrate ability to scroll through and choose Kerberos using a button. **Reach**: Write teensy-side code for a random maze generator.
Week 4: Due Thursday 04/28	Write teensy-side code for the game functionality and user object and maze interaction. Demonstrate ability to move user object along path of maze.
Week 5: Due Thursday 05/05	Write teensy-side code for button functionality to choose levels. Demonstrate ability to choose a username and level, complete the level and display the five lowest times (with kerberos') used to complete the level.

V. Parts List:

- Description: Monochrome 2.42" 128x64 OLED Graphic Display Module Kit
- Vendor: Adafruit
- Product ID: 2719
- Price: $39.95
- Link: https://www.adafruit.com/products/2719