Sprint 2 - Accuracy Design Document

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Table of Contents

1. Executive Summary

1.1. Project Overview

• This project has been conducted to test the accuracy 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 design and execute an algorithm that successfully makes the SPRK2 robot perform a series of tests. These tests involve a figure 8 path that the robot must accurately follow along with speaking a phrase and lighting up different colors. The intended audience of this experiment is our class and any outside individuals who may want to learn how to set up a SPRK2 and use it to create programs.

2. Product/Service Description

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 accuracy 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

- 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 second 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 our test anymore difficult.

2.4. Constraints

- 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#	Requirement	Date Rvwd	SME Reviewed / Approved
1	Robot must complete a figure 8	4/20/21	Approved
2	Repeat figure 8 five times	4/20/21	Approved
3	Robot must stop at starting position	4/20/21	Approved
4	Robot must speak "I am the winner"	4/20/21	Approved
5	Robot must flash multicolored lights for 5 seconds	4/20/21	Approved

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

Meeting Date	Attendees (name and role)
4/20/21	Tom Carleo
4/20/21	Tim Corcoran

5. System Design

This section will provide all details concerning the technical design, staffing, coding, and testing the system

5.1. Algorithm

1. Make robot complete a figure 8
2. Repeat step 1 5 times
3. Upon completion, make robot speak "I am the winner"
4. Make robot flash multicolored lights
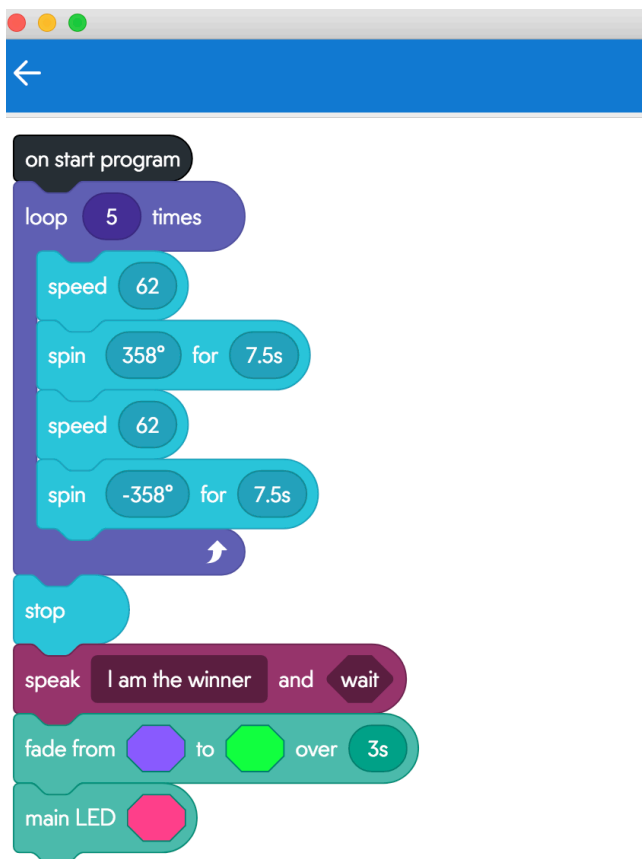
5.2. System Flow
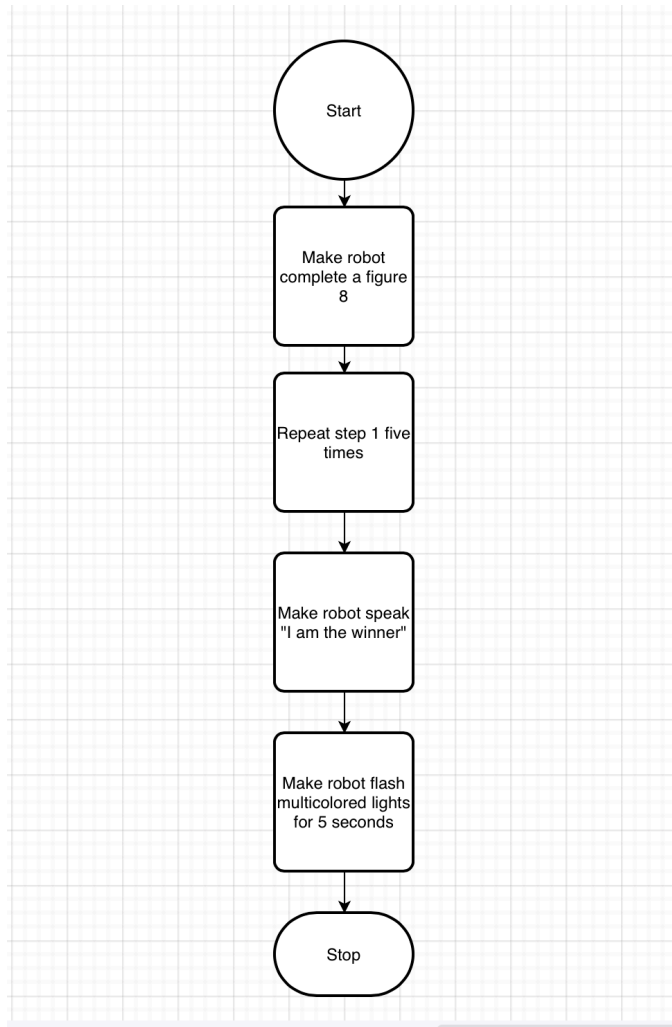
5.3. Software

• Excel, Draw io, Sphero Edu, Google docs

5.4. Hardware

• SPRK2 robot, Two Macbook laptops, chargers

5.5. Test Plan

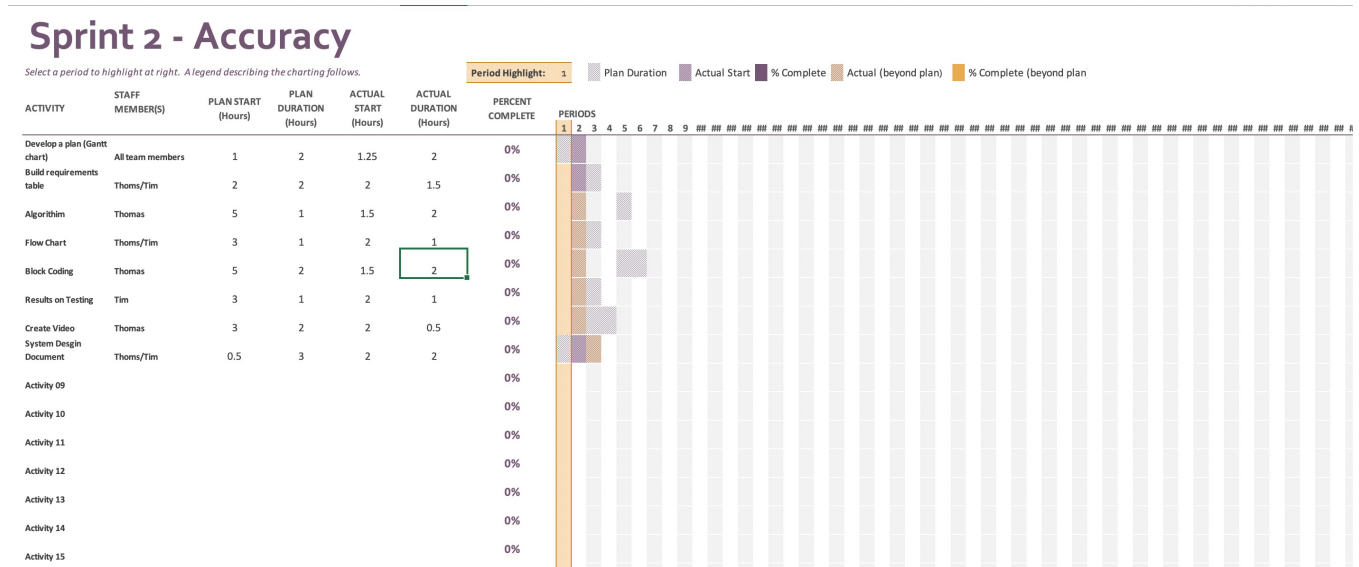| Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Make robot complete a figure 8	4/20/21	Robot completes figure 8	Robot swayed off course, did not turn the opposite direction after completing first circle	Tim and Tom	Fail
Make robot complete a figure 8	4/20/21	Robot completes figure 8	Robot completed first circle, swayed off course on 2nd circle	Tim and Tom	Fail
Make robot complete a figure 8	4/20/21	Robot completes figure 8	Robot completed figure 8 but swayed off course after a while	Tim and Tom	Pass
Make robot repeat figure 8 five times	4/20/21	Robot completes five figure 8s	Robot completed 2 figure 8s but swayed off course after a while	Tim and Tom	Fail
Make robot repeat figure 8 five times	4/20/21	Robot completes five figure 8s	Robot completed 3 figure 8s but swayed off course after a while	Tim and Tom	Fail
Make robot repeat figure 8 five times	4/20/21	Robot completes five figure 8s	Robot completed 3 figure 8s but swayed off course after a while	Tim and Tom	Fail
Make robot repeat figure 8 five times	4/20/21	Robot completes five figure 8s	Adjustments made, robot repeated figure 8 five times while staying mostly on course	Tim and Tom	Pass
Make robot speak "I am the winner"	4/20/21	Robot speaks the required phrase	Robot spoke "I am the winner"	Tim and Tom	Pass
Make robot flash multicolored lights for 5 seconds	4/18/21	Robot flashes colors for 5 seconds	Robot successfully flashed multicolored lights for 5 seconds	Tim and Tom	Pass

5.6. Task List/Gantt Chart

Sprint 2 - Accuracy

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)	All team members	1	2	1.25	2	0%
Build requirements table	Thoms/Tim	2	2	2	1.5	0%
Algorithim	Thomas	5	1	1.5	2	0%
Flow Chart	Thoms/Tim	3	1	2	1	0%
Block Coding	Thomas	5	2	1.5	2	0%
Results on Testing	Tim	3	1	2	1	0%
Create Video	Thomas	3	2	2	0.5	0%
System Desgin Document	Thoms/Tim	0.5	3	2	2	0%
Activity 09						0%
Activity 10						0%
Activity 11						0%
Activity 12						0%
Activity 13						0%
Activity 14						0%
Activity 15						0%

5.7. Staffing Plan

Name	Role	Responsibility	Reports To
Tim	Gantt Chart/ Summary	To complete the responsibilities needed to pass this accuracy test	Gil Eckert
Tom	Programmer/ FlowChart	To complete the responsibilities needed to pass this accuracy test	Gil Eckert