Executive Summary

Running has become quite the popular pastime. With this growth and popularity, more and more devices have come out to runners and track their progress. However, These products tend to be expensive. Products like Fitbit, Apple Watch, or other smart watch products could be too expensive for the everyday user. Our product, the Run buddy, aims to fill this gap. One of the biggest issues for runners is they want an easy way to see their progression. People like being able to see how they progress and how people around them are improving. Furthermore, some people have a hard time remembering that they have to work out and have a hard time keeping track of how far they run and how fast that run was.

Our group created a running band called RunBuddy similar to a Fitbit and an Apple Watch that can track various statistics while the user (everyday runners) run. The difference between our tracking band compared to the competition is that ours will have an application that will allow users to connect with one another. Furthermore, It has a companion app that will display those stats in various ways (graphs, tables, ect.). The system uses a Bluetooth Module microcontroller to transmit data wirelessly to the companion app. The team worked collectively to find applicable ideas on what components are going to be used for the project. The running band includes a heart rate sensor that monitors the user's heart rate and sends it to the user's connected device. Runbuddy also uses an accelerometer and the user's height to calculate how many steps and how far they have traveled in a given time frame. The app displays the user's information such as their heart rate and accelerometer data. The user is also able to connect to others through the app and see their data as well. Finally, The device will output its battery charge level to a small LED light.

During a period of 6 months, the team has put together a strategic plan to follow to design and build the product. The team has conducted almost weekly meetings to meet remotely on "discord" online platform and discuss the project's concerns. Each team member was assigned to at least two tasks/blocks to complete in this period. Throughout the weekly meetings, the team has thoroughly reviewed progress on the design. Below is the project timeline of our project that includes 4 sections which are electrical, mechanical, and software development and system integration.

PROJECT	ASSIGNED TO	PROGRESS	START	DAYS	END	BUDGET
Tactile Time logging						
Electrical Development						
Researching compents	Alex	100%	11/2/2021		12/18/2021	
First prototype(non Final PCB)	Alex and Ali	100%	11/8/2021		12/19/2021	
Prelimenary sensor testing	Ali	100%	1/4/2022		2/10/2022	
Mechanical Development						
Enclosure design research	Ali	100%	11/11/2021		1/30/2022	
Software Development						
Flutter Experimenting	Hudson and Ryan	100%	11/3/2021		1/3/2022	
App	Ryan	100%	1/13/2022		4/25/2022	
Bluetooth data receiving	Ryan	100%	1/13/2022		2/28/2022	
User Interface	Hudson	100%	1/14/2022		4/30/2022	
Software Finalization	Hudson and Ryan	100%	3/1/2022		4/25/2022	
Researching Software Framework	Hudson and Ryan	100%	10/24/2021		12/5/2021	

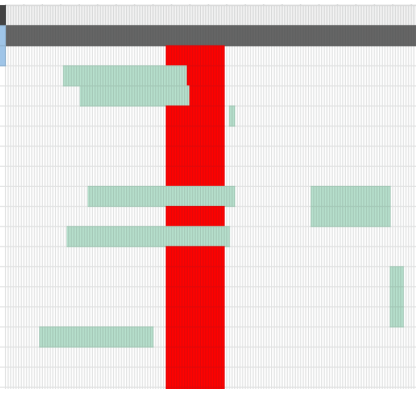

Figure 1: Fall timeline

PROJECT	ASSIGNED TO	PROGRESS	START	DAYS	END	BUDGET
Tactile Time logging	**Tactile Time logging**					
Electrical Development	**Electrical Development**					
Battery Charger	Alex	100%	1/21/2022		3/19/2022	
Battery LED indicator	Alex	100%	1/2/2022		1/21/2022	
Heart Rate Sensor	Ali	100%	1/2/2022		1/21/2022	
Accelerometer	Ali	100%	1/21/2022		3/19/2022	
Final PCB	Alex	100%	3/15/2022		4/3/2022	
Software Development						
Flutter Experimenting	Hudson and Ryan	100%	11/3/2021		1/3/2022	
App	Ryan	100%	1/13/2022		4/25/2022	
Bluetooth data receiving	Ryan	100%	1/13/2022		2/28/2022	
User Interface	Hudson	100%	1/14/2022		4/30/2022	
Software Finalization	Hudson and Ryan	100%	3/1/2022		4/25/2022	
App Interop	Ryan	100%	2/20/2022		3/19/2022	
System Intergration						
System Validation: Heart Rate	All	100%	1/13/2022		3/6/2022	
System Validation: Battery Life	All	100%	1/13/2022		3/6/2022	

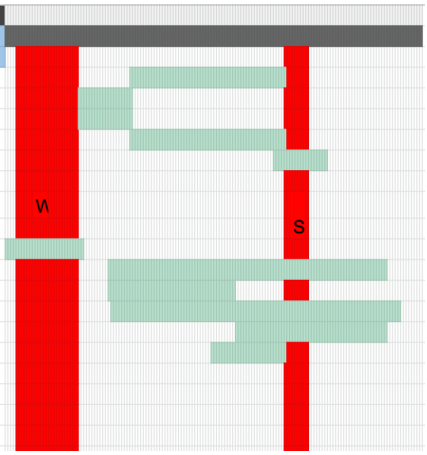

Figure 2: Winter timeline

PROJECT	ASSIGNED TO	PROGRESS	START	DAYS	END	BUDGET
Tactile Time logging						
Electrical Development						
Final PCB	Alex	100%	3/30/2022		4/10/2022	
Solder Parts on PCB	Alex	100%	4/15/2022		5/3/2022	
Hardware testing On PCB	Alex	100%	2/11/2022		4/10/2022	
Mechanical Development						
Enclosure design	Ali	100%	2/10/2022		4/10/2022	
Software Development						
Flutter Experimenting	Hudson and Ryan	100%	11/3/2021		5/3/2022	
App	Ryan	100%	1/13/2022		5/3/2022	
Bluetooth data receiving	Ryan	100%	1/13/2022		5/3/2022	
User Interface	Hudson	100%	1/14/2022		5/3/2022	
Software Finalization	Hudson and Ryan	100%	3/1/2022		5/3/2022	
System Intergration						
System Validation:Heart Rate	All	100%	3/30/2022		5/3/2022	
System Validation:Bluetooth	All	100%	3/31/2022		5/3/2022	
System Validation:Drop Test	All	100%	4/1/2022		5/3/2022	
System Validation:Accelerometer	All	100%	4/2/2022		5/3/2022	
System Validation: Information Display	All	100%	4/3/2022		5/3/2022	
System Validation:Alters	All	100%	4/4/2022		5/3/2022	
System Validation:Drop Test	All	100%	4/5/2022		5/3/2022	
System Validation:Drop Test	All	100%	4/6/2022		5/3/2022	

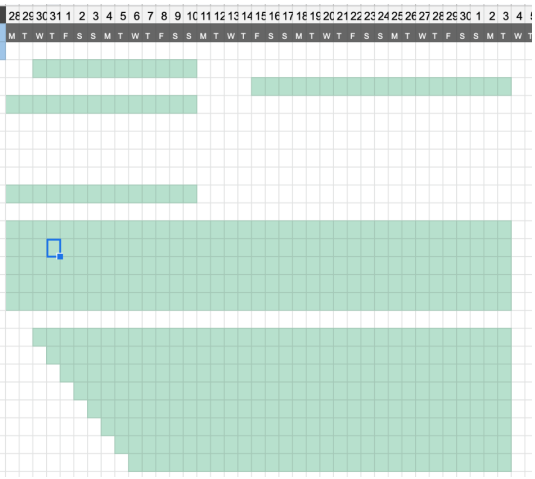

Figure 3: Spring timeline

The team has experienced many challenges throughout this period. One of the team members got into a car accident and he wasn't able to engage as much for a period of time. This increased the load work and pressure on the hardware side of the project. As a team, we learned that we should always ask for help and actually point out for help during such occasions. Moreover, as a team, we learned to communicate more effectively and meet more often in person as we understood that meeting physically can reduce the risk of wrong measurements. Finally, all team members have extensively gained experience in working in such situations. Skills such as communication, critical thinking, and time management were learned and practiced through the project.