Executive Summary

1.1   Project Overview

This project consists of our robot running an obstacle course set up. The course starts in a square and must avoid 3 objects. Next, the robot will go over a ramp. Last, the robot will knock as many pins over as possible.

1.2   Purpose and Scope of this Specification

The purpose is for the robot to successfully travel the obstacle course flawlessly.

In scope
- **The robot**
- **The obstacle course**
- **The pins**

Out of Scope
- **Code itself**
- **Software that allows the robot to run**
- **Sphero.edu**

2. Product/Service Description

2.1   Product Context

The general factor that affects this product is the obstacle course that has been set up. Also the 3 objects that must be avoided factor into the design because the robot cannot hit the objects. This project is not independent because it relies on the obstacle course. It relat4ed with a variety of related systems because it relies on sphero.edu

2.2   User Characteristics

Create general customer profiles for each type of user who will be using the product. Profiles should include:

- **Students**
- **Faculty**
- **Developers**
- **Those involved in programming**

2.3   Assumptions

Sphero.edu has to be available in order for the robot to work. Also the classroom and the obstacle course has to be available so the robot can run the course. The robot itself is essential because without it, the project cannot be done.

2.4   Constraints

Describe any items that will constrain the design options, including

- **A working computer**
- **Sphero.edu**
- **Robot**
- **Obstacle course**
- **Computer with proper battery life**

2.5 Dependencies

List dependencies that affect the requirements.

- **Code needs to match requirements**
- **Intended audience needs to be accurate**
- **Classroom needs to be present in order for the obstacle course to be set up**
- **Septrin 1 needs to be completed**
- **Sprint 2 needs to be completed**

3. Requirements

- **Robot will start in classroom**
- **Robot must travel entire obstacle course provided**
- **Robot must avoid all objects that come its way**
- **Robot will go over a ramp successfully**
- **Robot must knock as many pins as possible down**

3.1 Functional Requirements

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed / Approved
ENDUR_01	Robot must complete obstacle course	none	yes	4/21/20	everyone
ENDUR_02	must avoid objects	there will be 3 objects	yes	421/20	everyone
ENDUR_03	robot will go over a ramp	none	yes	4/21/20	everyone
ENDUR_04	robot will knock as many pins as possible down	points added to each pin knocked down	yes	4/21/20	everyone

3.2 Security

3.2.1 Protection

Specify the factors that will protect the system from malicious or accidental access, modification, disclosure, destruction, or misuse. For example:

Data integrity checks allow a user to observe discrepancies in the handling of a system. Activity logging is a logbook which displays the chain of custody/action of all activity for a system.

3.2.2 Authorization and Authentication

Specify the Authorization and Authentication factors. Consider using standard tools such as PubCookie.

While utilizing tools such as Pubcookie, Authentication is a centralization based process that must be obtained before users can attain authorization.

3.3 Portability

If portability is a requirement, specify attributes of the system that relate to the ease of porting the system to other host machines and/or operating systems. For example,

There are four attributes that can apply to portability of a system. Installability, Adaptability, Replaceability, and Compatibility.

Use of a proven portable language is required for adaptability and compatibility when porting the system to other host machines. Language must be interchangeable and independent enough to operate in its own environment. In some cases where replacing is necessary, systems must be able to overtake host operating systems with its original language.

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
4/21/20	Tom	confirmed
4/21//20	Meghan	confirmed
4/21/20	Tyrone	confirmed

5. System Design

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

5.1 Algorithm

Develop and describe here the algorithm that will be used to provide the required performance of your software
- start program
- roll forward from start for 5 seconds with speed 40
- spin clockwise around object 1
- roll forward for 3 seconds with speed 40
- spin counterclockwise around object 2
- roll to the right for 2 seconds with speed 40
- spin clockwise around object 3
- roll straight towards end
- end program

5.2 System Flow

Develop a flowchart (and show here) that accurately depicts how your software application will act to fulfill the algorithm
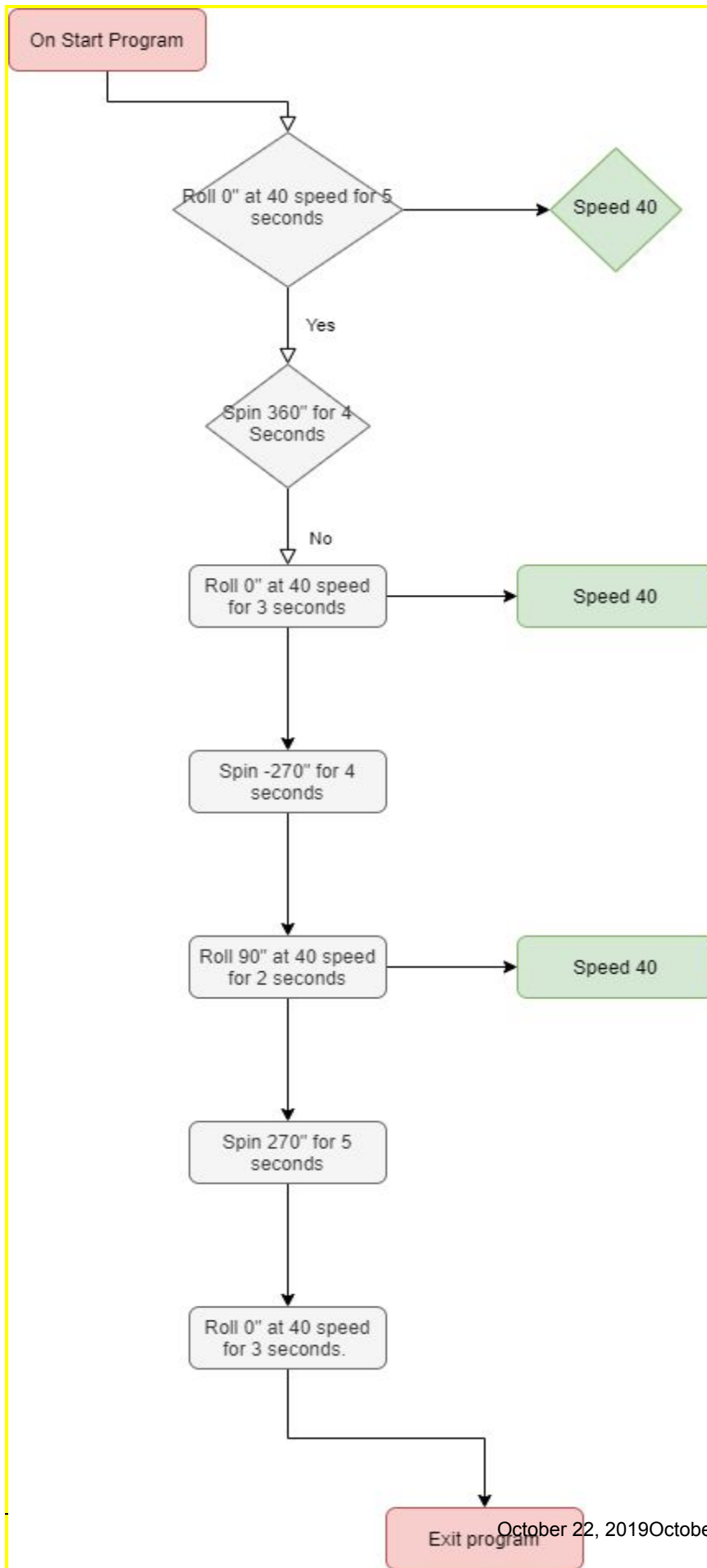
5.3   Software

- **Sphero.edu**

5.4   Hardware

- **MacBook Pro**
- **Sphero.edu**

5.5   Test Plan

Include a test plan showing all unit tests performed for this application, Include test rational, test date, staff member, pass/fail status

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
speed	4/21	constant speed	speed was good rate	Meghan	pass
goes around object 1	4/21	moves in complete circle around object	circle needs to be larger	Meghan	fail
goes around object 1	4/21	moves in complete circle around object	moved around without hitting object	Meghan	pass
goes around object 2	4/21	moves through legs of table without hitting	direction was incorrect, needs to be negative direction	Meghan	fail
goes around object 2	4/21	moves through legs of table without hitting	hit 1 leg of table	Meghan	fail

goes around object 2	4/21	moves through legs of table without hitting	did not hit table	Meghan	pass
goes around object 3	4/21	moves around object without hitting	did not hit object 3	Meghan	pass
continues and makes complete stop at end	4/21	moves straight, does not hit any objects	moves straight, does not hit any objects	Meghan	pass

5.6   Task List/Gantt Chart

	A	B	C	D	E	F	G
	Members	Activity	Plan Start (min)	Plan Duration(min)	Actual Start(min)	Actual Duration(min)	Percent Complete
	Tom	Product Overview	0	20			100%
	Tom and Meghan	Complete Executive Summary	20	5			100%
	Tom and Meghan	Complete Product/Service Description	25	20			100%
	Tom	Complete Requirements	45	10			100%
	Tyrone	Complete Security Requirements	55	15			100%
	Tom and Meghan	Complete Requirements Confirmation/Stakeholder sign-off	70	10			100%
	Meghan	Complete Code for Robot	80	20		100%%	
	Meghan	Complete System Design	100	30			100%
	Tom	Complete Gantt Chart	130	20			100%
	Tyrone	Complete Flowchart	150	20			100%

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
Meghan	code	writing and testing program code, system design template	Tom
Tom	system design	algorithm, system design, gantt chart, requirements, project overview, product description	Tom
Tyrone	flowchart, Security section	creating flowchart, security requirement and questions	Tom