Sprint 3 “Agility” design document

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1. Executive Summary

1.1 Project Overview

The project's intended audience is students, staff, and the professor. Its main purpose is for students to be able to create a program through the Sphero Edu app, learn block coding, and design an algorithm that will meet the requirements for the project to be satisfactory.

1.2 Purpose and Scope of this Specification

Project design manager: Aiden Ramsay
Purpose of the project- Successfully understand and implement block coding techniques to ensure the robot's algorithm is correct and follows the right path and maintains project integrity

Project objectives:

- Develop a specialized algorithm to ensure the robot follows the intended path
- Provide a user-friendly algorithm for students and faculty to view
- Implement features to maintain group efficiency and provide valuable feedback to the controller/ viewer
- Integrate designated algorithm for the robot to carry out
- Ensure the system of steps is correct and done in a timely manner
- Ensure the system of steps meets the overall project requirements and standards
- Control and maintain group member productivity while working around designated schedules

2. Product/Service Description

- For the third sprint, the uphill portion of the course frequently threw the robot off course, causing the group to start from the beginning
- The tape outline on the floor can force the robot to one specific side of the tape and throw the robot off course unintentionally
- The robot battery has remained a limiting factor regarding group efficiency

2.1 Product Context

2.2 User Characteristics

User	Experience	Technical Expertise	General Characteristics
Student	None	Not a lot of knowledge	Students could find the product interesting, depending on their major
Faculty	1-15 years minimum	Some knowledge, depending of their area of expertise	Show attention depending on their level of interest and knowledge
Staff	None	Not a lot of knowledge about the product	It might show some interest depending on what kind of staff (School Administrators, IT Support)

2.3 Assumptions

- Sphero Edu and Spark robots need to work. One can not function without the other.
- Charger included, without one, the project will be delayed
- Has the correct functions to go in a start line, if not, the requirement of following the course laid out on the floor can not be completed

2.4 Constraints

hardware constraint(limited speed and motor power of Sphero SPRK+,Bluetooth range for control)
Performance drops on uneven or non-smooth surfaces
limited obstacle detection with built-in sensors
requires frequent recharging(1hrs battery life)

Dependencies

2.5 dependencies(tools and environment;);

as software dependency of the Sphero EDi app; for programming and task execution
workspace setup ‘proper lighting and smooth surface
use GitHub for version control collaboration
keep testing ;
testing demonstration(CAPTURE TESTS OR DEMO FOR DEMONSTRATION)
apps to measure speed, accuracy, and response time

3. Requirements

3.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
Requirement 1-Agility	Connect Robot	Make sure Bluetooth is enabled on the device	High		Approved
Requirement 2-Agility	Find the right commands to guide the robot	Find and use correct commands so the robot travels successfully	High		Approved
Requirement 3-Agility	Correct heading	Make sure the robot goes at the correct direction	High		Approved
Requirement 4-Agility	Correct duration	Will changed depending on how long it takes the robot to run the figure	High		Approved
Requirement 5-Agility	Correct speed	Speed will be changed based on how the robot responds (too fast/slow)	Medium		Approved
Requirement 6-Agility	Correct AIM	The robot’s AIM should be centered or it will go off the path	High		Approved

3.2 Security

3.2.1 Protection

Because the robot itself is outsourced, the forms of protection are already implemented by the creators

3.2.2 Authorization and Authentication

- Only those invited to the SDD have access to modifying the document
- Sphero utilizes log-in features for the app, granting access to algorithm input to only those signed in and connected

3.3 Portability

- The use of block coding significantly reduces portability
- The block coding used in the project is portable but is limited to cross-platform-based apps that also use block coding

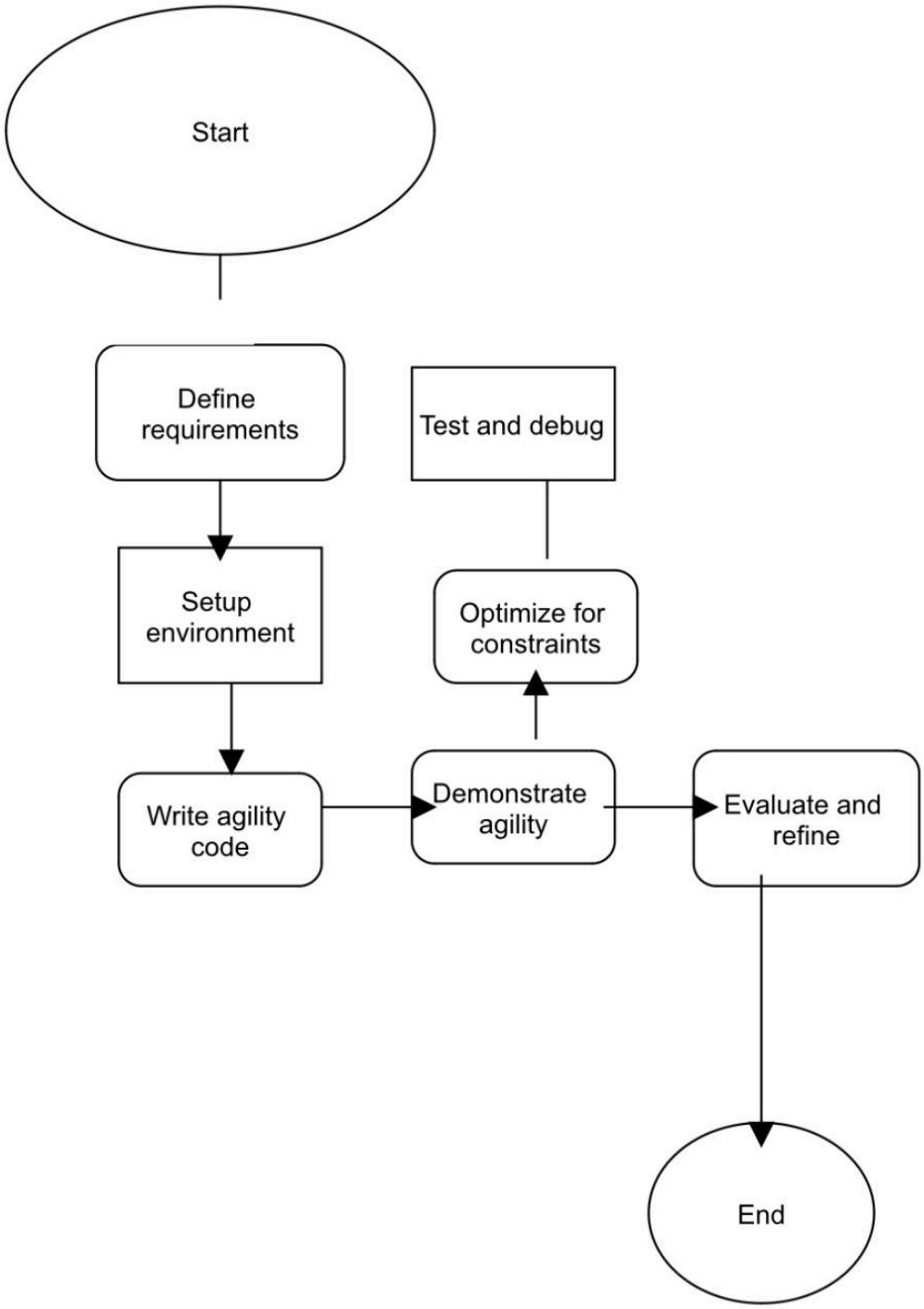
4. Requirements Confirmation/Stakeholder sign-off

Meeting Date	Attendees (name and role)	Comments
Nov. 22nd	Aiden Ramsay - Manager Melissa Blanc Doblas - Collaborator Dabanca Chery - Collaborator Fabiana Torres - Collaborator	Connect robot- approved Attempt to find the correct algorithm for phase 1 of the sprint- approved and successful
Dec. 2nd	Aiden Ramsay - Manager Melissa Blanc Doblas - Collaborator Dabanca Chery - Collaborator Fabiana Torres - Collaborator	Correct speed- approved correct heading- approved correct duration- approved correct spin- approved Finalize algorithm for phase 2 of the sprint- approved and successful

5. System Design

5.1 Algorithm

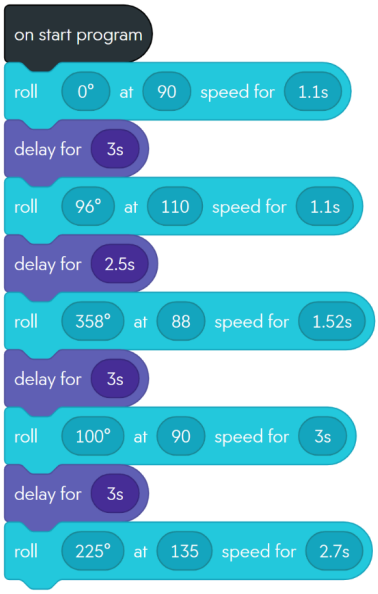
5.2 System Flow


Start
Define requirements
Setup environment
Write agility code
Demonstrate agility
Optimize for constraints
Test and debug
Evaluate and refine
End

5.4 Software

The language that was used to create the products was blocked language which is provided through the Sphero Edu app.

Block code- provided below.



5.5 Hardware

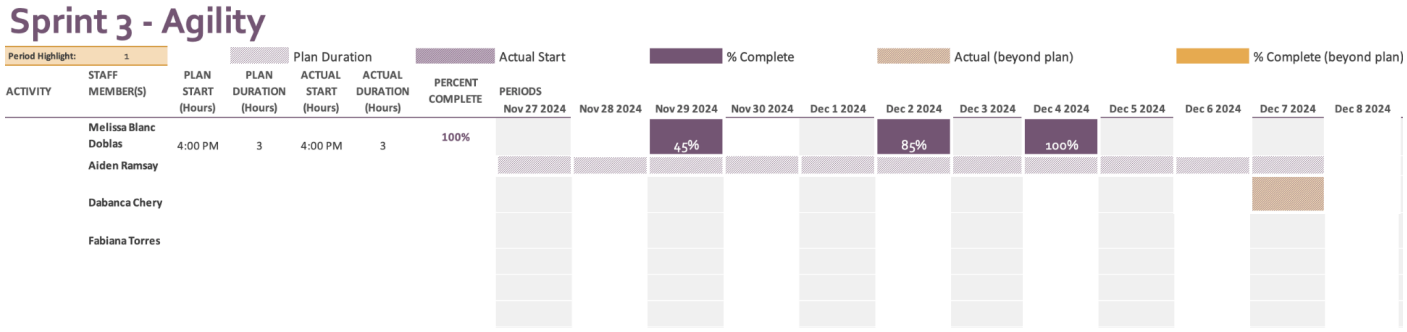
Sphero SPRK+(is the main hardware)
control devices like (computer and phone)
accessories like physical barriers; we have the markers, the ramp, and the bottles.
Python SDK+

5.6 Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
roll 42 90speed 0.5s	11/22/24	go straight, finish at the line, and don't hit the bottle	went to the right and stopped at a point that is about ¼ of the line	Melissa, Aiden, Fabiana	fail
roll 0 90speed 1s	11/22/24	go straight following the line without hitting the bottle and stop at the end of the line	went straight following the line but hit the bottle and stopped a little too early	Melissa, Aiden, Fabiana	fail
change aim changed the second to 1.1	11/22/24	go straight following the line without hitting the bottle and stop at the end of the line	went straight and didn't hit the bottle and stopped a little after the line	Melissa, Aiden, Fabiana	pass
roll 90 110 speed 1.1s	11/22/24	go right following the second line and ending at the line	went straight	Melissa, Fabiana, Aiden	fail

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
delay 3s	11/22/24	go right following the second line and ending at the line	went right hovering on the line	Melissa, Fabiana, Aiden	pass
roll 06	1/22/24	go right following the second line and ending at the line	went right following the line and stopped at the end of the line without hitting the bottle	Melissa, Aiden, Fabiana	pass
delay 3s roll 0 88 speed 1.1s	11/22/24	go straight following the line without hitting the bottle and stopping at the end of the line	went straight a little off the line and stopped too early, ¾ of the line	Melissa, Aiden, Fabiana	fail
delay 2.5s roll 358 88 speed 1.5s	11/22	go straight following the line without hitting the bottle and stopping at the end of the line	went in a straight line and stopped at the end of the line without hitting the bottle	Melissa, Aiden, Fabiana	pass
delay 3s roll 90 110speed 1sec	11/25/24	go straight rolling over the ramp and stop at the peak of the next line	rolled left and stopped beside the ramp	Melissa, Dabanca	fail
roll 112 88speed 2.5s	11/25/24	go straight rolling over the ramp and stop at the peak of the next line	rolled on the ramp but rolled off too early	Melissa, Dabanca	fail
roll 100 90 speed 3s	12/2/24	go straight rolling over the ramp and stop at the peak of the next line	roll over the ramp and stop a little too late	Melissa, Aiden, Fabiana	pass
delay 3s roll 180 90speed 2s	12/2/24	go down and hit the markers	went right on the line	Melissa, Aiden, Fabiana	fail
roll 225 135 speed 2.7s	12/2/24	go down and hit the markers	go straight down and hit the markers	Melissa, Fabiana, Aiden	pass

5.7 Task List/Gantt Chart



5.8 Staffing Plan

Name	Role	Responsibility	Reports To
Aiden Ramsay	Manager	Staffing plan, algorithm, portability, EDD, product description, purpose and scope, and GitHub	
Fabiana Torres	Collaborator	Gnatt chart, requirements, user characteristics	Manager
Melissa Blanc Doblas	Collaborator	Test planning, software, assumptions	Manager
Dabanca Chery	Collaborator	System flow, hardware, dependencies, and constraints	Manager