Sprint 3 - Endurance Design Document

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Table of Contents

[1. Executive Summary 3](#_Toc21616852)

[1.1 Project Overview 3](#_Toc21616853)

[1.2 Purpose and Scope of this Specification 3](#_Toc21616854)

[2. Product/Service Description 3](#_Toc21616855)

[2.1 Product Context 3](#_Toc21616856)

[2.2 User Characteristics 3](#_Toc21616857)

[2.3 Assumptions 3](#_Toc21616858)

[2.4 Constraints 3](#_Toc21616859)

[2.5 Dependencies 4](#_Toc21616860)

[3. Requirements 4](#_Toc21616861)

[3.1 Functional Requirements 5](#_Toc21616862)

[3.2 Security 5](#_Toc21616863)

[3.2.1 Protection 5](#_Toc21616864)

[3.2.2 Authorization and Authentication 6](#_Toc21616865)

[3.3 Portability 6](#_Toc21616866)

[4. Requirements Confirmation/Stakeholder sign-off 6](#_Toc21616867)

[5. System Design 6](#_Toc21616868)

[5.1 Algorithm 6](#_Toc21616869)

[5.2 System Flow 6](#_Toc21616870)

[5.3 Software 6](#_Toc21616871)

[5.4 Hardware 6](#_Toc21616872)

[5.5 Test Plan 7](#_Toc21616873)

[5.6 Task List/Gantt Chart 7](#_Toc21616874)

[5.7 Staffing Plan 7](#_Toc21616875)

# Executive Summary

## Project Overview

Our goal for this project is to make the Sphero robot complete an obstacle course. The course will start in a square. Then the robot will encounter 3 objects which it must avoid. Next, the robot will move to stage 2 square

and knock over as many pins as possible. Then the robot will proceed to stage 3 square, go over the ramp and finish in the same square where it started. Points added for each obstacle the robot completes, for each obstacle avoided, for each pin the robot topples and for each square the robot stops in during its run.

## Purpose and Scope of this Specification

In scope

Our main goal is to succesfully complete the obstacle course. By avoiding the 3 objects, knocking over pins and going over a ramp.

Out of Scope

Full credit is awarded if the robot avoids all objects, toppling over each pin, and stops at each stage square. Speed is also a huge factor in this.

# Product/Service Description

## Product Context

This is the third and last sprint in the Robotics Triathlon. The obstacle course is an indicator to the Sphero robot’s speed.

## Assumptions

Limited availability of the robots causes us to schedule ahead of time. We must also set up accurate measurements for the obstacle course so our program will operate exactly as planned.

## Constraints

As far as our group is concerned, there are no constrains that stop us from completing the project.

## Dependencies

As far as our group is concerned, we have no dependencies either.

# Requirements

## Functional Requirements

| Req# | Requirement | Comments | Priority | Date Rvwd | SME Reviewed / Approved |
| --- | --- | --- | --- | --- | --- |
| Req 1 | Avoid 3 objects |  | 1 | 11/23/19 |  |
| Req 2 | Stage 2 square |  | 1 | 11/23/19 |  |
| Req 3 | Speed up |  | 1 | 11/24/19 |  |
| Req 4 | Go over ramp |  | 1 | 11/24/19 |  |
| Req 5 | Slow Down |  | 1 | 11/24/19 |  |
| Req 6 | Stage 3 square |  | 1 | 11/24/19 |  |
| Req 7 | Knock over pins |  | 1 | 11/25/19 |  |
| Req 8 | Stop at starting point |  | 1 | 11/25/19 |  |
|  |  |  |  |  |  |

## Security

### Protection

Nothing physically protects the Sphero from going off course, the only thing that ensures the sphere’s completion of the task is its programming.

# 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 |
| 11/24/19 | Lance, Jannut, O’Cyrus | confirmed all requirements |
|  |  |  |

# System Design

## Algorithm

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

1. Start on start square
2. Avoid three objects
3. Move to stage 2 square
4. Speed up
5. Go over a ramp
6. Slow down
7. Move to stage 3 square
8. Knock over as many pins as possible
9. Finish at starting square

## System Flow

See in GitHub link

## Software

Sphero Edu Application

## Hardware

Sphero Gyro Robot

## Test Plan

| **Reason for Test Case** | **Test Date** | **Expected Output** | **Observed Output** | **Staff Name** | **Pass/Fail** |
| --- | --- | --- | --- | --- | --- |
| To make sure Sphero successfully avoids 3 objects | 11/23/19 | Avoids 3 objects | Avoided 2 and hit 1 | O’Cyrus | Fail |
| Make sure Sphero goes over ramp | 11/24/19 | Turns green at start and red at end | Went over ramp | O’Cyrus | Pass |
| Make sure Sphero knocks over pin | 10/28/19 | Sphero rotates 90 degrees at yellow markers | Sphero did not hit most pins but not all | O’Cyrus | Fail |
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## Task List/Gantt Chart

See in GitHub link

## 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 |
| --- | --- | --- | --- |
| Lance | Planner | Gantt Chart | Jannut |
| O’Cyrus | Programmer | Programming/Flowchart | Jannut |
| Jannut | Designer | Design Document | Eckert |