

# **Sprint 1 - Endurance Design Document**

**October XX, 2019**

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## **1.Executive Summary**

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

This product is intended for children as a toy for them to play with.

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

The purpose of this project is to get the robot to go around the room in a square shape without going far off the line that was given.

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

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

This product is a toy that children can use with other toys. It is an independent because it does not rely on anything. The interface does not have a variety of related systems.

### **2.2User Characteristics**

The staff are Dan, Victor, and Ana. Each staff member is doing different jobs. All staff members are freshmen taking an Intro to Computer Science. Dan and Victor are the coding experts and Ana is the script.

### **2.3 Assumptions**

The main thing that might affect the requirements would be our expertise on how to code the robot to go in a perfect rectangle. The angles and calculation of the rotations have to be perfect.

### **2.4 Constraints**

The robot can only travel in a perfect rectangle without going off on any angles. Each time we run the robot we have to estimate how many degrees to add or take off from the code.

### **2.5 Dependencies**

This project required us to set up the robot facing the same direction or the angles would become different. This project also required us to complete one turn before we could complete the next turn.

## **3. Requirements**

### **3.1 Functional Requirements**

Req #	Requirement	Comments	Priority	Date Rvwd
ENDUR_01	Set green as main LED light	Perfect	3	10/26/2020
ENDUR_02	Speak 'Ready, Set, Go'	Perfect	3	10/26/2020
ENDUR_03	Roll at 0° at a speed of 111 for 6.1s.	Fluctuates from the path slightly	1	11/5/2020
ENDUR_04	Spin 0° for 2s.	No issues	1	10/29/2020
ENDUR_05	Roll 90° at a speed of 111 for 4s.	Fluctuates from path	2	11/5/2020
ENDUR_06	Spin 0° for 2s.	No issues	1	10/29/2020
ENDUR_07	Roll at 180° at a speed 111 for 5.9s.	Fluctuates from path slightly	2	11/5/2020
ENDUR_8	Spin 0° for 2s.	No issues	1	10/29/2020
ENDUR_09	Set Red as main LED light	Perfect	3	10/26/2020

ENDUR_09	Speak 'I'm done and I need water'	Perfect	3	10/26/2020

### **3.2Security**

We locked the robot in our room to make sure nothing happened to it

#### **3.2.1Protection**

We used sphero on a macbook that is password protected.

#### **3.2.2Authorization and Authentication**

We used sphero to run our code and test it.

### **3.3Portability**

We used sphero and the robot relied on the code from sphero to decide what will be activated.

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

Meeting Date	Attendees (name and role)	Comments
10/26/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended
11/5/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended
11/8/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended
11/10/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended

## 5. System Design

### 5.1 Algorithm

The robot will start off going straight. Then the robot will stop and turn 90 degrees from position and then go straight. Then the robot will stop and turn another 90 degrees and proceed to go straight. The robot will stop and turn another 90 degrees. Then it will proceed to go straight one more time until it stops. After it stops it will turn red and say "I need water".

### 5.2 System Flow

*Uploaded on Github*

### 5.3 Software

We are using sphero block code to make and test our robot.

### 5.4 Hardware

We are using laptops to program the robot. The robot we are using is a sphero bot.

### 5.5 Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
To have the beginning of the project complete.	10/26/20	Display green lights and speak 'Ready, Set, Go'	Displayed green lights and spoke 'Ready, Set, Go'	Victor Lemuz	Pass
To have the end of the project complete.	10/26/20	Display red lights and speak 'I'm done and I need'.	Displayed red lights and spoke 'I'm done and I need'.	Victor Lemuz	Pass
To set a foundation for future adjustments	10/26/20	Go around the rectangular course as close to the outline	Steered off course	Daniel Lawrie	Fail
To have the robot follow the outline for Side 1	10/26/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come	Green light appeared, 'Ready, Set, Go' was spoken, and the robot went at the speed and degree given to then	Daniel Lawrie	Pass

		at a stop at Corner 1.	come at a stop at Corner 1.		
To have the robot follow the outline for Side 1 and 2	10/26/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2.	Green light appeared, 'Ready, Set, Go' was spoken, and the robot went at the speed and degree given to then come at a stop at Corner 1, spun 90° and went at the speed given to come to a stop at Corner 2.	Daniel Lawrie	Pass
To have the robot follow the outline for Side 1, 2, and 3.	10/29/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2, and turn another 90° going at the speed given to come to a stop at corner 3.	Robot went completely off course, steered too far left at the beginning	Daniel Lawrie	Fail
To have the robot follow the outline for Side 1, 2, and 3.	10/29/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2, and turn another 90° going at the speed given to come to a stop at corner 3.	Robot steered too far right.	Victor Lemuz	Fail
To have the robot follow the outline for Side 1, 2, and 3.	10/29/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2, and turn another 90° going at the speed given to come to a stop at	Green light appeared, 'Ready, Set, Go' was spoken, and the robot went at the speed and degree given to then come at a stop at Corner 1, spun 90° and went at the speed given to come to a stop at Corner 2, then turned another 90° and came to a stop at Corner 3.	Pass	Daniel Lawrie

		corner 3.			
To have the robot complete the last side of the course.	11/5/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2, and turn another 90° going at the speed given to come to a stop at corner 3, to then finally turn 90° and go at the speed given to come to a stop with red lights displayed and speak 'I'm done and I need water'.	Robot followed all requirements but was off the course by a few degrees	Daniel Lawrie	Fail
To have the robot complete the last side of the course.	11/5/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2, and turn another 90° going at the speed given to come to a stop at corner 3, to then finally turn 90° and go at the speed given to come to a stop at Corner 4.	Robot followed all requirements and stayed on course.	Victor Lemuz	Pass
To have to robot complete the course.	11/5/20	Green light appears, 'Ready, Set, Go' is spoken, and the robot goes at the speed and degree given to then come at a stop at Corner 1, spin 90° and go at the speed given to come to a stop at Corner 2, and turn another 90° going at the speed given to come to a stop at corner 3, to then finally turn 90° and	Robot followed all requirements and completed the course	Victor Lemuz	Pass

		go at the speed given to come to a stop at Corner 4 with red lights and speak 'I'm done and I need water'.			
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5.6Task List/Gantt Chart

Uploaded on Github

5.7Staffing Plan

Name	Role	Responsibility	Reports To
Daniel Lawrie	Programmer	Programming	Victor Lemuz
Victor Lemuz	Project Manager	Review codes, equipment	Daniel Lawrie
Ana Levytska	Scribe	Documents and organizes work dates	Victor Lemuz Daniel Lawrie