Sprint 1 - Endurance Design Document

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1. Executive Summary

1.1. Project Overview

- This project has been conducted to test the endurance of the Sphero robot. This project's intended audience consists of students and teachers.

1.2. Purpose and Scope of this Specification

The purpose of this specification is to execute an algorithm that successfully carriers the SPRK2 around a field in which its purpose was to stay on the blue line or close to it. The intended audience of this experiment is our class and any outside sources who want to learn how to program and set up a SPRK2.

2. Product/Service Description

In this section, describe the general factors that affect the product and its requirements. This section should contain background information, not state specific requirements (provide the reasons why certain specific requirements are later specified).

2.1. Product Context

- The SPRK2 is an independent product with the help of the operating system on your Apple or Android, phone and computer. The SPRK2 does interface with a lot of related systems as within the app there are all different types of products that can interface with the SPRK2. These relationships consist of building a flowchart after successfully using the app Sphero Edu. With the proper tools this endurance test was rather simple in the regard of figuring out the interconnection of the SPRK2 with the app in order for it to run.

2.2. User Characteristics

Create general customer profiles for each type of user who will be using the product. Profiles should include:

- Students who are enrolled in computer science classes
- Faculty/staff who teach computer science courses
- Those working in the computer science field

2.3. Assumptions

- When entering the room to do the first sprint test on the SPRK2 we had doubts whether the room would be open or not do the test. Upon arriving we were granted access to the room. After that we both opened our SPRK2 we had no difficulty accessing the operating systems via phone or computer. Other than that we had no assumptions that made out Sprint test anymore difficult.

2.4. Constraints

Describe any items that will constrain the design options, including

- System resource constraints (e.g., limits on disk space or other hardware limitations)
- Block programming problems
- Wifi / bluetooth availability
- Laptop / computer availability

2.5. Dependencies

- The dependencies needed in order to successfully carry out the SPRK2 endurance run involve minute amount of equipment. This equipment involved the SPRK2, a computer or phone with working Bluetooth, a clean path with no desks or other obstacles.

3. Requirements

3.1. Functional Requirements

Req#	Requirements	Priority
1	Robot will start from the yellow square with blue tape	1
2	Robot must start with a green light and speak ‘ready set go	1
3	Robot must travel to each of the yellow floor tiles and turn right at the center of each tile	1
4	Robot should not collide with any objects as it goes around the room	2
5	Robot must return to it’s starting location	2
6	Robot must stop with a red light and speak “I’m done and I need water”	1

3.2. Security

3.2.1. Protection

- We did not utilize any system protection.

3.2.2. Authorization and Authentication

- We did not use any authorization and authentication factors (unless logging into the Sphero app counts).

3.3. Portability

- When coming to Howard Hall 208 we had to bring both of our SPRK2 kits with charger and chagrining port. Upon arrival we had to turn on the lights and get the robot’s set up with the correct lineage too

the blue tape. When doing this we have completed transporting all goods from our homes to the class room.

4. Requirements Confirmation/Stakeholder sign-off

Include documentation of the approval or confirmation of the requirements here. For example:

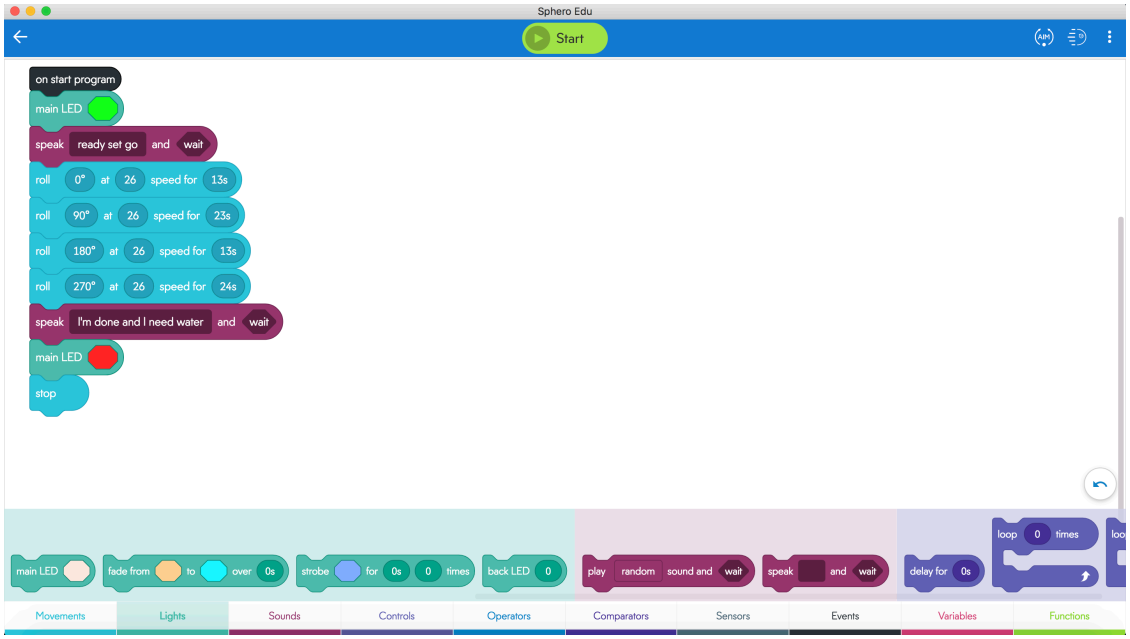
Meeting Date	Attendees (name and role)	Comments
3/29/21	Tom and Tim	
3/30/21	Tom and Tim	

5. System Design

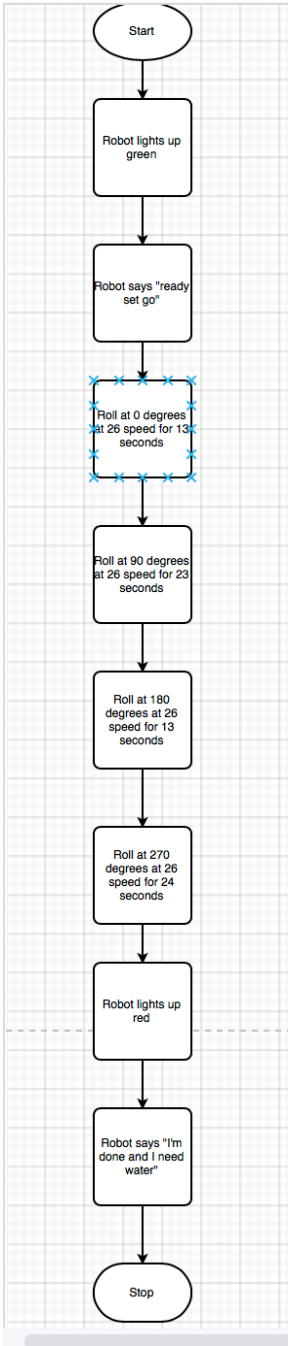
5.1. Algorithm

1. Robot lights up green
2. Robot says “ready set go”
3. Robot travels along tape to first corner
4. Robot turns right, travels to 2nd corner
5. Robot turns right, travels to 3rd corner
6. Robot travels back to starting position
7. Robot lights up red
8. Robot says “I’m done and I need water”

- This algorithm was made with block code in the Sphero app.



5.2. System Flow



5.3. Software

Excel, Draw io, Sphero Edu, Google docs

5.4. Hardware

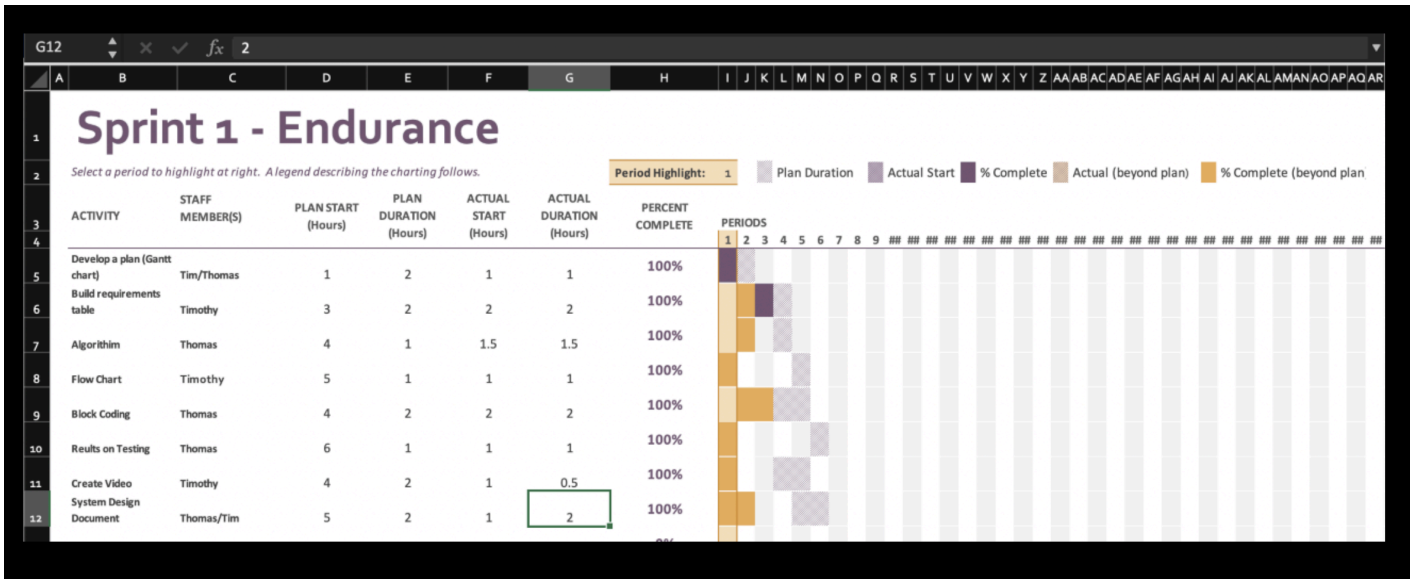
SPRK2 robot, Two Macbook laptops, chargers

5.5. 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	Pass/Fail
Make robot light up green, speak ready set go, and travel to first blue corner	3/30/21	Robot should light up green, speak ready set go and stop at corner and turn.	Robot lit up green and spoke ready set go but swayed left and traveled past the corner to far.	Fail
Make robot light up green, speak ready set go, and travel to first blue corner	3/30/21	Robot should light up green, speak ready set go and stop at corner and turn.	Robot lit up green, spoke ready set go, and followed course but was slightly off track swaying right	Fail
Make robot light up green, speak ready set go, and travel to first blue corner	3/30/21	Robot should light up green, speak ready set go and stop at corner and turn.	Robot lit up green, spoke ready set go, and successfully stopped at first corner and turned	Pass
Make robot travel to 2nd corner	3/30/21	Robot should stop at the 2nd corner and turn	Robot successfully traveled to 2nd corner and turned	Pass
Make robot travel to 3rd corner	3/30/21	Robot should reach the 3rd corner, stop, and turn	Robot hit desk on it's way to the 3rd corner	Fail
Make robot travel to 3rd corner	3/30/21	Robot should reach the 3rd corner, stop, and turn	Robot successfully made it to 3rd corner and turned	Pass
Make robot travel back to starting position, light up red, and speak "im done and I need water."	3/30/21	Robot should return to start position, light up red, and speaker "im done and I need water"	Robot stopped short of start position	Fail
Make robot travel back to starting position, light up red, and speak "im done and I need water."	3/30/21	Robot should return to start position, light up red, and speaker "im done and I need water"	Robot successfully stopped at the start position, lit up red, and spoke "im done and I need water	Pass

5.6. Task List/Gantt chart



Sprint 1 - Endurance

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

Period Highlight: 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)	Tim/Thomas	1	2	1	1	100%
Build requirements table	Timothy	3	2	2	2	100%
Algorithim	Thomas	4	1	1.5	1.5	100%
Flow Chart	Timothy	5	1	1	1	100%
Block Coding	Thomas	4	2	2	2	100%
Reults on Testing	Thomas	6	1	1	1	100%
Create Video	Timothy	4	2	1	0.5	100%
System Design Document	Thomas/Tim	5	2	1	2	100%

PERIODS 1 2 3 4 5 6 7 8 9 ...

5.7. 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
Thomas	Programmer/ FlowChart	To complete the responsibilities needed to pass this endurance test	Gill Eckertt
Tim	Gantt Chart/ Summary	To complete the responsibilities needed to pass this endurance test	Gill Eckertt