

# **Sprint 1 - Endurance Design Document**

**November 9, 2021**

***Kevin/Jodan/Jack***

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## **1. Executive Summary**

### ***1.1 Project Overview***

This first sprint of endurance will make our robot successfully travel around the periphery of HH208. A clear path will be provided from each outside wall. Robot will start from the yellow square with blue tape. The intended audience for this project is for the professor, fellow classmates and possibly some online viewers via online video to watch our robot perform the first sprint of endurance.

### ***1.2 Purpose and Scope of this Specification***

The purpose and the scope of this specification is to make the robot start from the yellow square with blue tape robot should start with the green light and speak ready set go and stop with the red light and speak I'm done, and I need water robot must travel to each of the yellow floor tiles and turn right at the center of each tile robot must return to its starting location.

#### **In scope**

This document addresses requirements related to phase 3 of sprint:

- Group members will meet on a consistent basis and go over project details.
- Test block code and modify the algorithm as we go.
- Each group member gets equal amount of work.

#### **Out of Scope**

The following items in phase 3 of Sprint are out of scope:

- Meeting everyday due to different schedules.
- Testing the robot as often as we would like because room availability
- Working on the project during class time

## **2. Product/Service Description**

In this section, we describe the general factors that affect the product and its requirements. This section contains background information and not state specific requirements.

### ***2.1 Product Context***

This product does not relate to other products that we are aware of and is independent and self-contained. This project does interact with a variety of related systems like draw.io, Sphero, Microsoft excel, and Microsoft word. These relationships of these different platforms and applications all come together to help build the finished product of the robot completing its task. Excel and Word help to construct the project background and plans while draw.io and Sphero help the robot to carry out the plan and the projected requirements.

### ***2.2 User Characteristics***

Creating general customer profiles for each type of user who will be using our product. Profiles include:

- Kevin (group member)
- Jodan (group member)
- Jack (group member)
- Professor Eckert ( faculty/staff)

### ***2.3 Assumptions***

Assumptions that affect their requirements includes, robot battery life, room availability, user expertise and block code, group members being able to meet on a consistent basis.

### **2.4 Constraints**

Describing items that will constrain with the design options, including

- Bad connection
- Time management
- The tape being taken off or damaged around the course
- Group members computers having limited storage

### **2.5 Dependencies**

Dependencies that affect the requirements.

- This product will require daily Gantt chart information
- This product will require daily test chart data
- Algorithm needs to be finished before flow chart

## **3. Requirements**

- Our robot must successfully travel around the periphery of HH208 robot will start from the yellow square with blue tape. Robot should start with a green light and speak ready set go and stop with the red light and speak I'm done, and I need water. Robot must travel to each of the yellow floor tiles and turn right at the center of each tile robot must return to its starting location robot should not collide with any object as it goes around the room.
- Each group member will have an equal amount of work.
- Gantt chart includes all tasks activities staff members plan start duration actual start duration percentage complete.
- A Requirements table
- Flow chart from draw.io
- Block code from Sphero
- Test table
- Staffing plan
- System design document all sections in the outline will be completed (all information above will be embed in system design document.)
- Robot video
- GitHub repository

#### **Priority Definitions**

- Priority 1 – Staffing plans all group members must have titles and responsibilities. Start Gantt chart. Begin developing an algorithm and flow chart.
- Priority 2 – Test table requirements, algorithm and flow chart completed. Updated Gantt chart.
- Priority 3 – Block code is correct video and sensor data prove it. System design document complement. GitHub Repository has all correct information.

### **3.1 Functional Requirements**

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
Sprint_01	For the robot to speak “Ready set go” then moves straight without curving to the right or left	Difficult at first but with a couple changes to the block code it became easier	High	11/3/21	Approved
Sprint_02	Robot must turn right after going straight on the second tile	Was probably the easiest part	Medium	11/3/21	Approved

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<b>Req#</b>	<b>Requirement</b>	<b>Comments</b>	<b>Priority</b>	<b>Date Rvwd</b>	<b>SME Reviewed / Approved</b>
Sprint_03	Robot goes straight after second tile	Difficult but possible	High	11/5/21	Approved
Sprint_04	Robot goes to third tile on the floor then turns right at tile on floor	None	Low	11/3/21	Approved
Sprint_05	Robot goes to fourth tile on floor then robot turns right	Went straight because the block code was correct from the steps before	High	11/5/21	Approved
Sprint_06	Robot then stops at the first tile where it started	Was hard to get the exact location	High	11/5/21	Approved
Sprint_07	Robot lights up red	None	Low	11/3/21	Approved
Sprint_08	Robot speaks "I'm done, and I need water"	None	Low	11/3/21	Approved
Sprint_09	End	Finished requirements robot completed its task	High	11/5/21	Approved

## **3.2 Security**

### **3.2.1 Protection**

Specifying the factors that will protect our system from malicious or accidental access, modification, disclosure, destruction, or misuse:

- We used basic passwords from our phones and computers to access documents and block code.
- Also for the zoom meetings we used passwords to enter.

### **3.2.2 Authorization and Authentication**

- We used our student ID numbers to authorize access to our work.

## **3.3 Portability**

- Our group used Jodan's iPhone to edit and build block code.
- Then we used email to share work with each other.
- We shared the robot among each other.
- Used email to share other work.

## **4. Requirements Confirmation/Stakeholder sign-off**

Include documentation of the approval or confirmation of the requirements here. For example:

<b>Meeting Date</b>	<b>Attendees (name and role)</b>	<b>Comments</b>
11/1/2021	Kevin SDD editor, Jodan Block code/Flowchart supervisor, Jack Algorithm/ Gantt Chart editor	Went over roles and assigned roles for the project.
11/3/2021	Kevin SDD editor, Jodan Block code/Flowchart supervisor, Jack Algorithm/ Gantt Chart editor	Started to test robot and block code
11/5/2021	Kevin SDD editor, Jodan Block code/Flowchart supervisor, Jack Algorithm/ Gantt Chart editor	Worked on individual work while finishing up robot performance.

## **5. System Design**

This section will provide all details concerning the technical design, staffing, coding, and testing the system

### ***5.1 Algorithm***

1. Robot starts at first tile
2. Robot lights up green
3. Robot speaks “Ready Set Go”
4. Robot goes to second tile on floor
5. Robot turns right at tile on floor
6. Robot goes to third tile on floor
7. Robot turns right at tile on floor
8. Robot goes to fourth tile on floor
9. Robot turns right at tile on floor
10. Robot goes to first tile on floor
11. Robot stops at first tile
12. Robot lights up red
13. Robot speaks “I’m done and I need water”

### ***5.2 System Flow***

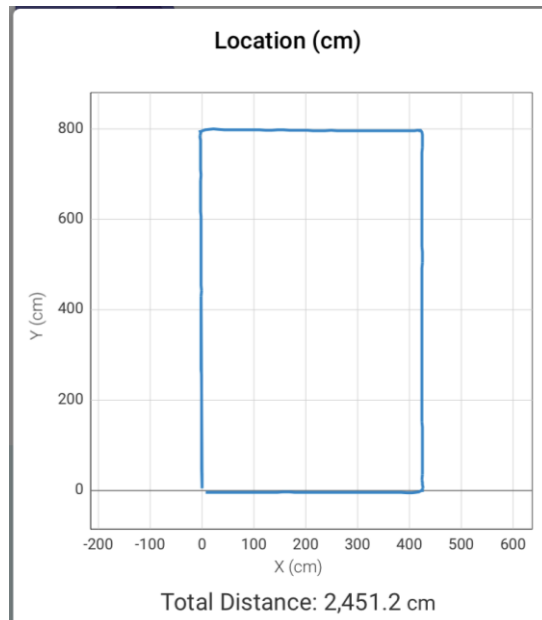
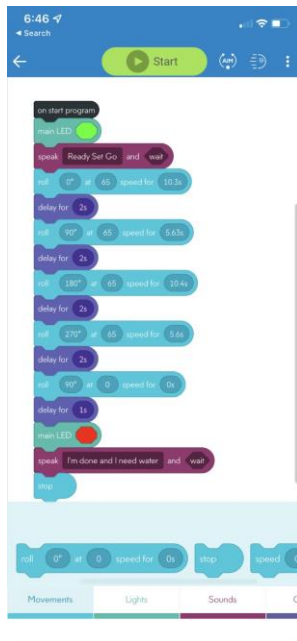
This link shows our Flowchart:

[Robotics Project Sprint 1 Flowchart.drawio.pdf](#)

### ***5.3 Software***

We Used the Sphero Edu app to help us develop and use block code for our project. This app allowed us to make our algorithm into block code directly in the app like the picture below demonstrates.

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### 5.4 Hardware

The hardware we used for this project was the Sphero robot being the main device, and then iPhones, and laptops.



### 5.5 Test Plan

Include a test plan showing all unit tests performed for this application, Include test rational, test date, staff member, pass/fail status

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
To make sure the robot can perform its task	11/3/21	Robot will fail our first test of the block code	Robot could not go straight	Kevin, Jack, Jodan	Fail
To make sure the robot can perform its task by going straight	11/3/21	Robot will go straight	Robot was almost perfect	Kevin, Jack, Jodan	Pass
To See if the robot can turn correctly	11/3/21	Robot will turn but stay straight	Robot went straight but kept going for too long	Kevin, Jack, Jodan	Fail
To make sure the robot can go straight and turn right on the third tile	11/3/21	Robot will go straight and turn right but have a hard time flowing the blue tape	Robot stayed straight but just a little off the blue tape	Kevin, Jack, Jodan	Pass
To Make sure the robot can follow the course correctly so we can take a video	11/5/21	Robot will be almost perfect on following its task	The Robot did everything correct	Kevin, Jack, Jodan	Pass

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Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail

#### ***5.6 Task List/Gantt Chart***

[Sprint 1 Endurance Gantt project plan Template.xlsx \(sharepoint.com\)](#)

#### ***5.7 Staffing Plan***

Insert a chart/table that depicts the roles and responsibilities of each team member that worked on this project

Name	Role	All Group members roles	Responsibility	Reports To
Kevin	SDD editor	Block code Gantt chart Sensor data diagram	To add information and edit the System Design Document while helping with Block code	All group members and professor
Jodan	Block code and Flowchart supervisor	Block code Gantt chart Sensor data diagram	To create a flow chart using draw.io following the algorithm. Recording the robot video while helping with Block code	All group members and professor
Jack	Algorithm/ Gantt Chart editor	Block code Gantt chart Sensor data diagram	To create a successful algorithm and overview the Gantt Chart while also helping develop block code	All group members and professor