

Sprint 2 - Accuracy Design Document

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1. Executive Summary

1.1 Project Overview

This project is software for the Sphero SPRK+ which is used to navigate the figure 8 course and the intended audience is our fellow students and professor

1.2 Purpose and Scope of this Specification

The purpose of the specification for the project is to have the code for the navigation of the course and to fulfil some other requirements like the robot changing colors for 5 seconds and 1 line

1. Product/Service Description

Our group needs to create software or to be specific block code that will allow our robot to complete the required course and have it completed the other requirements.

1.3 Product Context

This product is software for the Sphero SPRK+ and so it may work with other Sphero devices which can run off the block code

1.4 User Characteristics

- Students have more experience but have developed the block code the robot is using to complete the figure 8 course
- Professor has more experience but will be evaluating the students' performance on the sprint

1.5 Assumptions

If the difference in elevation of the ground and when placing the robot down to test it that the differences don't make too many differences when testing and navigating the course

1.6 Constraints

- We can only use the robot that we are assigned
- The robot must be programmed through the Sphero Edu application with its block code
- Must fulfill the requirements for the sprint

1.7 Dependencies

There aren't many dependencies that could affect the project requirements though whether the robot is charged, or the balance of the floor could lead to small changes in the trajectory

2. Requirements

2.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
ACCU_01	Must run the figure course 5 times	The robot must complete the figure 8 course 5 times	1	11/17	
ACCU_02	Must start and stop in space provided	The robot starts in the spot in the middle of the figure 8	1	11/17	
ACCU_03	Robot speaks "I am the winner"	The robot speaks after completing the course	1	11/17	

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Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
ACCU_04	Robot flashes multicolored lights for 5 seconds	After finishing the course, the robot must flash different colors for at least 5 seconds	1	11/17	

2.2 Security

2.2.1 Protection

- The software or block code for our robot is protected behind multi factor authentication
- The other documents are private documents which are not available to the public

2.2.2 Authorization and Authentication

- The authorization and authentication processes we have are that to access our documents and GitHub you need to have them shared with you

2.3 Portability

- Portability is not a requirement but the software was done in block code so it can be used on any Sphero device which uses block code

3. 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
11/17/21	Thomas Schulz-recorder/ Robot tester, Damien Pugh- Robot tester, Chrishen Tissera- Robot tester	Discuss project, and responsivities. Brainstormed and started working on how the robot will complete the figure 8 course
11/19/21	Thomas Schulz-recorder/ Robot tester, Damien Pugh- Robot tester , Chrishen Tissera- Robot tester	Robot was able to complete the figure 8 course and video was recorded.

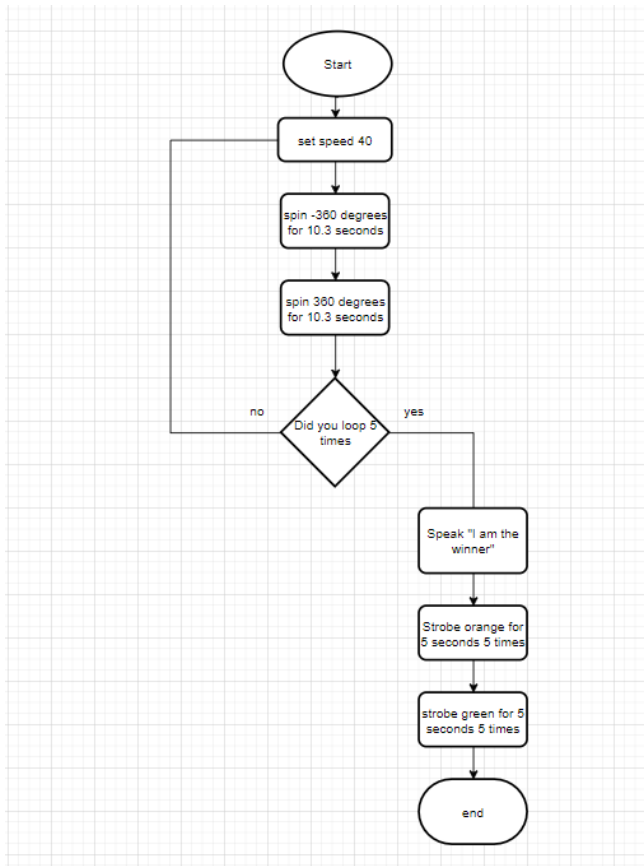
4. System Design

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

4.1 Algorithm

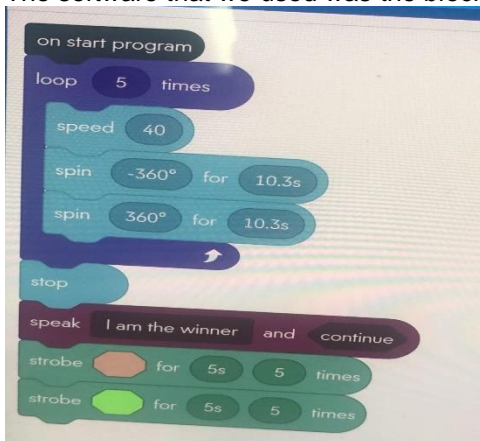
- 1 set speed to 40
- 2 spin -360 degrees for 10.3 seconds
- 3 spin 360 degrees for 10.3 seconds
- 4 loop steps (1,2,3) 5 times
- 5 stop movement
- 6 robot speaks I am the winner
- 7 strobe orange for 5 seconds 5 times
- 8 strobe green for 5 seconds 5 times

4.2 System Flow



4.3 Software

The software that we used was the block code that is integrated in the Sphero Edu application



4.4 Hardware

The hardware platform that we used was the Sphero SPRK+

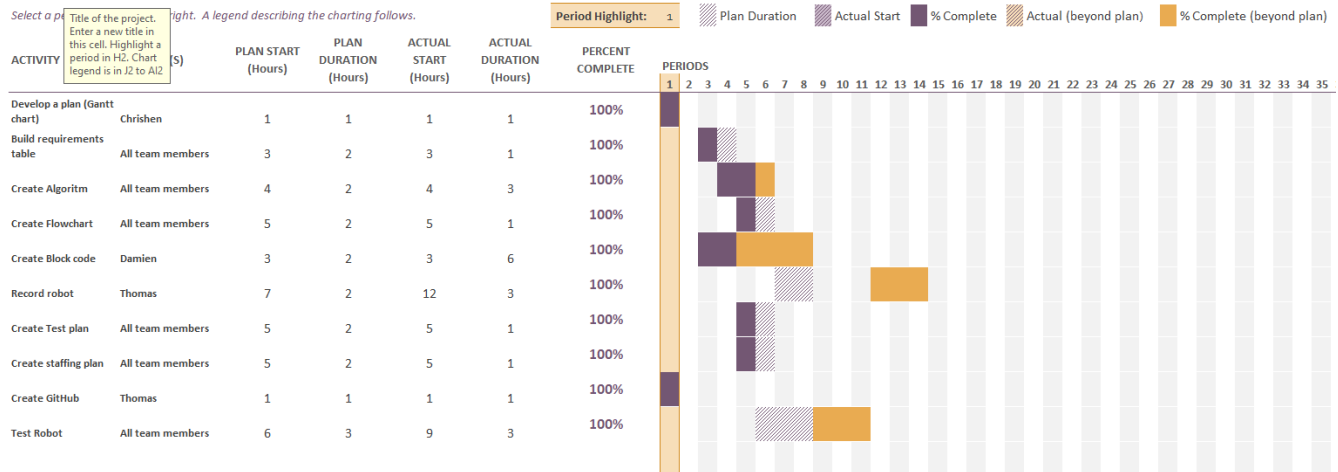
4.5 Test Plan

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Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Trying to figure out how to get the robot to go into a circle	11/19	The robot will go in a circle and return to staring position	Just continued straight	Damien Thomas Chrishen	Fail
Attempting to have robot travel in a circle	11/19	Robot will go in a circle	Robot went in a circle	Damien Thomas Chrishen	pass
Have the robot go in a figure 8	11/19	Robot will travel in a figure 8	Robot only went in a circle and then went straight	Damien Thomas Chrishen	fail
Second attempt at robot going in a figure 8	11/19	Robot will travel in a figure 8	Robot went in a circle and	Damien Thomas Chrishen	fail
Third attempt at robot going in a figure 8	11/19	Robot will travel in a figure 8	Robot was able to complete the course	Damien Thomas Chrishen	pass
Making the robot more accurate when running the course	11/19	The robot will more accurately run the course	The robot ran the course and kept closer to the established course	Damien Thomas Chrishen	pass
Final run which was recorded and spoke and flashed different colors	11/19	The robot completes the course, speaks, and changes colors	The robot completes course and the other requirements	Damien Thomas Chrishen	pass

4.6 Task List/Gantt Chart

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4.7 Staffing Plan

Name	Role	Responsibility	Reports To
Damien	Tester, Coder	Helped brainstorm ideas	

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Name	Role	Responsibility	Reports To
		Created the block code worked on the SDD	
Thomas	Tester, Recorder	Brainstormed and helped implement ideas Recorded the test runs Worked on the SDD Created the GitHub repository	
Chrishen	Tester, Documenter	Brainstormed and discussed ideas, suggestions, and strategies Worked on the SDD and Gantt Chart	