Sprint 1 - Endurance Design Document

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# Executive Summary

## Project Overview

Our robot should successfully travel around the rectangular course in room HH208. This is the endurance course

## Purpose and Scope of this Specification

In scope

* Responsibilities
* Meet times
* The course the robot will run

Out of Scope

* Exact code needed to complete track
* Length of time needed to complete

# Product/Service Description

* Robot needs to be charged to start the course.
* Robot is Bluetooth, so we need a device to connect to it to start the robot.

## Product Context

The product interface has lots of different options for movement, other robot types, and various kinds of block code for movement. It is dependent of the user to move and complete something such as the rectangular course being completed

## User Characteristics

* Justin – Novice Python experience, never used Shepro robot prior, no experience using block code or javascript
* Briana – Never used Sphero Robot prior, no experience using block code or javascript
* Jason - Never used Sphero Robot prior, no experience using block code or javascript

## Assumptions

* Equipment availability, if robot isn’t available, we would be able to test our code and see if the robot moved correctly.
* Need an electronic device to connect to robot to start it and make it move.
* If equipment isn’t fully charged, we wouldn’t be able to use it and test it out.
* In order for the robot to run the full course we need the block code to be finished.

## Constraints

Any items that will constrain the design options, including

* Sphero may or may not have issues connecting to certain devices
* Sphero may not roll correctly while on its path (I.e curving, sliding)
* Access to sphero is limited, there is only one sphero for three peopel
* criticality of the application
* Sphero application may react/work differently depending on OS (Windows, Linux, IOS, Android etc)
* Limited knowledge of Javascript
* Time constraints of physical meetings

## Dependencies

List dependencies that affect the requirements.

* The robot must be connected to a device via Bluetooth in order to function
* Said device must be on and not have other devices connected to it.
* The device must not have any interferences.
* This robot will require to be charged before running the course.
* This robot needs a block code in order to run the course correctly.

# Requirements

* Robot must follow course in the room.
* Robot should start with a green light and speak “ready set go”
* Stop with a red light and speak “I’m done and I need water”
* Must finish where it started.
* Must complete a block code for the robot to run the course.
* A flow chart must be completed

## Functional Requirements

| Req# | Requirement | Priority | Date Rvwd |
| --- | --- | --- | --- |
| END\_01 | Block Code/Sensor data | 1 | 3/21 |
| END\_02 | System Design Doc | 1 | 3/21 |
| END\_03 | Flow chart | 1 | 3/21 |
| END\_04 | Video | 1 | 3/21-28 |
| END\_05 | Ghant Chart | 1 | 3/21-28 |
| END\_06 | Requirement Table | 1 | 3/21-28 |
| END\_07 | Test Table | 2 | 3/21-28 |
| END\_08 | Staffing plan | 2 | 3/21-28 |
| END\_09 | Github Repos. | 2 | 3/21-28 |

## Security

### Protection

* Meetings and dates the program is accessed are recorded
* Sphero account is under 1password

### Authorization and Authentication

1password keeps data in a guarded virtual vault

## Portability

The sphero.edu website/app has an open option to be shared with others, as well as a private option, connecting the robot to a device is simple, all it requires is a stable bluetooth connection, and how the robot moves/speaks/lights up is not affected by the OS differences.

# Requirements Confirmation/Stakeholder sign-off

|  |  |  |
| --- | --- | --- |
| Meeting Date | Attendees (name and role) | Comments |
| 3/7/22 | All members | Confirmed roles, work that needed to be completed, time frames |
| 3/21/22 | Justin, Project Manager, and Briana Document recorder | Confirmed block code, robot track completion, finish up SDD |

# System Design

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

* We created an algorithm and made a flow chart
* Then did the block code for the robot to move.
* We tested the robot with the code a couple times to see if it ran correctly.

## Algorithm

setMainLed({ r: 0, g: 255, b: 0 });

await speak('Ready. Set. Go', true);

await roll(0, 35, 9.9);

stopRoll();

await delay(3);

await roll(90, 60, 11.2);

stopRoll();

await delay(3);

await roll(180, 35, 9.9);

stopRoll();

await delay(3);

await roll(270, 60, 11.2);

stopRoll();

setMainLed({ r: 255, g: 32, b: 0 });

await speak('I’m done and need water', true);

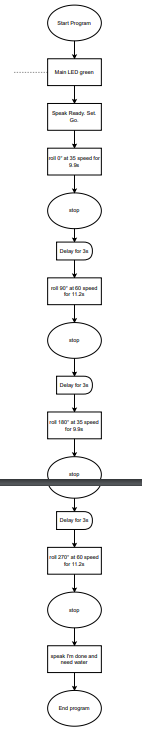
exitProgram();

This is the Javascript code used to direct the robot, It was put together using block code

Graphical user interface, text, application, chat or text message

Description automatically generated

## System Flow



## Software

The Sphero application follows block code/javascript

## Hardware

Cell phones and laptops were used to create/ put together the block/javascript code

## Test Plan

| **Reason for Test Case** | **Test Date** | **Expected Output** | **Observed Output** | **Staff Name** | **Pass/Fail** |
| --- | --- | --- | --- | --- | --- |
| Get Project started | 3/1 | Robot would be able to lead itself in a straight line | Robot was able to complete steadily moving forward on track line | Justin | Pass |
| Get Block Code put together | 3/7 | Complete course | Robot could not end at starting point, moved too fast | Jason | Fail |
| Try to run full course, understand speeds/delays | 3/21 | Complete course | Robot could not end at starting point, became unable to complete entire course | Briana | Fail |
| Run course | 3/24 | Complete course | Robot could not end at starting point | All | Pass |
| Confirm course is ran correctly | 3/28 | Complete course | Robot was able to complete course without hitting objects | Justin, Briana | Pass |

## Task List/Gantt Chart

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ACTIVITY** | **STAFF**   **MEMBER(S)** | **PLAN START**  **(Hours)** | **PLAN DURATION**  **(Hours)** | **ACTUAL START**  **(Hours)** | **ACTUAL DURATION**  **(Hours)** | **PERCENT COMPLETE** |
|  |  |  |  |  |  |  |
| **Develop a plan (Gantt chart)** | **Justin** | 1 | 1 | 1 | 1 | **100%** |
| **Build requirements table** | **Justin** | 2 | 1 | 1 | 1 | **100%** |
| **Algorithim** | **Briana** | 3 | 2 | 1 | 1 | **100%** |
| **FlowChart** | **Jason** | 5 | 1 | 2 | 1 | **100%** |
| **Block Code** | **Justin** | 6 | 8 | 3 | 3 | **100%** |
| **Sensor Data Diagram** | **Briana** | 8 | 2 | 6 | 1 | **100%** |
| **Test Table** | **Briana** | 10 | 1 | 6 | 1 | **100%** |
| **Staffing Plan** | **Justin** | 11 | 1 | 6 | 1 | **100%** |
| **SDD** | **Briana** | 12 | 2 | 7 | 1 | **100%** |
| **Robot Video** | **Jason** | 14 | 1 | 8 | 1 | **100%** |
| **Github Repos** | **Jason** | 15 | 1 | 8 | 1 | **100%** |

## 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 |
| --- | --- | --- | --- |
| Justin | Project Manager | Manage roles, responsibility, meet times | All |
| Briana | Documentation  Recorder | Documentation Corrections/SDD completion | All |
| Jason | Visual | Creates workspace (GitHub)/flowcharts/Robot Videos | All |