

Arcade

ECE 153B Project Proposal

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Project Webpage: <https://sites.google.com/view/153b-proj-a-k/home>

OVERVIEW

We propose to make an arcade system using an ultrasonic sensor, which allows the game to detect if a player is ready to start the game. If there is only one player detected, it will allow the player to play against an AI and if there are two players, it will allow the players to play each other. To play, players will first communicate to Termite by selecting if they want to play Tic Tac Toe or Blackjack. If Tic Tac Toe is selected, the 8x8 LED Matrix will light up showing the current board. Each decision will be determined based on the joystick on the microcontroller. If Blackjack is selected, the termite will show the cards being played and the bets being placed.

PERIPHERALS

1. 2 HCSR04 Ultrasonic Sensors
 - a. Will be utilized to detect if there are 1 or 2 players playing the arcade game
2. 8x8 LED Matrix (<https://www.adafruit.com/product/902>)
 - a. Will be utilized to display the tic-tac-toe board

SERIAL INTERFACES

1. UART
 - a. Communication with Termite
2. I2C
 - a. Communication with LED

SOFTWARE DESIGN

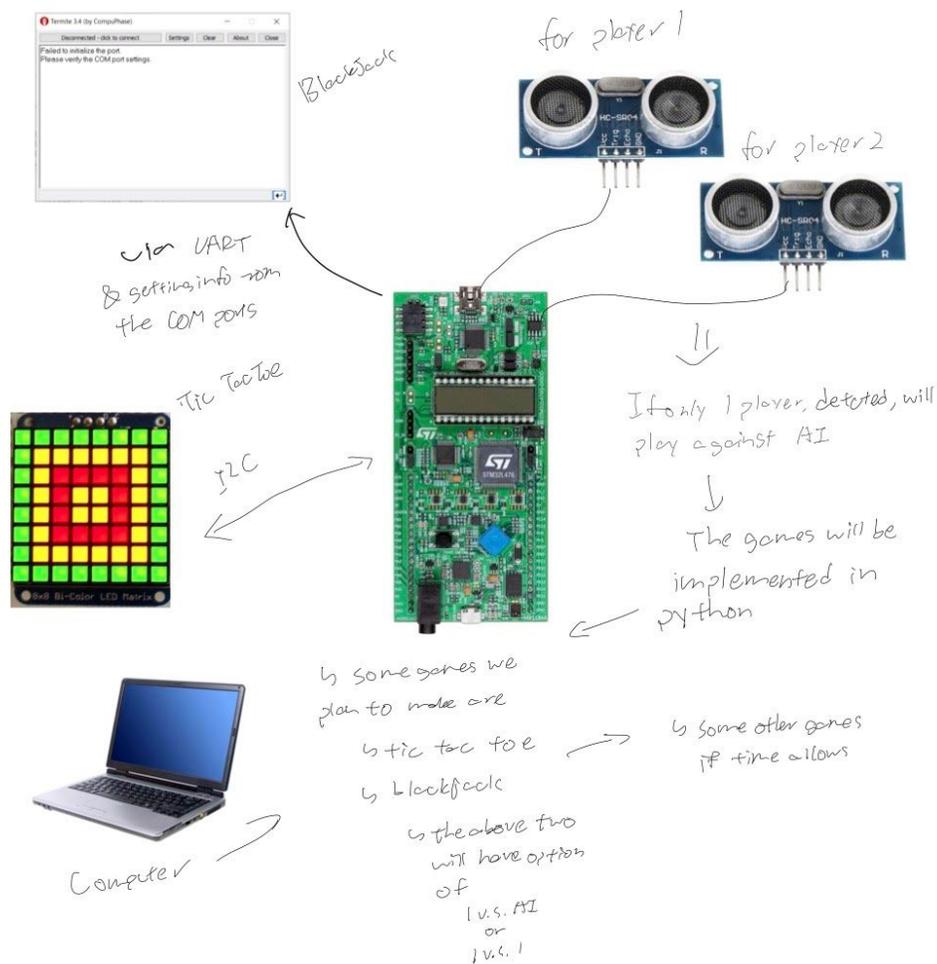
Tic-Tac-Toe

- One player: User will be able to play against an AI by inputting through the joystick on the STM32 board.
 - If the user wins, their color will flash on the LED Matrix display, and if the AI wins, the AI's color will flash on the LED Matrix display.
- Two players: Users will be able to play against each other by inputting through the joystick on their respective turns.
 - Each player will be assigned a color based on whether they decide to go first or second.
 - Winner will have their light flashing on the LED Matrix

BlackJack:

- Prior to the turn, the user will be able to make a bet by inputting the desired bet amount on the termite. This input will be recorded and kept.
- The user will be able to “hit” or “hold” based on the current cards being held. These actions will be done through certain key presses where case would not matter.
- Will keep track of all users hands and bet amounts
 - If 1 player, will keep track of player’s info and the AI’s
 - If 2 player, will keep track of both players’ info
- Will keep track of each player’s money held to determine if they can continue playing / can make the inputted bet amount

BLOCK DIAGRAM



GOALS

1. If one player sits in front of the ultrasonic sensor, they will play against an AI and if two players are seated, they can play against each other.
2. Once one or two players are seated, they will get the option to play either tic-tac-toe or blackjack
3. If they choose to play tic-tac-toe, the LED Matrix will flash to begin the game
 - a. If there is one player, they will play the AI and the winner's color will flash.
 - b. If there are two players, they will play until a winner is decided. The winner's color will flash on the matrix
4. If they choose to play Blackjack, the Termite terminal will indicate the start of the game.
 - a. If there is one player, they will play against the dealer.
 - b. If there are two players, they will play against each other and the dealer.
 - c. User(s) will be able to determine whether to "hit" or "hold" based on certain key presses on the keyboard.
 - d. Blackjack will be programmed with simple Blackjack rules.
5. Ideally, if the player(s) walk away, we will terminate the game.

GROUP RESPONSIBILITY

We are both responsible for hardware and software setup for the project. This includes working with the peripherals, interrupts, software development for the games, and the serial interface protocols.