## Team Name:

# List of team members (5 maximum): Brianna Dewey, Allison Gentry, Leo Herman, Kyle Tomasula, Rayna Choi

## **Brief Project Description:**

This project aims to revolutionize the classic laser tag experience by creating a portable system that can be played anywhere. The core components include laser blasters paired with wearable vests equipped with sensors to detect hits. These vests not only register hits but also collect data on player performance, health status, and in-game statistics. A key feature of the system is its integration of electronic warfare elements, such as signal jamming, which temporarily disables opponents' blasters, as well as proximity detection. There will be options of individual play (everyone for themselves) or team play, and teams will be indicated by different colored LEDs that coordinate with teammates. Additionally, the system will include standalone targets for solo practice, where players can hone their accuracy. The game will feature a scoring system to drive competition and fun.

#### Features demonstrate on Demo Day:

List the **top 5** features that you are planning on demonstrating at the end of next semester.

- Sending and receiving signals (potentially IR or ultrasonic?)
- Accurate directional receiving
- Responses to the received signal (blinking lights, audio output)
- Wireless communication between player modules
- Game logic (score tracking for hits, misses)
- Manufactured laser blaster with working trigger

# **Technology Analysis:**

There will likely be several technologies that will be necessary to complete your project. List any key technologies and show that they are available, affordable, and accessible. Note that each team's budget will be on the order of \$500 (depending on the final number of teams, team size, etc.). By accessible, I want you to show that you can reasonably incorporate the technology into your design.

<u>Game logic</u>: **Microcontrollers** will be needed to track scores or other game mechanics (power-ups?) and will need to communicate with each other to signal things such as game end and player health. It will also be used to trigger the transmitter to send pulses

when a shot is fired and will read information / process signals from the receiver. Also will implement **wireless communication** to allow coordination of multiple modules.

<u>Team and individual modes</u>: There will be options of individual play (everyone for themselves) or team play. Teams will be indicated by different colored LEDs in the blaster that coordinate teammates with one another. In individual mode, each player will have their own color.

<u>Transmitting and receiving signals</u>: This would generally include a **transistor amplifier**, a **high-power IR LED or Ultrasonic Transmitter and Receiver**, and potentially **lenses** for enhanced directionality. The receiving side would include an **IR-receiving module and a power regulation module** 

<u>Signal processing</u>: Aim to integrate elements of electronic warfare, such as proximity detection (friendly vs non-friendly players nearby) and signal jamming, which would temporarily disable opponents' blasters.

<u>User interaction</u>: **OLED scree**n to display player health, **LEDs** and **speakers** to signify when a player has been hit, and buzzers for haptic feedback for hits.

<u>Power supply</u>: Rechargeable **battery pack** or replaceable batteries, to power components. **Voltage regulators** to ensure stable voltage to components.

<u>Design considerations</u>: May try to format the module as one item that both transmits and receives such that the laser blaster has transmitter and receiver inside OR could have the receiver hardwired to the laser blaster but located on a vest instead of inside the blaster.

<u>Central hub (possibly)</u>: There would be a central hub that all of the microcontrollers communicate back to and it would have the functionality of setting a timer for the game, a button to start the game, as well as keep track of the score and display the score at the end of the game.