

Sprint 2 - Accuracy Design Document

November 20, 2023

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1. Executive Summary

1.1 Project Overview

Your robot must successfully run the figure eight course 5 times. A path will be laid out on the floor. Your robot must stay within the path provided. Your robot will start and finish in the square provided. Upon finishing, the robot will speak 'I am the winner' and flash multicolored lights for 5 seconds. Points will be deducted if your robot strays from the path, if it does not go around 5 times, or if it does not finish in the same place it started.

1.2 Purpose and Scope of this Specification

The goal is for the Sphero robot to follow its path correctly.

In Scope

- This document addresses the processes and requirements to carry out the endurance project:
 - Modifications in the process so that the robot complies with its trajectory.

Out of Scope

- Having the robot follow the blue tape exactly, rather than just being within a inch or two from the tape while traveling around the course.

2. Product/Service Description

Various factors can influence the performance and requirements of the product. For instance, obstacles like tables, walls, chairs, or people in the robot's path can hinder its ability to move in the intended direction. Additionally, a sloping floor may cause the robot to deviate slightly from its course. Furthermore, a smooth floor surface can result in increased sliding, though the outcome in this scenario closely aligns with the desired effect.

2.1 Product Context

Sphero is a robot, meaning it relates to other robots. It is controlled remotely like other robots, meaning that this product is like other products. Sphero is self-contained because it contains everything in itself to work. Sphero's interface works with other related systems.

2.2 User Characteristics

Gil Eckert, M.S. is a Specialist Professor at Monmouth University. Professor Eckert has an extensive background in technology management and consulting, particularly in the fields of education and medicine. He has experience in developing, marketing, and providing support for software applications in these sectors. Additionally, he has created data pathways to facilitate accreditation processes at the university level.

2.3 Assumptions

Some issues that could interfere with the requirements could be issues with Sphero Edu, broken robot, or an obstructed pathway. With what we have learned in class (CS-104, taught by Professor Gil Eckert), we feel confident that we are educated on Sphero Edu enough to complete the coding. We are also well aware of classroom availability to be able to complete the test. All members of the group are experienced with completing Sprint 1 together, which we believe better prepared us to show further improvement with the following project, Sprint 2.

2.4 Constraints

Constrain the design options, including

- Battery life of robot
- Limited availability of the room
- Knowledge of Sphero Edu
- Access, management and security
- System resource constraints: limits on disk space or other hardware limitations

2.5 Dependencies

- The block programming on Sphero must be completed
- The robot Sphero
- The space (room HH208)

3. Requirements

3.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
ACCUR_01	successfully run figure 8, 5 times	points will be deducted	1	11/20	Approved
ACCUR_02	must stay within path provided	points will be deducted	1	11/20	Approved
ACCUR_03	start and finish on square provided	points will be deducted	1	11/20	Approved
ACCUR_04	when finished, robot must say, "I am the winner", and flash multicolored lights for 5 seconds	points will be deducted	1	11/20	Approved

3.2 Security

Keep your robot safe, don't put it in dangerous places or situations. Keep your Sphero and Github login safe, do not share your information.

3.2.1 Protection

After installing the Sphero app, there will be two login options: school and home. In the school section, you can choose to join as a student using a class code, become a teacher to create and manage a class, or simply dive into programming without signing in immediately. For the home section, logging in is possible either through email or Apple sign-in.

3.2.2 Authorization and Authentication

Consider using standard tools, connecting your number, email, or app.

3.3 Portability

Portability was an important factor in this project as we needed to transfer information from our computer to the robot so that it could work.

4. Use of a proven portable language;
5. Use of a particular operating system; Sphero And Github
6. The need for environment-independence - the product must operate the same regardless of operating systems, networks, development or production environments.

7. Requirements Confirmation/Stakeholder sign-off

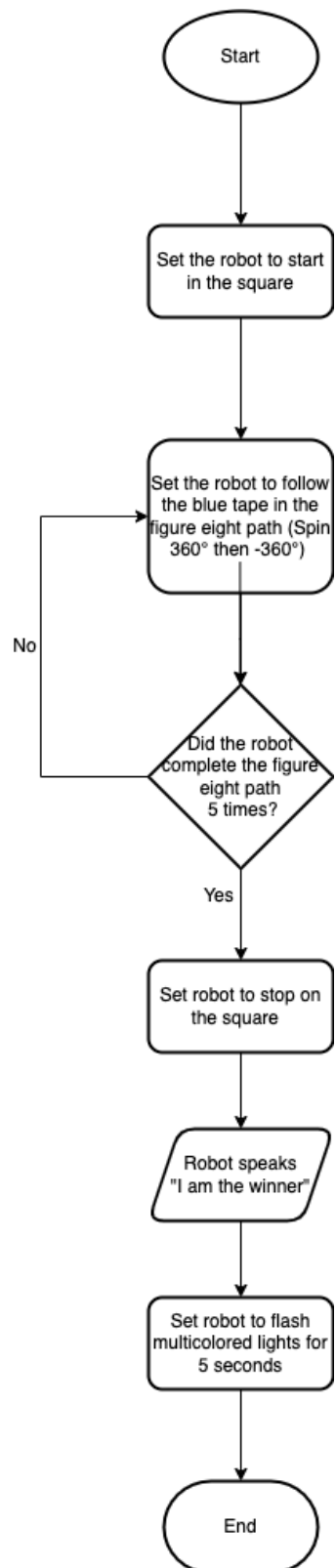
Meeting Date	Attendees (name and role)	Comments
11/19/23	Bailey, Gaby, Angela	Confirmed all
11/20/23	Bailey, Gaby	Confirmed all

8. System Design

8.1 Algorithm

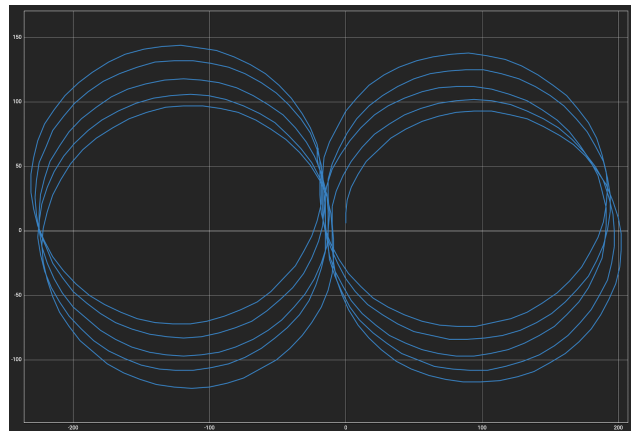
- Set the robot to start in the square provided
- Set Robot to Travel
- Set robot to complete the figure eight path 5 times while touching the blue tape at all times
- Set robot to stop on the square when the course is completed
- Robot will speak "I am the winner"
- Set robot to flash multicolored lights for 5 seconds

8.2 System Flow



8.3 Software

The block code written on the Sphero app or website was the software used to develop and deploy this application.



8.4 Hardware

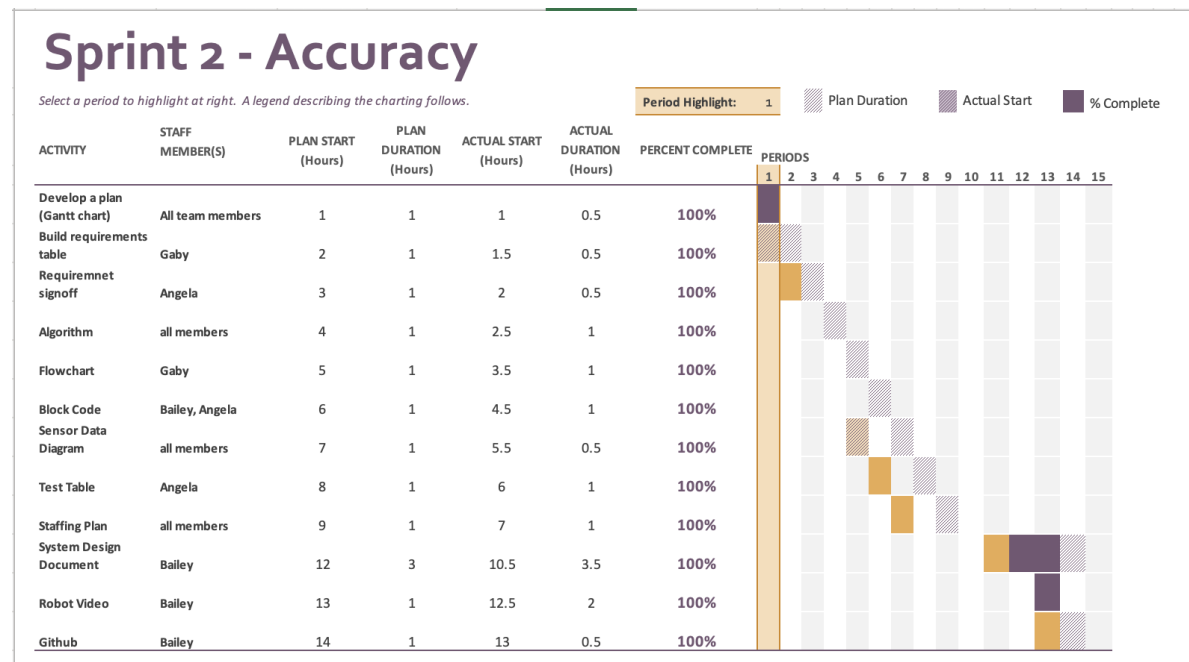
The hardware used to develop and test this project was macOS and Windows

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8.5 Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
accuracy	11/20	stays on line and does figure 8, 5 times	robot didn't move, spun inside "globe"	gaby	fail
accuracy	11/20	stays on line and does figure 8, 5 times	robot went straight off path	gaby	fail
accuracy	11/20	stays on line and does figure 8, 5 times	robot turns extremely wide	gaby	fail
accuracy	11/20	stays on line and does figure 8, 5 times	robot does not stay on path	gaby	fail
accuracy	11/20	stays on line and does figure 8, 5 times	mostly stays on line	gaby	pass

8.6 Task List/Gantt Chart



8.7 Staffing Plan

Name	Role	Responsibility	Reports To
Angela	SDD Creator/Editor	Create and edit the System Design Document	All members
Bailey	Github owner	Upload videos	All members
Gaby	Programmer	Create Block Code and Test	All members