Sprint 3 - Agility Design Document

December 4, 2023

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1. Executive Summary

1.1 Project Overview

This project is split into 4 parts- agility being the 3rd. The course will start in a square. Then the robot will encounter 3 objects which it must avoid.. Next, the robot will go over the ramp. Finally, the robot will know over as many pins as possible. Points added for each obstacle the robot completes, for each obstacle avoided and, for each pin the robot topples.

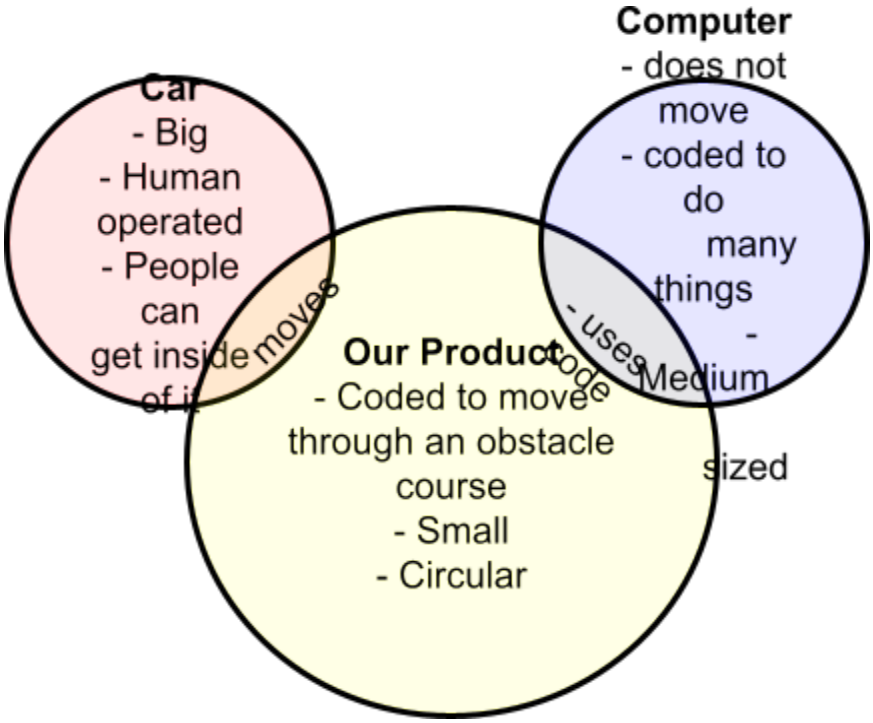
1.2 Purpose and Scope of this Specification

This document addresses requirements related to phase 3 of our CS final:

- Accuracy
- Agility
- Repetition
- Precision

2. Product/Service Description

This project requires our robot to travel through an obstacle course. Some possible factors that may affect or challenge us in the completion of this project are how the robot glides after we code it to stop moving, how to maneuver the angles, speed, and timing of the block code, any dirt or obstacles in the way that may knock our robot ff its path, and the trial and error in getting our robot to precisely topple the pins and maneuver through the course.



2.1 Product Context

This product relates to automobiles in the way that they both move, though they are different because our product is coded and small, and cars are user operated and large. This product relates to a computer in the way that they both use code to operate, though they are different because our product is coded to move, and computers are coded for a multitude of reasons, but they are not able to move.

2.2 User Characteristics

1. Student
    a. in a computer science class
    b. has a computer
2. Teacher
    a. teaching the computer science class
    b. has a computer

2.3 Assumptions

In order to use this product, you would need to have a Sphero SPRK+ robot, a computer or phone that can run Sphero EDU, and access to room HH208. That can be checked on the MyMU.

2.4 Constraints

This design may not work if you do not have…

- the current version of Sphero EDU downloaded on your device
- access to room HH208
- a Sphero SPRK+ robot
- an obstacle course
- a correct orientation of your robot
- a working computer with a lot of disc space

The obstacle course had odd metrics and needed to be coded to the specific metrics of the classroom the obstacle course was made for

2.5 Dependencies

This product will need…

- the current version of Sphero EDU downloaded on your device
- access to room HH208
- a Sphero SPRK+ robot
- an obstacle course
- a correct orientation of your robot
- a working computer with a lot of disc space

3. Requirements

- Start in the provided square
- Maneuver around the obstacles in the obstacle course
- Conquer the incline
- Knock over pins

3.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
AGILITY_01	Start in the provided square	Easy	1	12/3	12/3
AGILITY_02	Maneuver around the obstacles in the obstacle course	Difficult	1	12/3	12/3
AGILITY_03	Conquer the incline	Difficult	1	12/3	12/3
AGILITY_04	Knock over pins	Easy	1	12/3	12/3

3.2 Security

3.2.1 Protection

The computer used should have a password in order to keep the code secured. The robot should be in possession of the students at all times so it does not get lost or stolen.

3.2.2 Authorization and Authentication

The computer will have to be logged on by one of the students/team members.

3.3 Portability

All of the parts are relatively portable. The computer can be a laptop which you can carry around, and the robot is small enough to fit in a backpack. You just can't take room HH208 with you.

4. Requirements Confirmation/Stakeholder sign-off

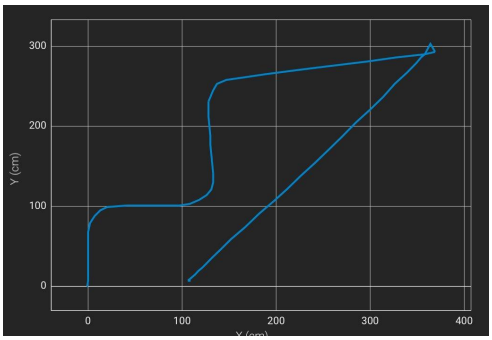
Meeting Date	Attendees (name and role)	Comments
12/3/2023	Lynda, Kevin, Chris	4th meeting outside of class (sprint 3)

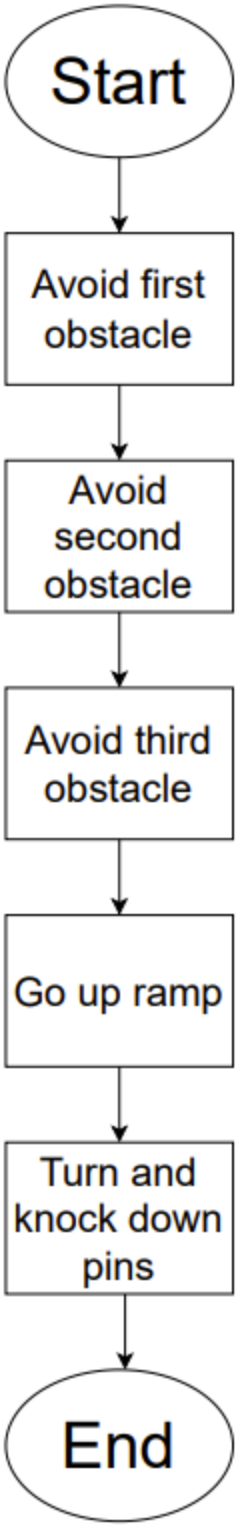
5. System Design

5.1 Algorithm

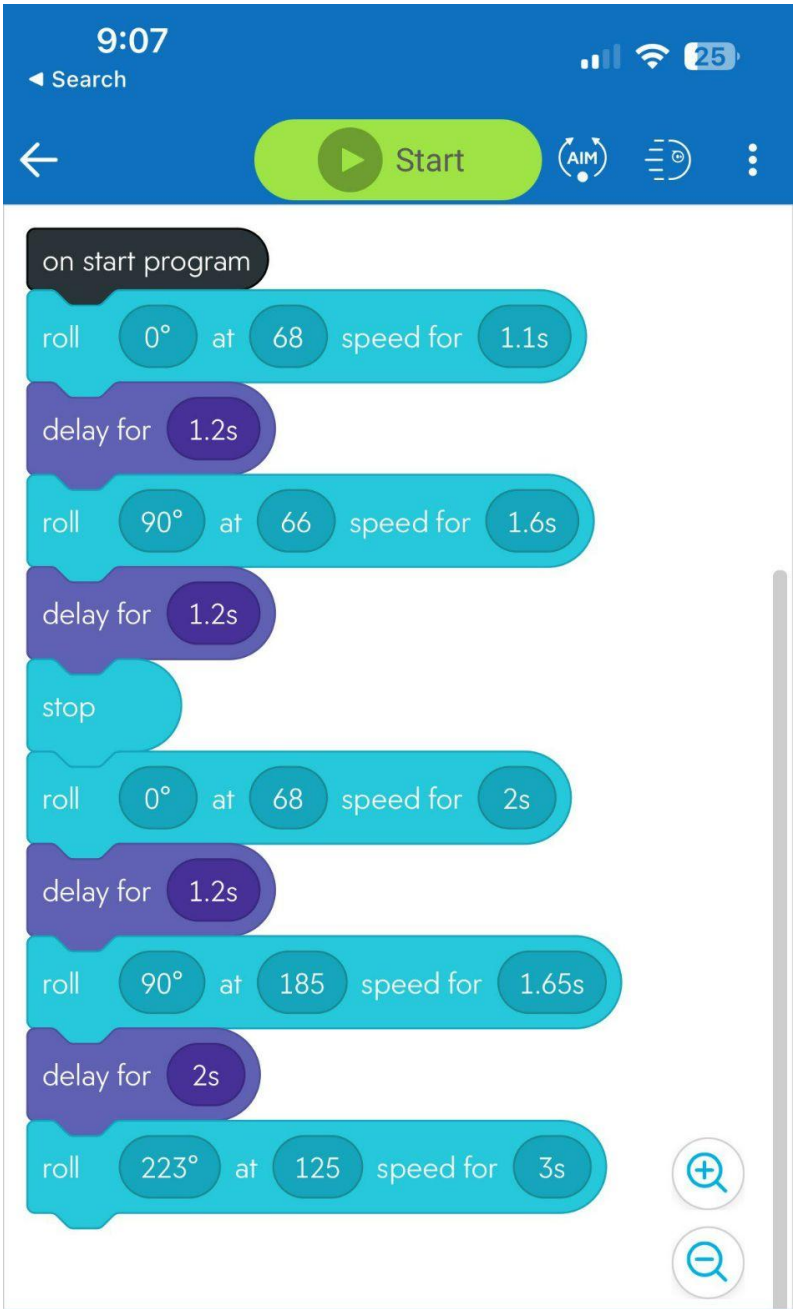
- Start in the starting square of obstacle course
- Move 3’3 feet forward (avoid obstacle in path)
- Move 3’3 feet to the right (avoid obstacle in path)
- Move 3’10 feet forward (avoid obstacle in path)
- Move 7 feet to the right
- Move 9’1 feet to the right (knock into the pins)

5.2 System Flow




Start
Avoid first obstacle
Avoid second obstacle
Avoid third obstacle
Go up ramp
Turn and knock down pins
End

5.3 Software



5.4 Hardware

- a Sphero SPRK+ robot
- a working computer with a lot of disc space

5.5 Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Maneuver the obstacles	12/3	it willmove around all the obstacles	knocked into the first obstacle	Lynda, Chris	Fail

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Maneuver the obstacles	12/3	it will move around all the obstacles	knocked into the second obstacle	Lynda, Chris	Fail
Maneuver the obstacles	12/3	it will move around all the obstacles	knocked into the third obstacle	Lynda, Chris	Fail
Maneuver the obstacles	12/3	it will move around all the obstacles	moved around all the obstacles	Lynda, Chris	Pass
Get over the ramp	12/3	it will go over the ramp	it was too slow	Lynda, Chris	Fail
Get over the ramp	12/3	it will go over the ramp	it got over the ramp	Lynda, Chris	Pass
Knock into pins	12/3	it will knock over most pins	it knocked over all but 2 pins	Lynda, Chris	Pass

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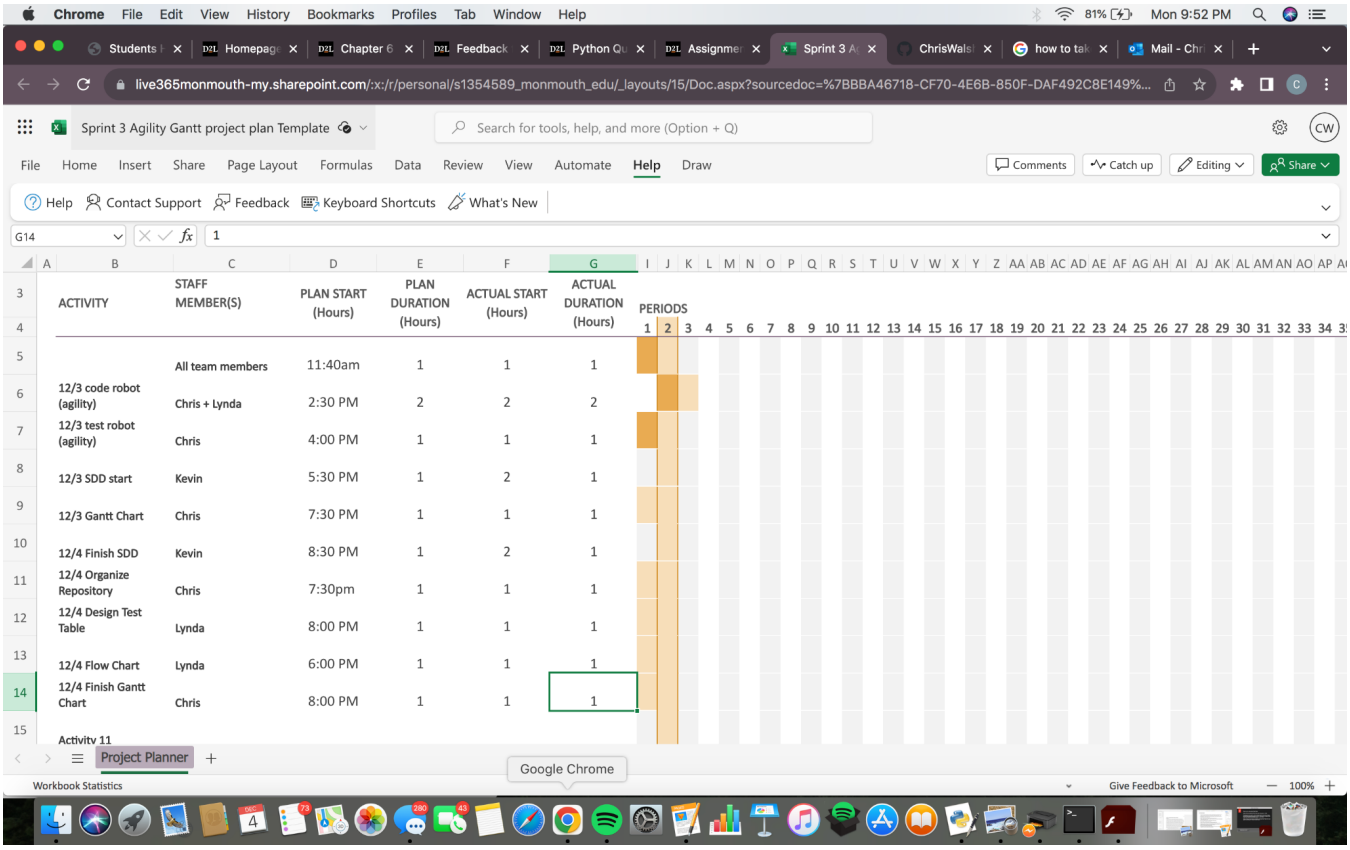
5.6 Task List/Gantt Chart



5.6 Staffing Plan

Name	Role	Responsibility	Reports To
Chris	Tester	Troubleshooting	Lynda

Name	Role	Responsibility	Reports To
Lynda	Center of data	Puts work into data tables (data entry)	Kevin
Kevin	Manager	Make sure everything is on task	Chris