(Proposed) Design Solution • Feasible: Solution is practical considering various constraints (e.g., time, cost, complexity, resources). • Informed: Solution has evidence of merit (e.g., literature, rapid prototyping/testing) and addresses the problem. • Creative: Solution is elegant and appropriately engineered. Considers multiple factors (e.g., technological, economic, social, environmental, human).

RTanks Implementation:

**Game Design:**

The game will feature multiple raspberry pi’s as unique units that are able to “shoot” lasers at each other with sensors to detect when one is shot.

**RTank Unit:**

Each RTank will have:

1 x Raspberry Pi

2 x 5v stepper motors

1 x 5v Servo motor

1 x 5v Battery pack with wattage above 15.3W

1 x Infrared emitter

1+ Infrared receiver

4 x wheels

1 x 3D printed shell

Wiring

The RTank will have a car design with the wheels attaching to the 3D printed shell. Inside the shell will be the battery, raspberry pi, and the stepper motors. One stepper motor will act as a motor while the servo motor is used precision steering. The second stepper motor will be position at the top of the vehicle, with its shaft attached to rotate around the x-axis. Attached to the shaft will be the infrared emitter, which acts as the cannon, and the infrared receiver(s). The infrared receivers will used to detect when the other RTank has had a hit it. The RTanks will then be controlled through the raspberry pi’s Bluetooth connection.

**Smartphone Application & Database:**

The smartphone application with be created using Flutter in the Dart language. It will have several different pages. The primary page will be a create account/login screen. The login options include accounts create using the create account function and google accounts. The information of the users will be stored in the database. The second page will have a start game and a scoreboard button. The scoreboard screen will have the leaderboard with the win-loss records of all the players. This information will also be stored in the database. The start game page will have a select RTank page (i.e. RTank 1 or RTank 2). When all tanks have been selected the game will begin. T

The game controller interface will have digital joystick on the bottom left to control speed and direction. The bottom right hand corner will have three buttons, left right and fire. The current score will be displayed in the middle top, and a “heat bar” will be displayed at the top. The heat bar is a limit to how many shots can be fired in a time period.