Sprint 1 - Endurance Design Document

November 12, 2020

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1. Executive Summary

1. *Project Overview*

This product is intended to test our knowledge on software development. It is specifically designed to be an early project where we can gain a better understanding at coding and the development process as a whole.

2. *Purpose and Scope of this Specification*

In scope

Our project is meant to control a machine through software only.

Out of Scope

Our project can not obey other commands, as we develop its code the robot responds only to management.

2. Product/Service Description

Our product is designed for the sole purpose of overcoming environmental obstacles. In this first instance, the robot must navigate the perimeter of HH208, while at the same time, say a few phrases. These requirements were outlined by our instructor.

1. *Product Context*

Compared to other products, ours is very easy to use. The specific block code was created in an app called Sphero Edu. In order for the user to use our particular code, they will need to download the app and look up the code we created. The user then simply selects the “Run” option at the top of the screen.

2. *User Characteristics*

- Student/faculty
- Experience: Beginner level
- Technical expertise:
    - Must know how to navigate the Sphero Edu application on either Windows/IOS

3. Assumptions

- User has some understanding/knowledge of navigating the Sphero Edu app
- User possesses the Sphero robot
- User has some basic knowledge on the type of block code consistent with the Sphero app
- User has a computer/phone

4. Constraints

- Must have IOS 10.0 or higher
- Must have space available for the robot to operate.
- Must have a Sphero account to access the code.
- Must have available space (67.4 MB of existing storage).
- Smooth surface is needed for the robot path.

*5. **Dependencies***

- Requires space for occasional updates to the applications
- Requires specific version of the Sphero robot (SPRK +)

3. Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
ENDUR_01	Travel in a figure 8 shape	A bit of difficulty here regarding making the robot stop at the starting point	1st	11/23	11/23
ENDUR_02	Speak, “I am the Winner” and wait	Some trouble when it came to having the robot speak the last term, easily fixed with trial and error.	2nd	11/23	11/23
ENDUR_03	Flash 5 different colors within the duration of 5 seconds	Lights were going from green to blue immediately instead of fading between 5 different colors	3rd	11/23	11/23
ENDUR_XX					

Security

- All users are protected by the Sphero edu app’s data protection software
- Users can only access code with their private account
- Uses Bluetooth
    - Can be accessed and remembered by the owners ios or windows device

Authorization and Authentication

User must link their device with the robot via bluetooth to be authorized access

Portability

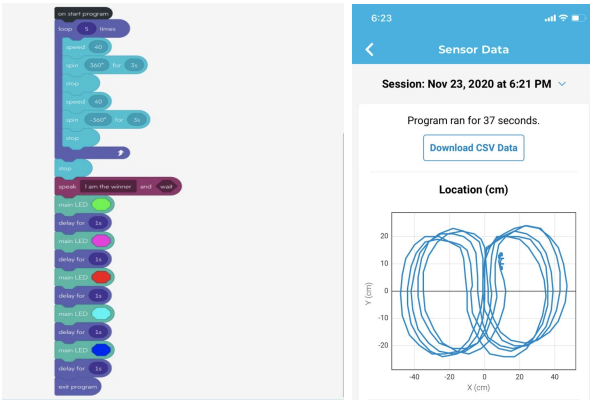
- Robot can be used across multiple platforms, as long as it supports bluetooth
- Sphero app must be loaded on such device
- Code can be pulled up quickly via the Sphero app

4. Requirements Confirmation/Stakeholder sign-off

Meeting Date	Attendees (name and role)	Comments
11/23/2020	Connor Przelomski - SDD author / project director Vincent Loretta - Robot code author	Completed every project requirement except • Finish Gantt chart • Finish SDD • Flow chart not completed • Video not recorded
11/23/2020	Connor Przelomski - SDD author / project director Vincent Loretta - Video recorder / robot user / Flowchart maker	Confirmed…… • Finished Gantt chart • Finished SDD • Flow chart completed • Video recorded

5. System Design

1. *Algorithm/Sensory Data*



This algorithm encompasses a loop, so the robot will perform a figure 8 shape 5 times in a row before speaking, “I am the Winner.” The robot then flashes 5 different colors over the duration of 5 seconds (1 second for each color). The colors are green, pink, red, cyan, and dark blue, respectively. The program then ends.

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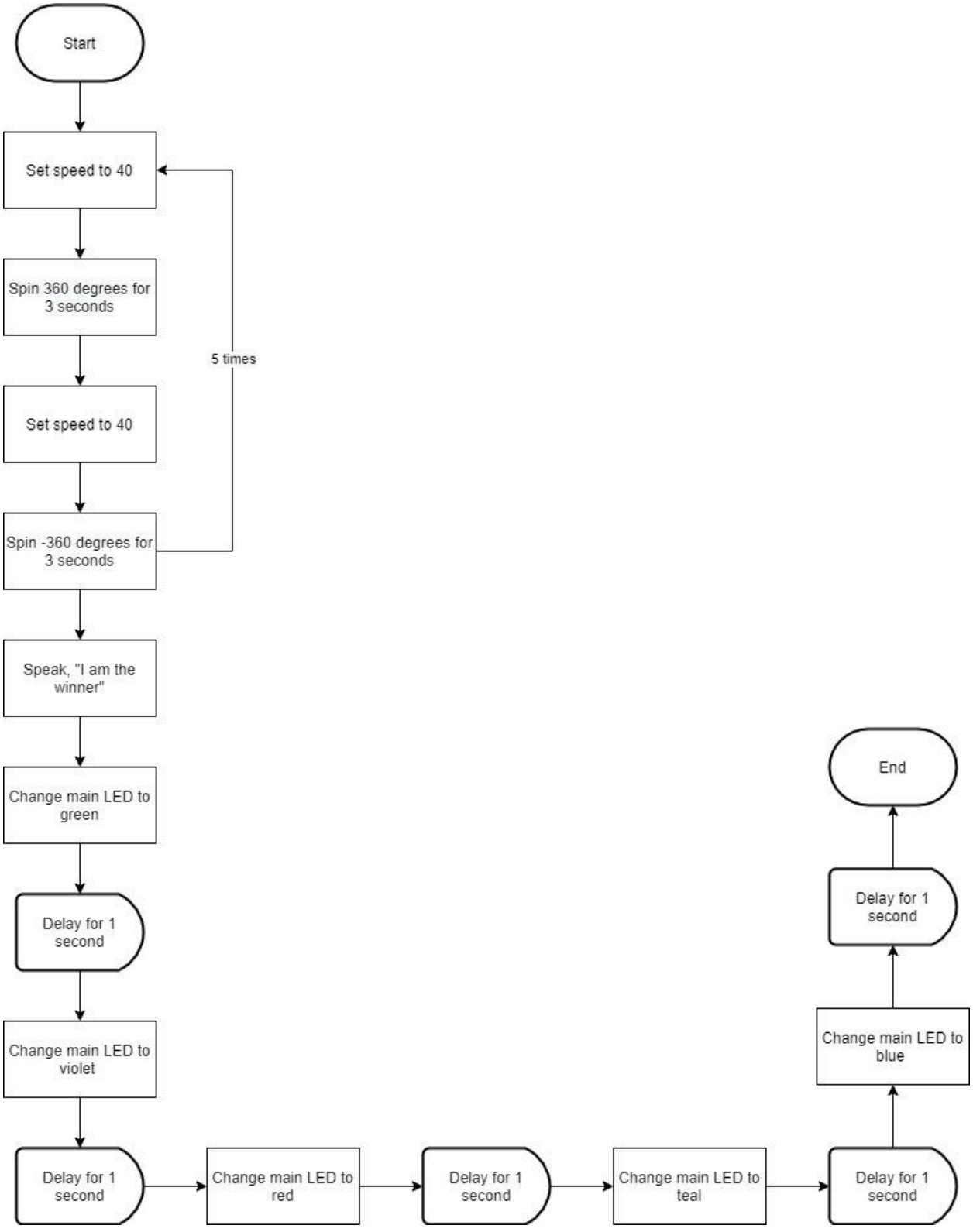
2. *System Flow*


Start
Set speed to 40
Spin 360 degrees for 3 seconds
Set speed to 40
Spin -360 degrees for 3 seconds
5 times
Speak, "I am the winner"
Change main LED to green
Delay for 1 second
Change main LED to violet
Delay for 1 second
Change main LED to red
Delay for 1 second
Change main LED to teal
Delay for 1 second
Change main LED to blue
Delay for 1 second
End

3. ***Software***

Sphero Edu - We used the Sphero Edu app on IOS and the Microsoft Store to develop and deploy this application using block code as the primary language.

4. ***Hardware***

- Sphero Sprk +
- ASUS Laptop
- iPhone XR

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
Figure 8	11/23	Do a figure 8 five times	Shifted every time the loop was repeated	Vincent	Fail
Figure 8	11/23	Do a figure 8 five times	Did figure 8 5 times	Vincent	Pass
Figure 8	11/23	Stop movement after completing the figure 8 5 times.	Went in a straight line after figure 8s	Vincent	Fail
Figure 8	11/23	Do a figure 8 five times then speak and change colors	Did not speak or change colors	Vincent	Fail
Figure 8	11/23	Do figure 8 five times then speak and change colors	Did not change colors properly	Vincent	Fail
Figure 8	11/23	Do figure 8 five times then speak and change colors and finish program	Did figure 8 five times then spoke and changed colors but did not exit program	Vincent	Fail
Figure 8	11/23	Do figure 8 five times then speak and change colors and finish program	Did figure 8 five times then spoke and change colors and finish program	Vincent	Pass

6. ***Task List/Gantt Chart***

View Repository

7. ***Staffing Plan***

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

Name	Role	Responsibility	Reports To
Connor Przelomski	Project Manager/SDD Author	Responsible for making sure all members understand their roles and the project gets done on time Responsible for writing and organizing the System Design Document	Gil Eckert (Professor)
Vincent Loretta	Sphero code author/video recorder	Responsible for designing the robot's algorithm and recording the robots's run in action	Project Manager