

## 3 Project Plan

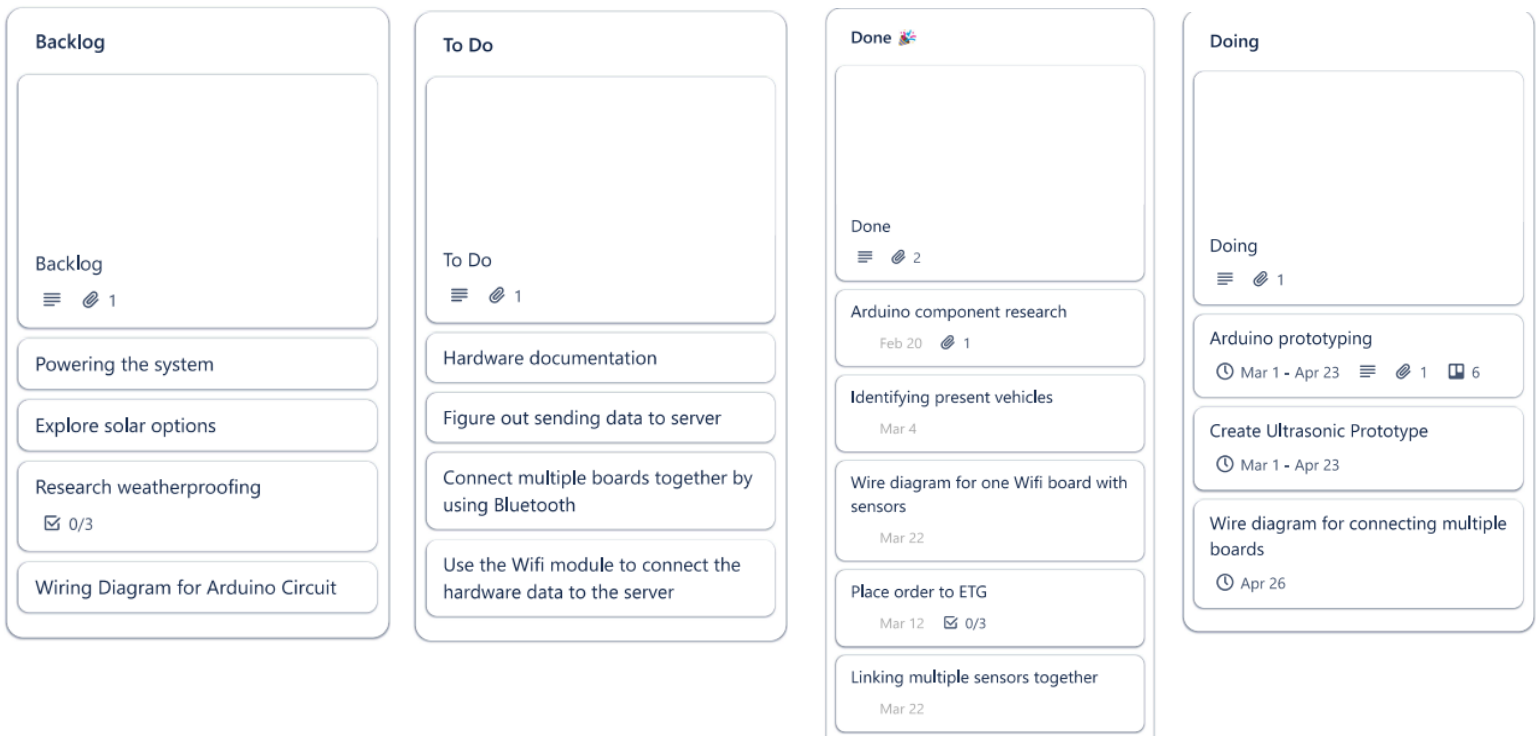
### 3.1 PROJECT MANAGEMENT/TRACKING PROCEDURES

Our team has decided to adopt the agile management style. As a group, we have decided it is best to meet twice a week to work on parts of our project while also meeting with the client/advisor once a week. While we do meet often, we do not have a structured set of tasks each time we meet and just tackle whatever we feel is most pressing that day. This works best for us because, between the hardware and software, many unexpected issues could arise that, if we were on a stricter timeline, would cause significant shifts in focus that would delay the project completion time.

To track our progress, we are using a software called Trello. This website allows us to organize our tasks into different categories based on the completion of the task. Trello allows specific team members to review and complete the assigned tasks as needed. This makes it easy for our team to see who should be doing what and who to contact if there is an issue. Additionally, we are organizing our files in Google Drive to stay orderly.

### 3.2 TASK DECOMPOSITION

As an agile team, we decompose tasks as small as possible; for example, when considering the overall task of researching information about the hardware, we broke it down into researching boards, sensors, how to power the boards, etc.



### 3.3 PROJECT PROPOSED MILESTONES, METRICS, AND EVALUATION CRITERIA

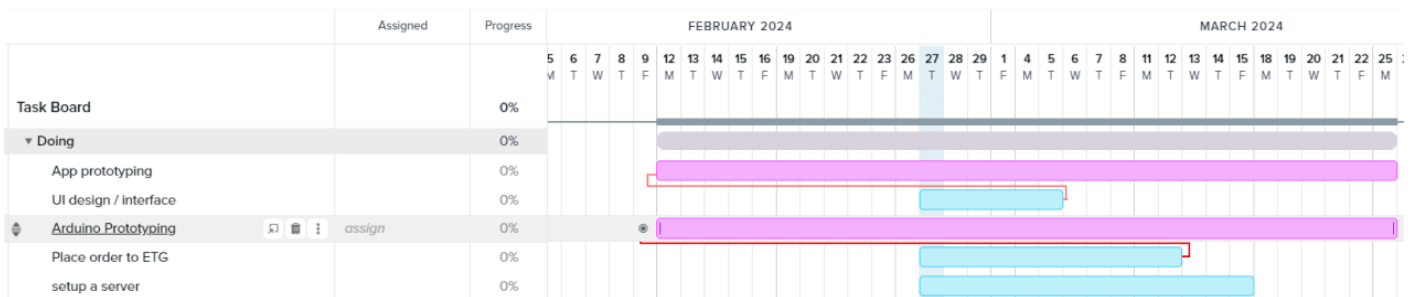
#### Hardware Team

One of the main upcoming objectives for the hardware team is to have a prototype by the end of the semester. We have broken this down into more achievable tasks to accomplish this goal. The first is to get the ultrasonic sensor working with Arduino. The success of this task will be measured by having LEDs connected to the Arduino that will light up if a vehicle is within 30cm of the ultrasonic sensors. The next task was to link multiple sensors to one board and get the system functioning for all the sensors. This is easily measured by getting the system to work with a standard test. Our goal at the end of this project is to know when a car has left a parking spot within 10 seconds of leaving. In other words, we want our program to have live data with a buffer of 30 seconds.

#### App Development Team

The app team has many milestones to accomplish in order to succeed in creating a usable application. For example, making the first functional prototype is the main upcoming objective for the app development team. This involves having a functional live application that displays our app requirements. We will first have to finalize our UI design by breaking this task into subtasks. This will be accomplished after discussing which design suits our needs. After choosing a UI design, we will program with React Native. Our first prototype will have multiple pages, so the creation of each page could be broken down into a subtask. This extrapolates our main idea of prototyping, as each page will require its prototyping phase.

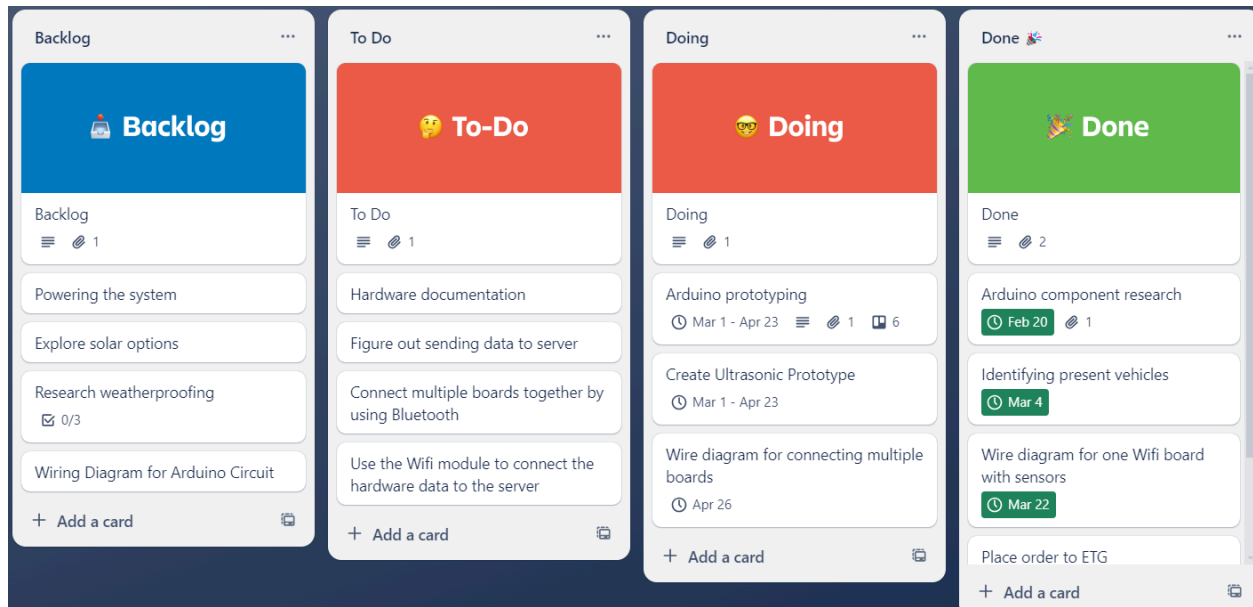
### 3.4 PROJECT TIMELINE/SCHEDULE



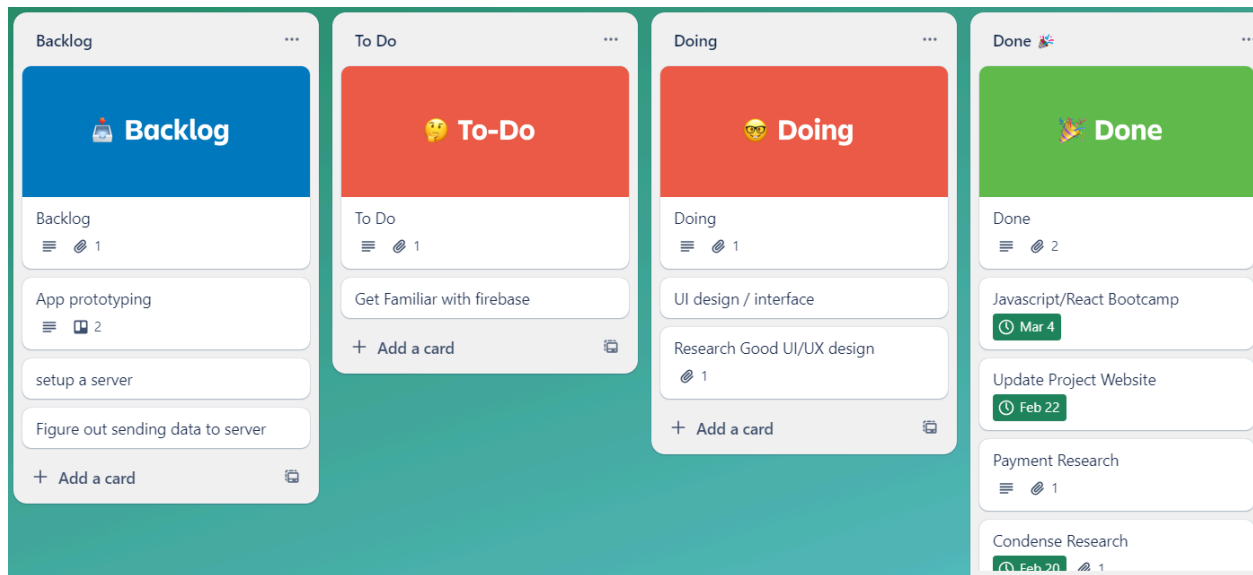
The image above shows our team’s Gantt chart. This is not one of our primary resources in scheduling. Instead, we use our team’s Trello board, as mentioned earlier.

For each sprint, we focus on 1-2 tasks that each group can work on throughout the week. Once the week is over, we discuss what task we got done, and issues we came across, and how those issues will impact the following week. Once the issues have been discussed and potential solutions brought forth. We talk about what we should get done in the following week. Coming up with a schedule weekly allows us to address new problems quickly rather, and continually improve our design as we become more knowledgeable about our project.

Hardware Trello



Software Trello



3.5 RISKS AND RISK MANAGEMENT/MITIGATION

To show examples of the risks attached to our tasks, we have included a few scenarios in the table below. Overall, our risks seem to be insignificant but not negligible. To mitigate these risks, we will become aware of all possible risks by documenting them before each task is started. This will decrease the probability of these risks occurring which will save us many hours and potential money as it is less likely for equipment to become damaged. If we come across a task that is too hazardous, we will reevaluate the task to lower the risk factor. For our project, the main risk is losing time to ventures that do not end up contributing to the end goal of our project.

Task	Risks	Probability
Learn the basics of React Native	No risks.	N/A
First app prototype	Spending many hours on an idea that does not satisfy our needs.	20%
Create hardware prototype	Similar to our other prototypes, we could lose many hours if the prototyping is unsuccessful.	35%
Testing hardware	In order to test the hardware in a real-world application, we risk damaging the equipment.	10%

### 3.6 PERSONNEL EFFORT REQUIREMENTS

Include a detailed estimate in the form of a table accompanied by a textual reference and explanation. This estimate shall be done on a task-by-task basis and should be the projected effort in the total number of person-hours required to perform the task.

Task	Hours Required
Design UI	5
First App Prototype	30
Arduino Prototype	30
Connect multiple Arduino boards together through Bluetooth	5
Hardware to Server	5
Documentation	3

### 3.7 OTHER RESOURCE REQUIREMENTS

The main resource for completing our project is hours. With the volume of our school work, it is difficult to allot time for this project. Additionally, it will be necessary for us to acquire an Apple Developers subscription in order to publish our application to the App Store.