**Sprint 3 - Agility Design Document**

**December 2nd, 2020**

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1. Executive Summary
   1. ***Project Overview***

The intended audience for this project is computer science major or people that want to learn about robots. This project is made to show the change of direction on a course

* 1. ***Purpose and Scope of this Specification***

Describe the purpose of this specification and its intended audience.   Include a description of what is within the scope and what is outside of the scope of  these specifications.

**In scope**

This document addresses requirements related to phase 2 of Project A:

* all past parts are done and filmed for the Sprint 4

**Out of Scope**

The following items in phase 3 of Project A are out of scope:

* Making the presentation  for Sprint 4

(Phase 3 will be considered in the development of the requirements for Phase 2, but the Phase 3 requirements will be documented separately.)

1. Product/Service Description

In this section, describe the general factors that affect the product and its requirements. This section should contain background information, not state specific requirements (provide the reasons why certain specific requirements are later specified).

* 1. ***Product Context***

How does this product relate to other products? Is it independent and self-contained?  Does it interface with a variety of related systems?  Describe these relationships or use a diagram to show the major components of the larger system, interconnections, and external interfaces.

This project does to relate to any other product because only one kind of robot can use it. It does interface with other systems because it can be transferred to other devices easily.

* 1. ***User Characteristics***

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

* Student with a interest in computers or coding
* teacher that want to inspire interest in their students.
* people that want to get into programing
  1. ***Assumptions***

The user must have a device to download the Sphero app. Also the user must know how to operate the app or be taught it because it has no guide to help the user. The equipment is available at any major retail store and costs around $100.

* 1. ***Constraints***

Describe any items that will constrain the design options, including

* We were no able to go into the room
* Time allowed in room given was limited
* materials were not
  1. ***Dependencies***

List dependencies that affect the requirements.  Examples:

* the product needs to have the firmware updated at certain time periods
* the product relies on a downloaded OS on app called Sphero

1. Requirements

* the Robot must follow a path that is laid out for it without crashing into anything
* They will be sharpe right trunks that the robot must take
* They will be a so-called jump that the robot must make.

**Priority Definitions**

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

* Priority 1 – The robot must make all turns at the right time
* Priority 2 – Robot must not touch any touch any of obstacles on the path it will take
* Priority 3 – the robot must make a so called “jump”
* Priority 4 - The robot needs to stay on the correct path
* Priority 5 - It would be nice if that robot hit all of the pins.
  1. ***Functional Requirements***

In the example below, the requirement numbering has a scheme - BR\_LR\_0## (BR for Business Requirement, LR for Labor Relations).  For small projects simply BR-## would suffice. Keep in mind that if no prefix is used, the traceability matrix may be difficult to create (e.g., no differentiation between '02' as a business requirement vs. a test case)

The following table is an example format for requirements.  Choose whatever format works best for your project.

For Example:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req#** | **Requirement** | **Comments** | **Priority** | **Date Rvwd** | **SME Reviewed / Approved** |
| AGLTY\_01 | must travel in a straight line |  |  |  |  |
| AGLTY\_02 | must stop at a certain point then make a right turn |  |  |  |  |
| AGLTY\_03 | then stop again at a point then make a right turn and make a “jump” |  |  |  |  |
| AGlty\_04 | The robot must stop then turn full speed and make impact to attempt to knock over makers. |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* 1. ***Security***
     1. **Protection**

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

* encryption
* activity logging, historical data sets
* restrictions on intermodule communications
* data integrity checks
* the program is only on one device and can be only edited on that device.
* VPN is used on the device has the program
  + 1. **Authorization and Authentication**

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

* 1. ***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,

* the language is very portable and can be copied easily
* The code is entirely host dependent and can be changed at any time.

1. 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** |
| MM/DD/YY | My group member names | confirmed all except AGLTY\_XX |
| MM/DD/YY | My group member names | confirmed…………. |

1. System Design

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

* 1. ***Algorithm***

while robot has not reached 3' 3":

  roll robot

delay robot for x seconds

make robot turn right

while robot has not reached 3' 4":

  roll robot

delay robot for x seconds

make robot turn left

while robot has not reached 3' 10":

  roll robot

make robot turn right

while robot has not reached ramp:

  roll robot

jump ramp

delay robot for x seconds

turn robot in a 45º angle to the right

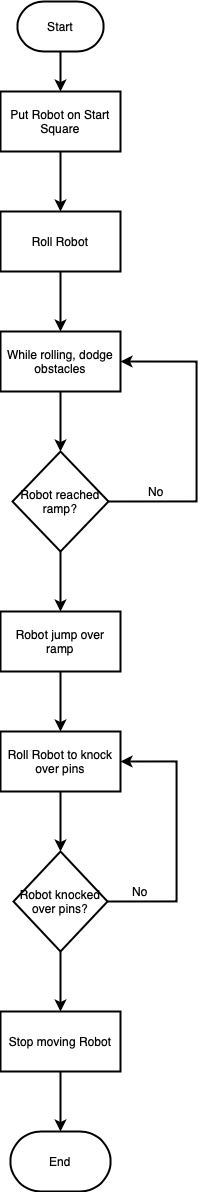
while robot has not reached 7' 1"

  roll robot

hit markers

stop robot

* 1. ***System Flow***



* 1. ***Software***

The software is the Sphero app that uses block coding

* 1. ***Hardware***

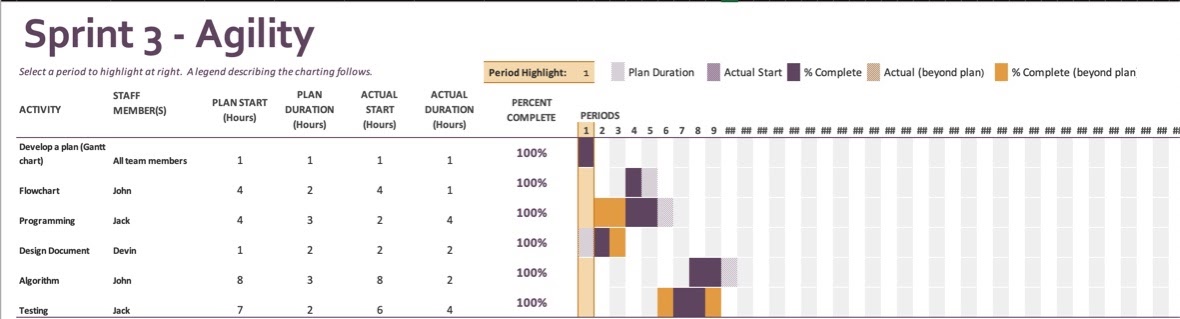
Describe hardware platforms that were used to develop, test and demonstrate this application

* 1. ***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** |
| to see if the robot can make it to the first stopping point | 12/1/2020 | the robot will not make it to the first stopping point or over shoot the point | the robot over shoot the stopping point | jack | fail |
| to see if the robot will make it  to the first stopping point | 12/1/2020 | the robot will make it to that stopping point and stop on time. | the robot stopped in time | jack | pass |
| to see if the robot will make the first stop and reach the second stopping point | 12/1/2020 | the robot will make the first stop but will not make the second stop. | the robot made the first stopping point, but didnt make the sound stopping point | jack | fail |
| to see if the robot will make it to the sound stopping point | 12.1.2020 | the robot will make it to the sound stopping point | the robot made the sound stopping point | jack | pass |
| to see if robot reaches the third stopping point | 12/1/2020 | the robot will over shoot the stopping point | the robot did not make it to the third stopping point | jack | pass |
| to see if the robot can make the fourth stopping point | 12/1/2020 | the robot may take the sworn angle or overshoot the stopping point | the robot took the wrong angle and did not make it to the stopping point. | jack | fail |
| to see if the robot will take the right angle and make the stopping point | 12/1/2020 | the robot will take the right angle and the stopping point | the robot took the right angle and stop n time | jack | pass |
| to see if the robot will take the right angle to crash into the pins | 12.1.2020 | the robot will take the right angle to crash into the pins | the robot took the right angle to crash into the pins | jack | pass |
| to see if the robot will make all of the stopping points and take the right angles | 12/1/2020 | the robot will make all of the stopping points and finish | the robot made all the stopping points and took the right anlges | jack | pass |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

* 1. ***Task List/Gantt Chart***



* 1. ***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 |
| Jonathan Cheema | Organizer | Create plans of blocks of code by constructing a flowchart, algorithm, and make sure every part of the project is completed | Jack |
| Jack Berkowitz |  |  |  |
| Devin Brattvet |  |  |  |