Sprint 2 - Accuracy Design Document

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# Executive Summary

## Project Overview

This project is to test our knowledge of software engineering. We test our knowledge of making algorithms, testing code, and making flow charts. Each group is assigned a robot that must do the following: Go around the endurance course. There are a series of requirements the robot must do while doing this course. Like color changes, speaking, and staying on the path.

## Purpose and Scope of this Specification

In scope

Modification of the second sprint, give a good deep analysis of sprint 2. It helps us gain more experience for our final sprint.

Out of Scope

It helps give us knowledge for sprint 3. Gets us ready for any changes that need to be made for upcoming projects and assignments.

# Product/Service Description

Some General factors that can affect the product and its requirements are:

* Robot battery
* Room availability
* Group member availability
* Other groups working on at the same time

## Product Context

It relates to other products because we are basically in our own software engineering group, working on a project. It relates to real world scenarios for future software engineers because you work in a group, and each member must do their part.

## User Characteristics

* Professors
* Students
* Group members
* Kids
* No experience required
* People do not need any technical expertise

## Assumptions

We would assume:

* that the rooms would be available on the times listed
* Our group will meet when scheduled too
* The robot block code will work when started
* The Robot is fully functioning and charged

## Constraints

* The room is not available
* The robot isn’t charged
* The block code doesn’t work
* Only one member of the group can meet
* The course tape is ripped

## Dependencies

* Robot must be charged
* Door to room must be unlocked
* Building must be open
* Sphero Edu app must be available with the code
* Lights in the room must work
* Area must be clear

Requirements

* In the following table there are a list of requirements that must be met to successfully complete the project. The robot must start in the center of the figure 8. The robot must successfully do the figure 8 five times. The robot must do this while staying within the path required. When the robot successfully completes the figure 8 five times it must stop where it started. Once it does that it must speak “I am the winner!”, then flash multicolored lights for 5 seconds.

Priority Definitions

The following definitions are intended as a guideline to prioritize requirements.

* Priority 1 – States the requirements that must be met to achieve the goal
* Priority 2 – States certain secondary needs that can help make the robots path of travel and code more accurate.
* A good requirement is:
  + Making sure the robot stays within the path

## Functional Requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Endur\_01 | Blue light faces opposite direction of initial | Not required, however, to go on the right path alignment is vital | 2 | 3/30/2022 | Approved |
| Endur\_02 | Robot Starts in the center of the two circles |  | 1 | 3/30/2022 | Approved |
| Endur\_03 | Robot spins  -360 degrees | This starts the robot off to complete one part of the figure 8 | 1 | 3/30/2022 | Approved |
| Endur\_04 | Robot spins 360 degrees | This helps the robot complete the other part of the figure 8 | 1 | 3/30/2022 | Approved |
| Endur\_05 | Robot completes the figure 8 loop 5 times |  | 1 | 3/30/2022 | Approved |
| Endur\_06 | Robot stops where it started |  | 1 | 3/30/2022 | Approved |
| Endur\_07 | Robot Speaks: “I am the Winner!” |  | 1 | 3/30/2022 | Approved |
| Endur\_08 | Robot flashes multicolored lights for 5 seconds |  | 1 | 3/30/2022 | Approved |

## Security

### Protection

* We all have our own emails and passwords that aren’t shared
* Our laptops and devices are locked with passcodes so no one can get in
* The Sphero Edu app is linked up to our personal emails where only we can view our code
* Our Git Hub is private so no one can see

### Authorization and Authentication

* Only we can work on our code and test the robot
* The Professor has access to the robot’s code
* Git Hub has authorization and requires you to sign in

## Portability

* Our laptops are portable
* Our Sphero Robot is portable
* The Sphero Edu app is on every device, so we always have access to it

# Requirements Confirmation/Stakeholder sign-off

|  |  |  |
| --- | --- | --- |
| Meeting Date | Attendees Name and Role | Comments |
| 3/30/2022 | Brandon, Xabien  (Block code program) | Successful meeting. Didn’t have too much trouble with this one. The only problem we had was getting the robot to stay within the path, which was fixed by adjusting the speed at which the robot executed the program. |

# System Design

## Algorithm:

* Loop Program 5 times
* Set Speed to 63
* Spin -360 degrees for 7 seconds
* Spin 360 degrees for 7 seconds
* End loop after 5 times
* Stop
* Speak: “I am the winner!”
* Fade main light green to pink for 1 second
* Fade main light pink to purple for 1 second
* Fade main light purple to red for 1 second
* Fade main light red to blue for 1 second
* Fade main light blue to yellow for 1 second
* End program

Graphical user interface

Description automatically generated

## System Flow

Diagram

Description automatically generated

## Software

The software language used in this program was block code from Sphero Edu

## Hardware

The Hardware platforms that were used to design and test this, was Sphero Edu app as well as Draw.io

## Test Plan

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Reason for Test Case** | **Test Date** | **Expected Output** | **Observed Output** | **Staff Name** | **Pass/ Fail** |
| Make the robot go in a circle | 3/30 | Go in circle | Went in a circle | Xabien, Brandon | Pass |
| Make the robot follow the figure eight | 3/30 | Go in figure eight | Went in a figure eight | Xabien, Brandon | Pass |
| Make the robot follow the figure eight on the floor | 3/30 | Go in figure eight | Went in figure eight but did not follow the path | Xabien, Brandon | Fail |
| Make the robot follow the figure eight on the floor | 3/30 | Go in figure eight | Went in figure eight but needed readjustment | Xabien, Brandon | Fail |
| Make the robot follow the figure eight on the floor 5 times | 3/30 | Follow the course | Robot travelled around the course | Xabien, Brandon | Pass |

## Task List/Gantt Chart

Chart

Description automatically generated

## Staffing Plan

|  |  |  |
| --- | --- | --- |
| Name | Role | Responsibility |
| Develop a plan (Gantt chart) | Planning | All team members |
| Build Requirements table | Planning | Brandon |
| Requirements Sign Off Table | Planning | Brandon |
| Algorithm | Provide the required performance of our software | Brandon |
| Flowchart | accurately depicts how our software application will act to fulfill the algorithm | Brandon |
| Block code | Instructs the robot to complete the course | All team members |
| Sensor Data Diagram | Data | Xabien |
| Test Table | Data | Joshua |
| Staffing Plan | a chart/table that depicts the roles and responsibilities of each member | Xabien |
| System Design Document | detailing system flow, algorithms, staffing plan, software/hardware, and Test Plan | Brandon |
| Robot video | Video showing robot fulfilling the correct instructions | Xabien |
| GitHub Repository | All members submit their work here | Joshua |