Sprint 2 - Accuracy Design Document

November 19, 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 have the robot complete the figure 8 course five times with the required effects at the completion of the cycles.

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.

2.3Assumptions

The main thing that might affect the requirements would be our expertise on how to code the robot to go in a perfect figure 8. The angles and calculation of the rotations have to be perfect or it would not seem like a figure 8.

2.4Constraints

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.

2.5Dependencies

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 have it turn around in a curved way

3.Requirements

3.1Functional Requirements

Req #	Requirement	Comments	Priority	Date Rvwd
ACCUR_01	**first loop**		**1**	**11/20/2020**
ACCUR_02	**Second loop**		**1**	**11/20/2020**
ACCUR_03	**First and second loop**		**1**	**11/20/2020**
ACCUR_04	**Repeat 4 more times**		**1**	**11/23/2020**
ACCUR_05	**Speak “I am the winner”**		**3**	**11/23/2020**
ACCUR_06	**Flash multicolor lights for 5 seconds**		**3**	**11/23/2020**
ACCUR_07				
ACCUR_ 8				
ACCUR_09				
ACCUR_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

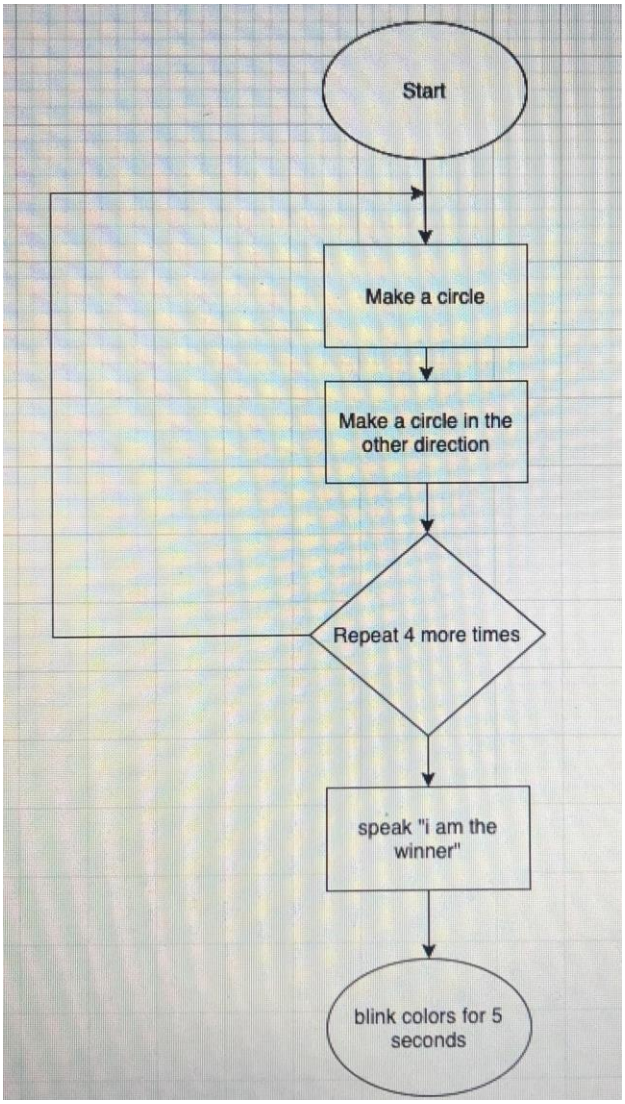
Meeting Date	**Attendees (name and role)**	**Comments**
11/19/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended
11/20/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended
11/23/2020	Dan(Programmer), Victor(Project Manager), Ana(Scribe)	Everyone attended

5.System Design

5.1Algorithm

The robot first needed to go in a circle to the left of the starting position. Then when the robot hit the starting point it would do another circle to the right of the starting point. After it reached the starting point again, it would repeat that code 4 more times. Then the robot will speak “I am the winner” and will blink lights for 5 seconds.

5.2System Flow



5.3Software

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

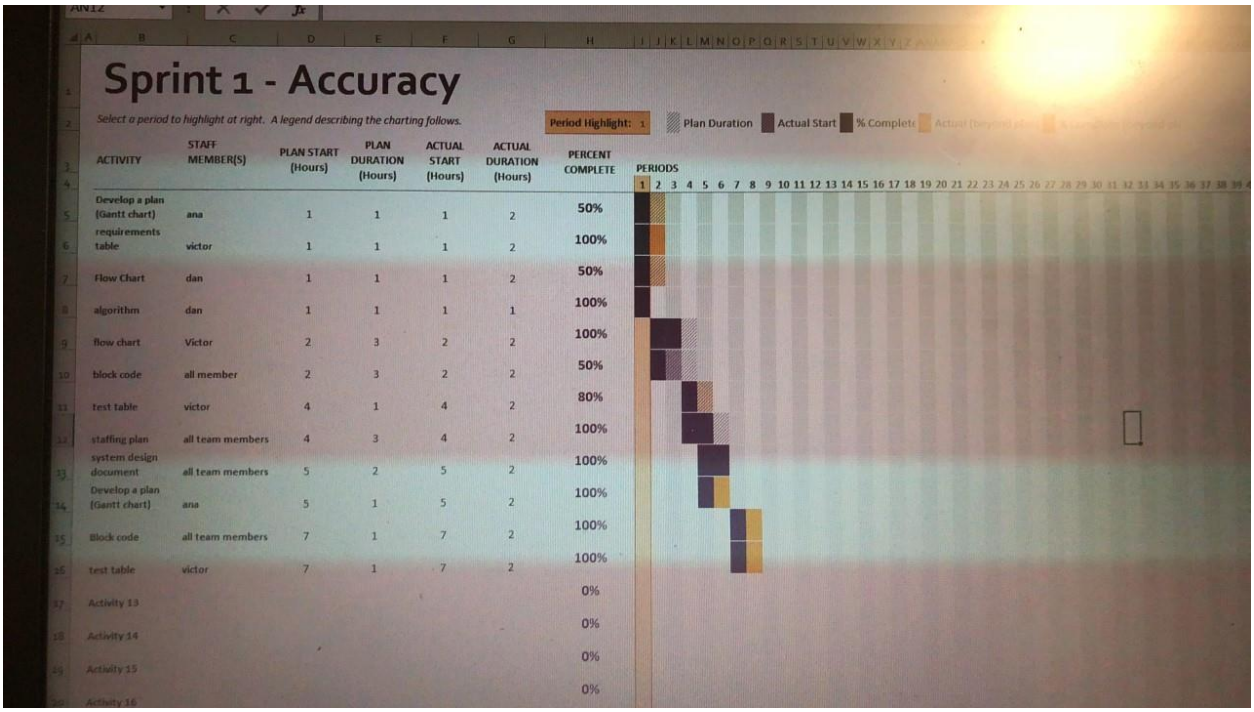
5.4Hardware

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

5.5Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
To start the project	**11/20/2020**	**The robot goes around one circle**	**Went in an oval shape.**	**Daniel**	**Fail**
To start the project	**11/20/2020**	**The robot goes around one circle**	**Went in a circle, completing half of one cycle.**	**Daniel**	**Pass**
To have the robot go around the figure 8 course.	**11/20/2020**	**The robot goes around the figure 8 course once.**	**Steered off course, went in and out of the lines.**	**Victor**	**Fail**
To have the robot go around the figure 8 course.	**11/20/2020**	**The robot goes around the figure 8 course once.**	**Robot went around the figure 8 completing one full cycle**	**Daniel**	**Pass**
Add a loop so the robot can go around the course 5 times.	**11/23/2020**	**The robot goes around the figure 8 course 5 times**	**Steered off course, went in and out of the course lines at the 2nd-5th cycle.**	**Daniel**	**Fail**
Add a loop so the robot can go around the course 5 times.	**11/23/2020**	**The robot goes around the figure 8 course 5 times**	**Steered off course in the first cycle.**	**Victor**	**Fail**
Add a loop so the robot can go around the course 5 times.	**11/23/2020**	**The robot goes around the figure 8 course 5 times**	**Stayed pretty close to the course throughout all 5 cycles.**	**Victor**	**Pass**
Add the speech and light requirements	**11/23/2020**	**Robot completes course with all requirements**	**Robot completed the course, made 5 full cycles around the figure 8 course, spoke “I am the winner”, and flashed multicolor lights for 5 seconds.**	**Daniel**	**Pass**

5.6Task List/Gantt Chart



Sprint 1 - Accuracy

Select a period to highlight at right. A legend describing the charting follows.

Period Highlight: 1 | Plan Duration | Actual Start | % Complete

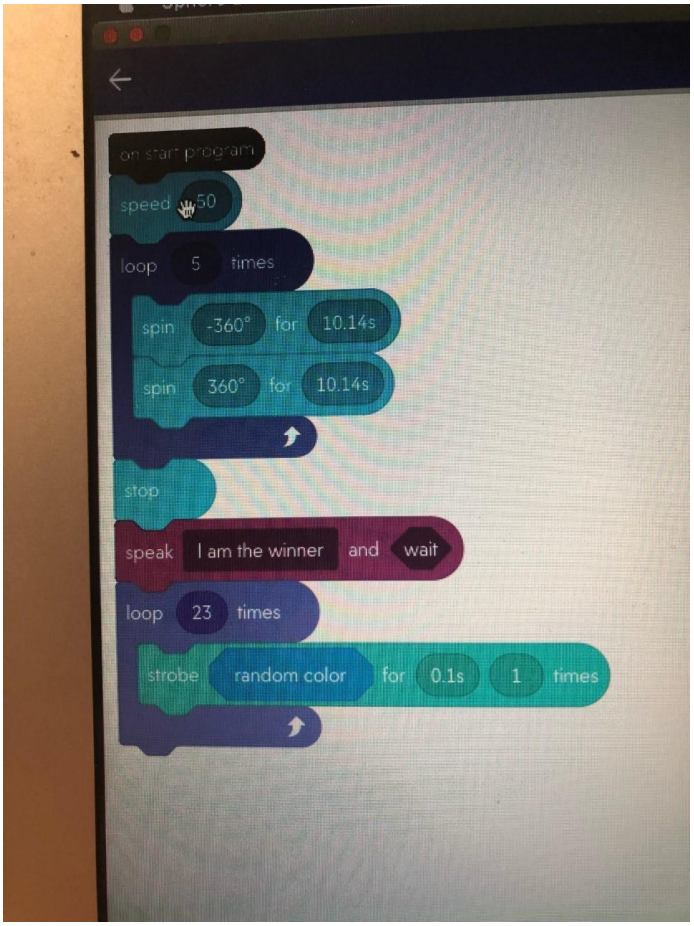
ACTIVITY	STAFF MEMBER(S)	PLAN START (Hours)	PLAN DURATION (Hours)	ACTUAL START (Hours)	ACTUAL DURATION (Hours)	PERCENT COMPLETE
Develop a plan (Gantt chart)	ana	1	1	1	2	50%
requirements table	victor	1	1	1	2	100%
Flow Chart	dan	1	1	1	2	50%
algorithm	dan	1	1	1	1	100%
flow chart	Victor	2	3	2	2	100%
block code	all member	2	3	2	2	50%
test table	victor	4	1	4	2	80%
staffing plan	all team members	4	3	4	2	100%
system design document	all team members	5	2	5	2	100%
Develop a plan (Gantt chart)	ana	5	1	5	2	100%
Block code	all team members	7	1	7	2	100%
test table	victor	7	1	7	2	100%
Activity 13						0%
Activity 14						0%
Activity 15						0%
Activity 16						0%

PERIODS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

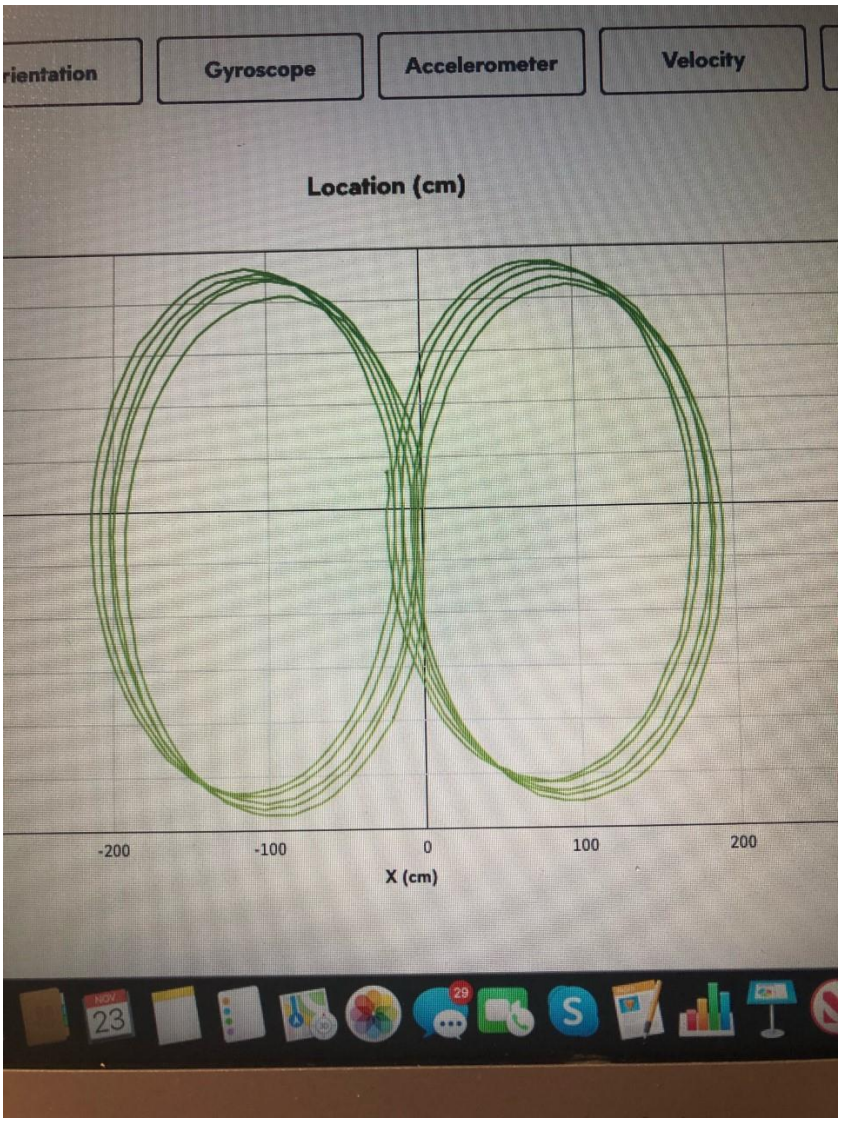
5.7Staffing Plan

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

Picture of Block Code:



Picture of Sensor Data: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Gyroscope
Accelerometer
Velocity
Location (cm)
-200
-100
0
100
200
X (cm)
NOV
23
29