

Sprint 2 - Accuracy

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1. Executive Summary

1.1. Project Overview

This project is made to complete a course in the shape of a figure 8, doing so multiple times and completing it by ending in the same spot that it began. It will show how the Sprk+ robot can complete specified code and be precise in its route when correctly programmed.

1.2. Purpose and Scope of this Specification

The purpose of this program is to show the ability of the programmer to create a code that allows the robot to accurately trace the course in a timely manner, and to finish in the way specified in the requirements. Intended audience may include those interested in the inner workings of a simple code and its effects on the robot.

In scope

This robot must complete the figure 8 course specified

- It must be able to speak
- It must be able to change color
- Must be able to repeat the course multiple times and be consistent
- Robot cannot interfere with outside objects

Out of Scope

The following items in phase 3 of Project A are out of scope:

- Robot must be programmed using Sphero Edu
- Robot must be on flat surface

2. Product/Service Description

2.1. Product Context

- This product relates to other in the fact that it runs on a code that is run and completed by the object in the order specified.
- Product is not self-independent as it requires outside device to complete tasks.

2.2. User Characteristics

- Used by Student/faculty/staff/other
- No prior experience needed
- No technical expertise needed

2.3. Assumptions

Although mobility may seem limited due to the program, this code will prove the versatility of the sprk+ robot by showing its capability to move in a rounded motion consistently.

2.4. Constraints

- Requires hardware devices to be fully charged
- Requires space on hard drive to run Sphero edu program

2.5. Dependencies

- Will require Sprk+ robot to be charged and linked to the device
- Requires Sphero app to be up to date

3. Requirements

Priority 1

- Robot must be able to complete entire course without straying from the line
- Robot must change colors when specified in the algorithm
- Robot must be able to complete course 5 times
- Robot must end up in starting location once all 5 revolutions are completed

Priority 2

- Robot should be aimed correctly to ensure it stays on the line

Priority 3

- Robot should complete course within a timely manner

3.1. Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvw'd	SME Reviewed / Approved
ENDUR_01	Power	Robot was charged and could work before tested	1	11/19	Reviewed and Approved
ENDUR_02	Movement	Robot moved along course when specified	2	11/19	Reviewed and Approved
ENDUR_03	Sound	Robot speaks phrase allotted	3	11/22	Reviewed and Approved
ENDUR_04	Light	Robot changes color when specified	4	11/22	Reviewed and Approved
ENDUR_05	Orientation	Robot adjusts orientation when specified	5	11/22	Reviewed and Approved

3.2. Security

3.2.1. Protection

- encryption via iPhone password
- Encryption via MacBook password
- Must be connected to specific Sprk+ robot
- Code only accessible through personal Sphero Edu account

3.2.2. Authorization and Authentication

the Authorization and Authentication factors included

- Code only accessible by logging into password protected Sphero Edu account
- Project documents only shared within group through protected email accounts

3.3. Portability

- Start and end of code are not host dependent
- Speed and time are host dependent
- Block code can be easily recreated but not copied exactly to another device
- Program is easily accessible

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
11/19/21	Bianca, Noah - algorithm/documentation	confirmed ENDUR_01
11/22/21	Bianca - project manager/tester/coder	Confirmed ENDUR_02 through ENDUR_05

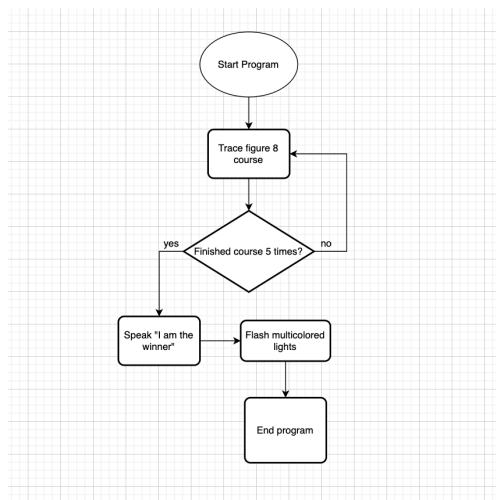
5. System Design

5.1. Algorithm

Develop and describe here the algorithm that will be used to provide the required performance of your software

- Program robot to follow figure 8 course
- Program to repeat course 5 times
- Program to end in starting location
- Program speak "I am the winner"
- Program to flash multicolored lights
- End program

5.2. System Flow



5.3. Software

- Sphero Edu to create block code
- Excel to develop gantt chart
- Pages to create System Design Document
- Drawio to develop flow chart

5.4. Hardware

- MacBook Air laptop
- iPhone to record robot
- Sprk Robot

5.5. Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Try to create circular pattern	11/22	Robot will turn	Robot moves in circle	Bianca	Pass
Try to create figure 8	11/22	Robot makes figure 8 pattern on smaller scale	Robot continues spinning in same direction	Bianca	Fail
Turn spin degrees into negative	11/22	Robot begins spinning opposite direction	Robot spins opposite direction	Bianca	Pass

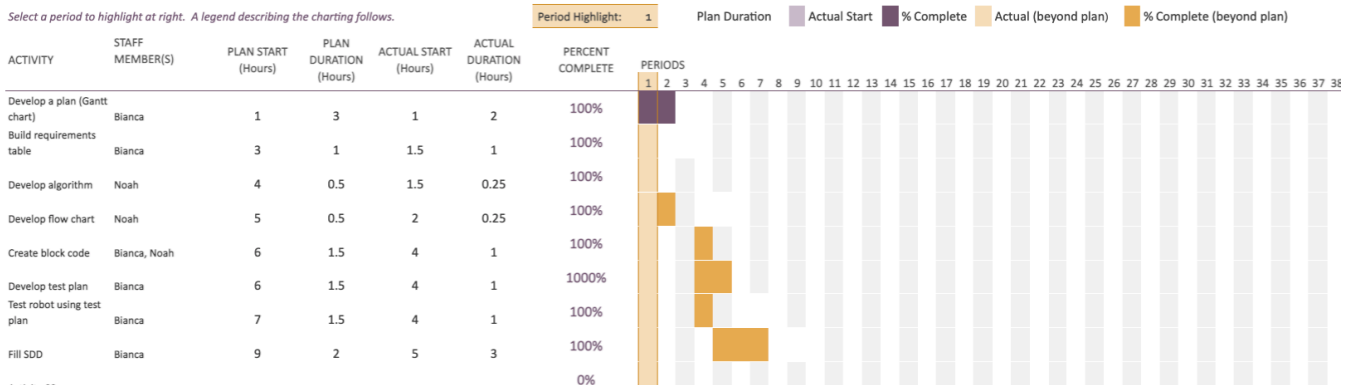
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Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Lengthen amount of time to spin	11/22	Robot will follow path	Robot overshot path	Bianca	Fail
Readjust direction of spin	11/22	Robot will carry out same function in the correct direction	Robot went the correct direction	Bianca	Pass
Adjust amount of time robot spins	11/22	Robot will follow path for correct amount of time before switching spin	Robot strayed slightly	Bianca	Fail
Adjust time of spin	11/22	Robot will follow path	Robot stayed relatively close to tape	Bianca	Pass
Adjust flashing colors	11/22	4 colors will flash for 5 seconds	Colors flashed for allotted time	Bianca	Pass
Add stop command after loop	11/22	Robot will stop after 5 rotations	Robot stopped in starting position	Bianca	Pass
Decrease speed for better accuracy	11/22	Robot will be on the blue line	Robot stays on blue line	Bianca	Pass

5.6. Task List/Gantt Chart

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



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
Bianca	Project leader/Coder/Tester	Complete rest of SDD, program robot and take video	Noah
Noah	Documentation/Algorithm	Complete gantt chart, design algorithm and flowchart	Bianca

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