# Sprint 3 - Agility Design Document

**December 2, 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 |
|---|---|---|---|---|---|
| AGILIT_01 | Prior to the obstacle course, form a square by going down, right, up, then left. | | 1st | 12/2 | 12/2 |
| AGILIT_02 | Avoid 3 objects. | | 2nd | 12/2 | 12/2 |
| AGILIT_03 | Travel over a ramp. | | 3rd | 12/2 | 12/2 |
| AGILIT_04 | Knock over multiple “pins”. | | 4th | 12/2 | 12/2 |
| [redacted] | | | | | |

**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**

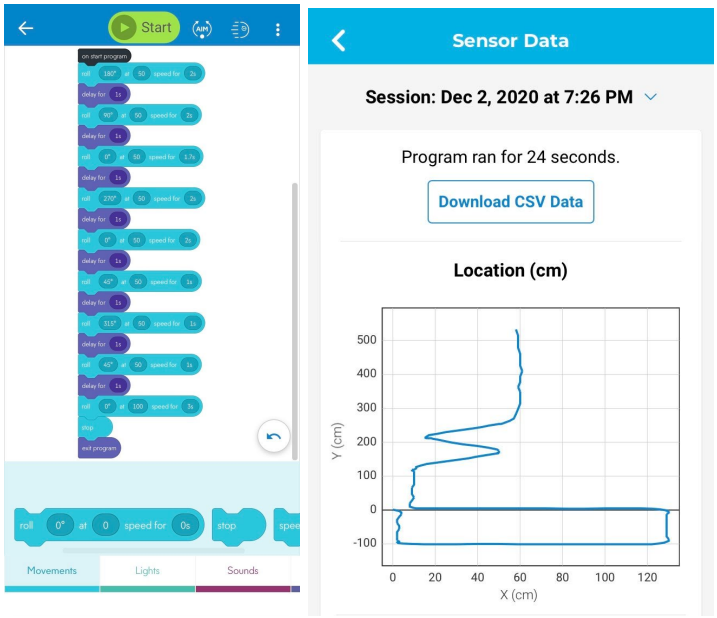
- Robot can be used across multiple platforms, as long as it supports bluetooth
- Sphero app must be loaded on such device
- Code can be pulled up quickly via the Sphero app

## 4. Requirements Confirmation/Stakeholder sign-off

| Meeting Date | Attendees (name and role) | Comments |
|---|---|---|
| 12/1/2020 | Connor Przelomski - SDD author / project director<br>Vincent Loretta - Robot code author/ video recorder<br>Moises Pomales - Gantt chart author/ flowchart maker | Completed every project requirement except<br>• Finish Gantt chart<br>• Finish SDD<br>• Flow chart not completed<br>• Video not recorded |
| 12/2/2020 | Connor Przelomski - SDD author / project director<br>Vincent Loretta - Video recorder / robot user / Flowchart maker<br>Moises Pomales - Gantt chart author/ flowchart maker | Confirmed……<br>• Finished Gantt chart<br>• Finished SDD<br>• Flow chart completed<br>• Video recorded |

## 5. System Design

1. ***Algorithm/Sensory Data***




This algorithm encompasses part of what happened in sprint 1 where the robot had to travel in a rectangular shape. This is what happens here, except now the robot will travel in a zigzag formation. It will do this while also avoiding obstacles planted on the floor. Eventually, after the 3 obstacles regarding the zig zag, it will speed up over the ramp and crash into the dominoes on the floor. The program then ends and the robot stops moving.

2. ***System Flow***


Start
Set speed to 50 and roll 180 degrees for 2s.
Delay for 1s
Roll 90 degrees for 2s.
Delay for 1s
Roll 0 degrees for 1.7s.
Delay for 1s
Roll 270 degrees for 2s.
Delay for 1s
Roll 0 degrees for 2s.
Delay for 1s
Roll 45 degrees for 1s.
Delay for 1s
Roll 315 degrees for 1s.
Delay for 1s
Roll 45 degrees for 1s.
Delay for 1s
Set speed to 100 and roll 0 degrees for 1s.
End Program

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 |
|---|---|---|---|---|---|
| Travel down, right, up, then left in order to make a square | 12/2/20 | Make a square | Hit wall | Vincent | Fail |
| To complete the course and avoid all obstacles | 12/2/20 | Go through whole course successfully | Hit wall | Vincent | Fail |
| To avoid the obstacles in a zig/zag formation | 12/2/20 | Zig through obstacles | Hit first obstacle | Vincent | Fail |
| To avoid the obstacles in a zig/zag formation | 12/2/20 | Zig through obstacles | Hit second obstacle | Vincent | Fail |
| To avoid the obstacles in a zig/zag formation | 12/2/20 | Zig through obstacles | Hit third obstacle | Vincent | Fail |
| To be aligned properly and travel up and over the ramp | 12/2/20 | Go over ramp | Went to the left of ramp | Vincent | Fail |
| To be aligned properly and travel up and over the ramp | 12/2/20 | Go over ramp | Went over ramp | Vincent | Pass |
| To travel through the whole course successfully | 12/2/20 | Go through full course with no interruptions | Missed ramp | Vincent | Fail |

| | | | | | |
|---|---|---|---|---|---|
| To travel through the whole course successfully | 12/2/20 | Go through full course with no interruptions | Hit first obstacle | Vincent | Fail |
| To travel through the whole course successfully | 12/2/20 | Go through full course with no interruptions | Hit third obstacle | Vincent | Fail |
| To travel through the whole course successfully | 12/2/20 | Go through full course with no interruptions | Went through full course with no interruptions | 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<br>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 |
| Moises Pomales | Gantt chart organizer/writer | Responsible for making sure that each task within the project is being completed on time. Makes sure that the production schedules | Project Manager |

# Sprint 3 - Agility

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

Period HighNight: 1 | Plan Duration | Actual Start | % Complete | Actual (beyond plan) | % Complete (beyond plan

| ACTIVITY | STAFF MEMBER(S) | PLAN START (Hours) | PLAN DURATION (Hours) | ACTUAL START (Hours) | ACTUAL DURATION (Hours) | PERCENT COMPLETE |
|---|---|---|---|---|---|---|
| Develop a plan (Gantt chart) | Vincent | 1 | 2 | 1 | 2 | 100% |
| Build requirements table | Moises | 3 | 1 | 3 | 1 | 100% |
| Building block code | Vincent | 4 | 1 | 4 | 1 | 100% |
| Recording video | Vincent | 5 | 1 | 5 | 1 | 100% |
| Bulilding test plan | Vincent | 6 | 2 | 6 | 1 | 100% |
| Describing algorithm | Connor | 7 | 1 | 7 | 2 | 100% |
| Completing SDD | Connor | 9 | 1 | 9 | 1 | 100% |
| Flowchart Creation | Moises | 10 | 1 | 10 | 1 | 100% |

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 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60