

# **Sprint 3 - Agility Design Document**

**December 3, 2020**

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## **1.Executive Summary**

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

This product is intended for children as a toy for them to play with and could use to race other bots.

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

The purpose of this project is to meet the requirements given and to get the robot to follow the path and avoid all the obstacles. Then the robot will knock over as many pins as possible.

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

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

This product is a toy that children can use with other toys. It is 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 a different job. 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 follow the path and avoid the objects. Also, the way it moves after the ramp also has an impact on the robot.

### **2.4 Constraints**

The robot can only travel in a perfect path or it will hit the obstacles. Each time we run the robot we have to estimate how many degrees to add or take off the code. The speed is also very important because when it goes up the

### **2.5 Dependencies**

This project requires us to set up the robot facing the same direction or the angles would become different. This project also requires us to follow a path while avoiding objects. It also requires us to go fast enough that we can go up a ramp and knock down pins.

## **3. Requirements**

### **3.1 Functional Requirements**

Req #	Requirement	Comments	Priority	Date Rvwd
AGILI_01	First obstacle		1	12/1/2020
AGILI_02	Second obstacle		1	12/1/2020
AGILI_03	Third obstacle		1	12/2/2020
AGILI_04	square		1	12/2/2020
AGILI_05	pins		3	12/2/2020
AGILI_06				
AGILI_07				

AGILI_ 8				
AGILI_09				
AGILI_09				

### **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**

<b>Meeting Date</b>	<b>Attendees (name and role)</b>	<b>Comments</b>
12/1/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended
12/2/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended

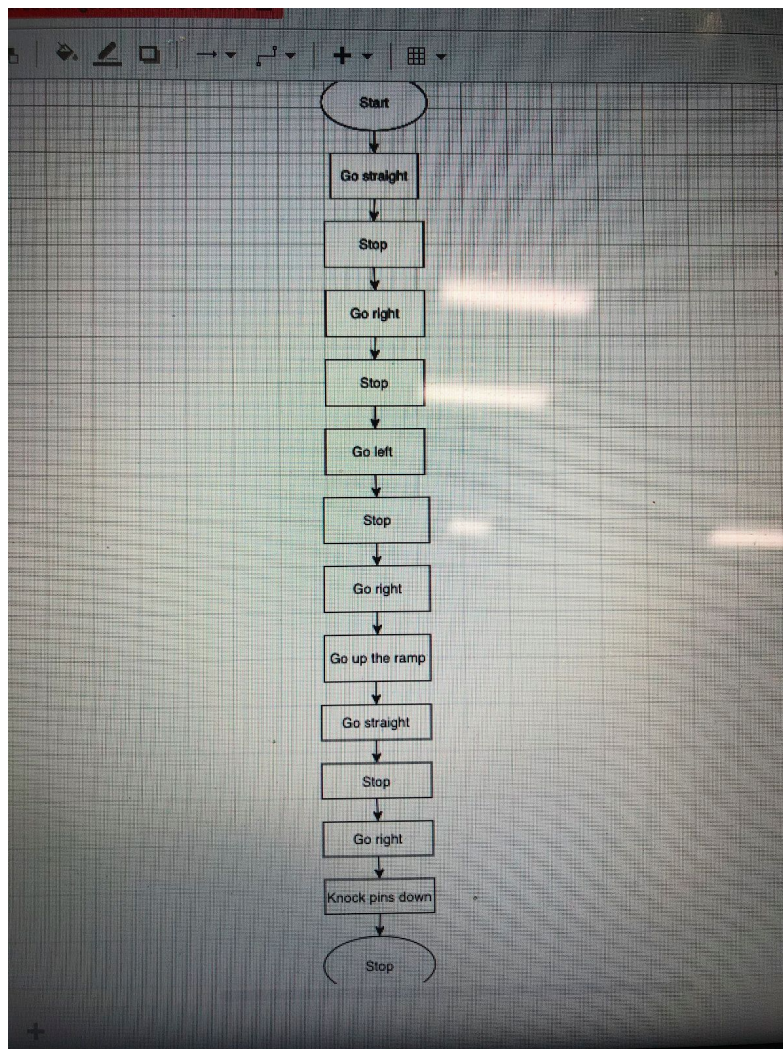
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## 5.System Design

### 5.1Algorithm

The first thing the robot needs to do is go straight without touching the object on the right and then turn right. Then it goes straight and avoids the object on the left and turns left. Then the robot avoids the object on the right and then turns right. The robot goes straight until it gets to the box and then goes in the shape of a box and stops on the other side. Then it goes straight and turns right. Lastly, the robot goes straight fast and attempts to knock down as many pins as possible.

### 5.2System Flow



### 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 get the robot past the first object.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn.	The robot successfully avoided the first object and made the 90° right turn.	Victor Lemuz	Pass
To get the robot past the first and second object.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn and continue straight to stop at the second object's right side to make a 90° left turn.	The robot successfully avoided the first object but collided with the second	Victor Lemuz	Fail
To get the robot past the first and second object.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn and continue straight to stop at the second object's right side to make a 90° left turn.	The robot successfully avoided the first object but collided with the second	Daniel Lawrie	Fail
To get the robot past the first and second object.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn and continue straight to stop at the second object's right side to make a 90° left turn.	The robot successfully went past the first two objects.	Daniel Lawrie	Pass
To get the robot past the first, second, and third object.	12/1/2020	The robot will go past the first object's left side and stop to	The robot successfully avoided the first three parts	Victor Lemuz	Pass

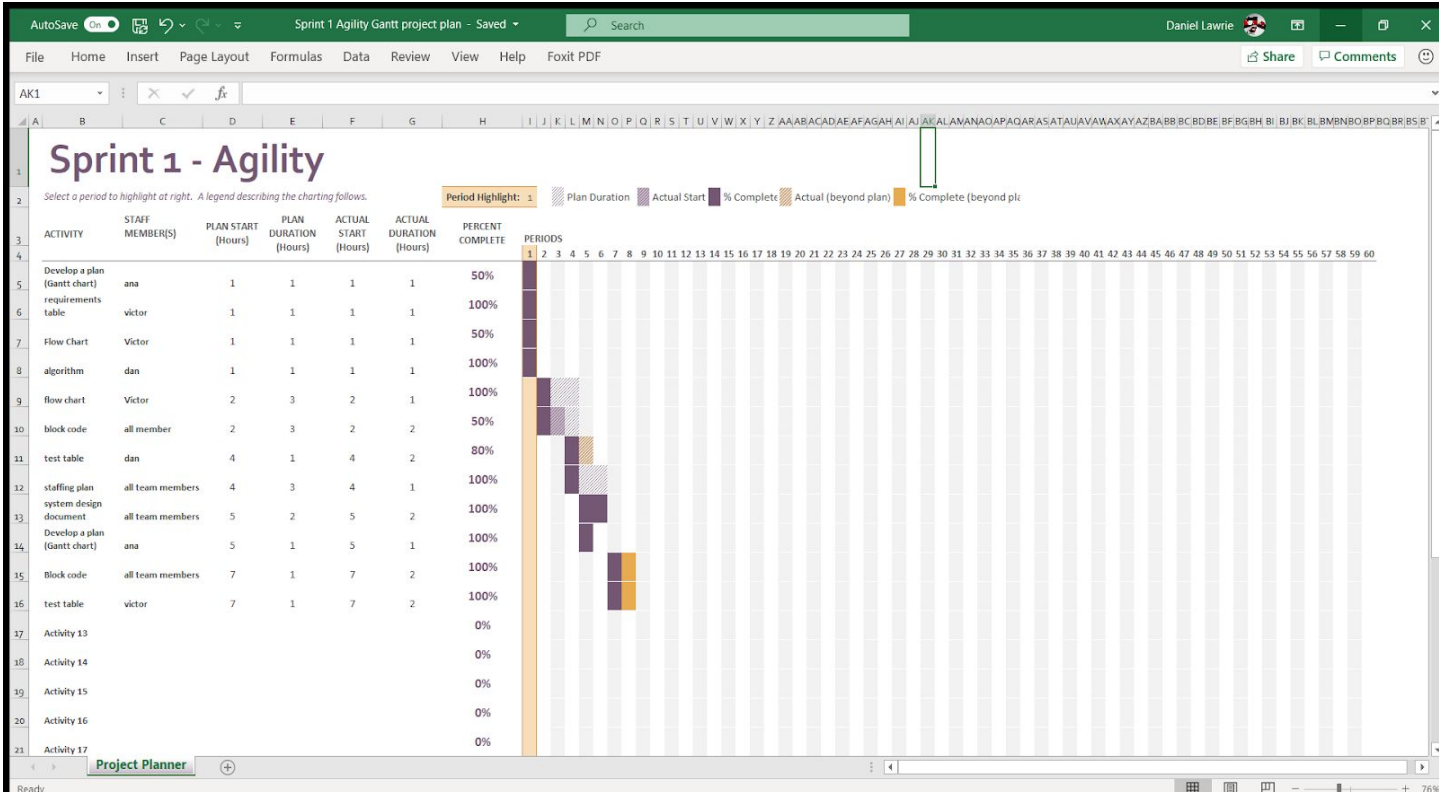
		make a 90° right turn, continue straight to stop at the second object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn.	of the course by avoiding the three objects following the course path.		
To get the robot past the three objects and go up the ramp.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn, continue straight to stop at the second object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn, then continue straight and go up the ramp to stop at the corner an make a 135° degree right turn	The robot successfully avoided all three objects by going through the course and went up the ramp to come to a stop at the last corner and turn 135° to the right.	Victor Lemuz	Pass
To get the robot to complete the course: (Following the course) avoid all three objects, go up the ramp, and knock as many pins down as possible.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn, continue straight to stop at the second object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn, then continue straight and go up the ramp to stop at the corner an make a 135° degree right turn, and finally continue straight to knock as many pins down possible.	The robot completed the majority of the course but missed the pins completely.	Victor Lemuz	Fail
To get the robot to complete the course: (Following the course) avoid all three objects, go up the ramp, and knock as many pins down as possible.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn, continue straight to stop at the second	The robot avoided all of the objects but went off course after the ramp.	Victor Lemuz	Fail

		object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn, then continue straight and go up the ramp to stop at the corner an make a 135° degree right turn, and finally continue straight to knock as many pins down possible.			
To get the robot to complete the course: (Following the course) avoid all three objects, go up the ramp, and knock as many pins down as possible.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn, continue straight to stop at the second object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn, then continue straight and go up the ramp to stop at the corner an make a 135° degree right turn, and finally continue straight to knock as many pins down possible.	The robot collided with the second object.	Victor Lemuz	Fail
To get the robot to complete the course: (Following the course) avoid all three objects, go up the ramp, and knock as many pins down as possible.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn, continue straight to stop at the second object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn, then continue straight and go up the ramp to stop at the corner an make a 135° degree right turn, and finally continue straight to knock as many pins down	The robot completed the majority of the course but knocked down 1 pin.	Victor Lemuz	Fail



		possible.			
To get the robot to complete the course: (Following the course) avoid all three objects, go up the ramp, and knock as many pins down as possible.	12/1/2020	The robot will go past the first object's left side and stop to make a 90° right turn, continue straight to stop at the second object's right side to make a 90° left turn, continue straight and stop at the third object's left side and make a 90° degree right turn, then continue straight and go up the ramp to stop at the corner an make a 135° degree right turn, and finally continue straight to knock as many pins down possible.	The robot completed the entire course by avoiding all three objects, went up the ramp, and knocked down 7/10 pins.	Victor Lemuz	Pass

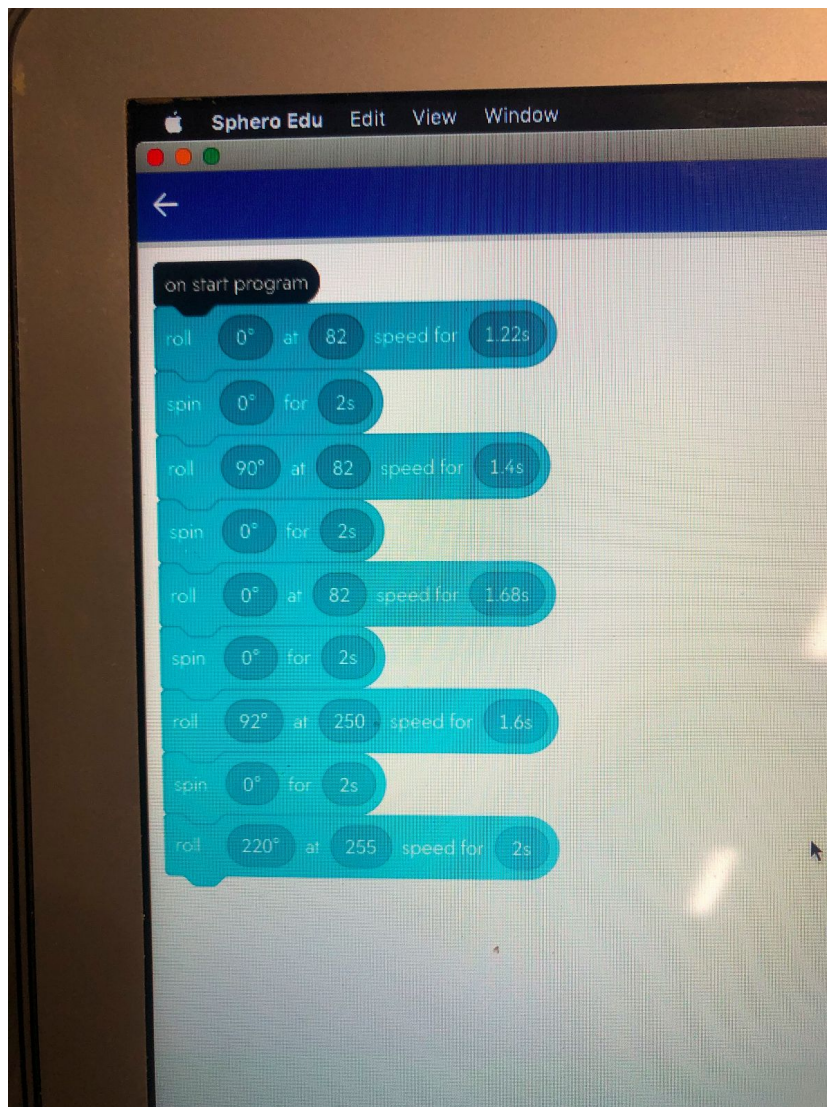
5.6Task List/Gantt Chart



## 5.7 Staffing 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

### Picture of Block Code:





**Picture of Sensor Data:**

