Sprint 3 - Agility Design Document

December 2, 2021

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# Executive Summary

## Project Overview

* The goal of this project is to construct a plan that will allow our Sphero robot to complete the agility course in HH208.

## Purpose and Scope of this Specification

**In scope**

* Completing the requirements of the Sprint-3 Agility course.

**Out of Scope**

* Completing the requirements of the Sprint 1-Endurance course.
* Completing the requirements of the Sprint 2-Accuracy course.

# Product/Service Description

## Product Context

* This project is not related to the other Sprint project
* Each of the Sprint projects are self-contained.

## User Characteristics

* Student/Teacher
* Programmer

## Assumptions

* Sphero Edu will be used for designing the code
* HH208 will be available to test our code
* The Sphero robot will be used for this project

## Constraints

* Must use Sphero block code
* Must use the accuracy course in HH208

## Dependencies

* HH208 will need to be available to test the robot on the accuracy course
* The Sphero robot will need to be available to test our block code

# Requirements

## Functional Requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Req#** | **Requirement** | **Comments** | **Priority** | **Date Rvwd** | **SME Reviewed / Approved** |
| AGILITY\_01 | Sphero robot must start inside the square on the obstacle course. |  | 1 | 12/1 |  |
| AGILITY\_02 | Sphero robot must follow the course outline |  | 1 | 12/1 |  |
| AGILITY\_03 | The robot must avoid the 3 objects it encounters. |  | 1 | 12/1 |  |
| AGILITY\_04 | The robot must go over the ramp. |  | 1 | 12/1 |  |
| AGILITY\_05 | Robot must knock down as many pins as possible |  | 1 | 12/1 |  |

## Security

### Protection

* A password to the Sphero Edu account is required to access the block code.
* The SDD and Gantt Chart cannot be accessed without the host’s permission.

### Authorization and Authentication

* You must enter the correct email and password to be authorized to access the block code
* The document creator must authorize access to the SDD and the Gantt Chart

## Portability

* The computer where the block code is located is portable.
* The Sphero robot is portable
* The HH208 agility course is not portable

# Requirements Confirmation/Stakeholder sign-off

Include documentation of the approval or confirmation of the requirements here. For example:

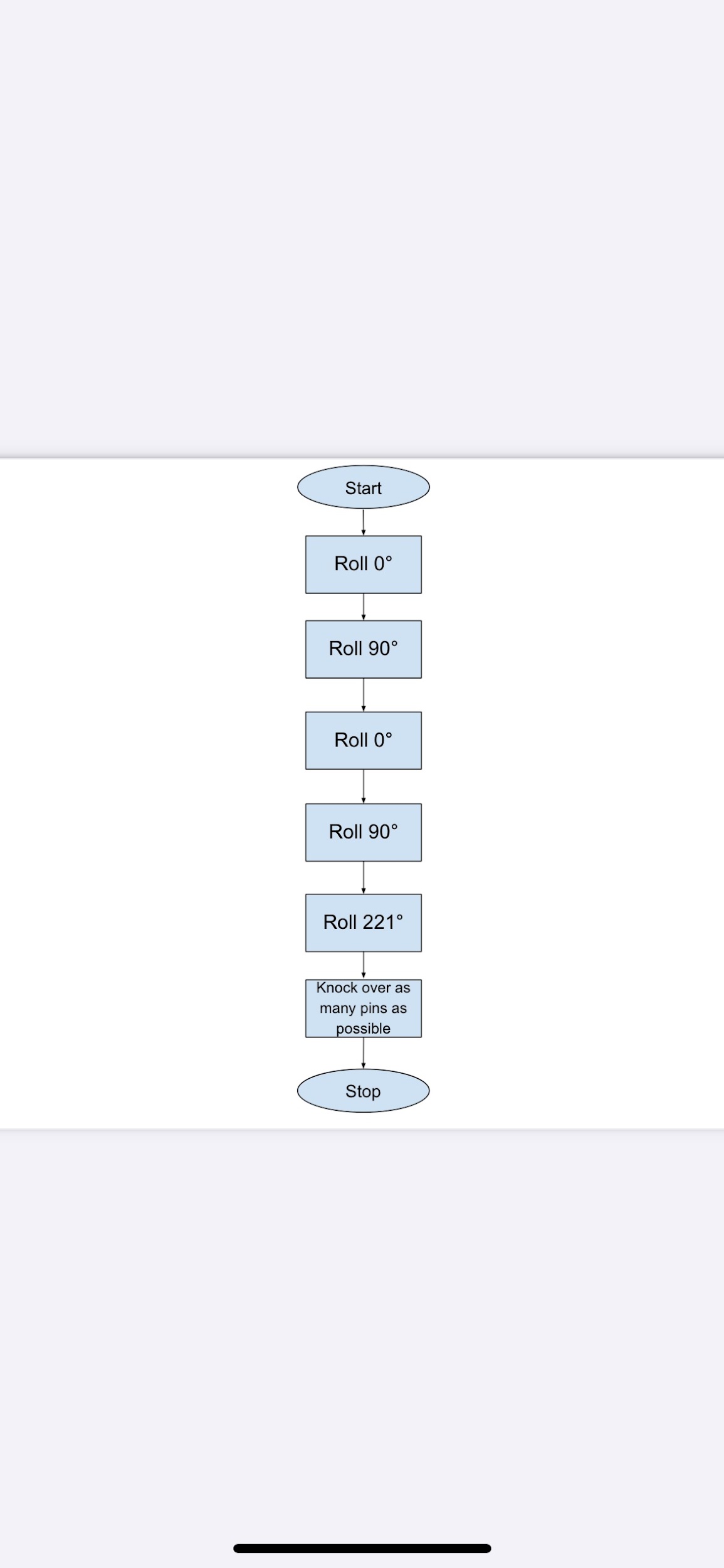
|  |  |  |
| --- | --- | --- |
| **Meeting Date** | **Attendees (name and role)** | **Comments** |
| 12/1 /21 | Patrick Frohn | Confirmed all |
| 12/1 /21 | Madison Kapuscinski | Confirmed all |

# System Design

## Algorithm

* Start
* Roll 0 degrees
* Roll 90 degrees
* Roll 0 degrees
* Roll 90 degrees
* Roll 221 degrees
* Knock over as many pins as possible
* Stop

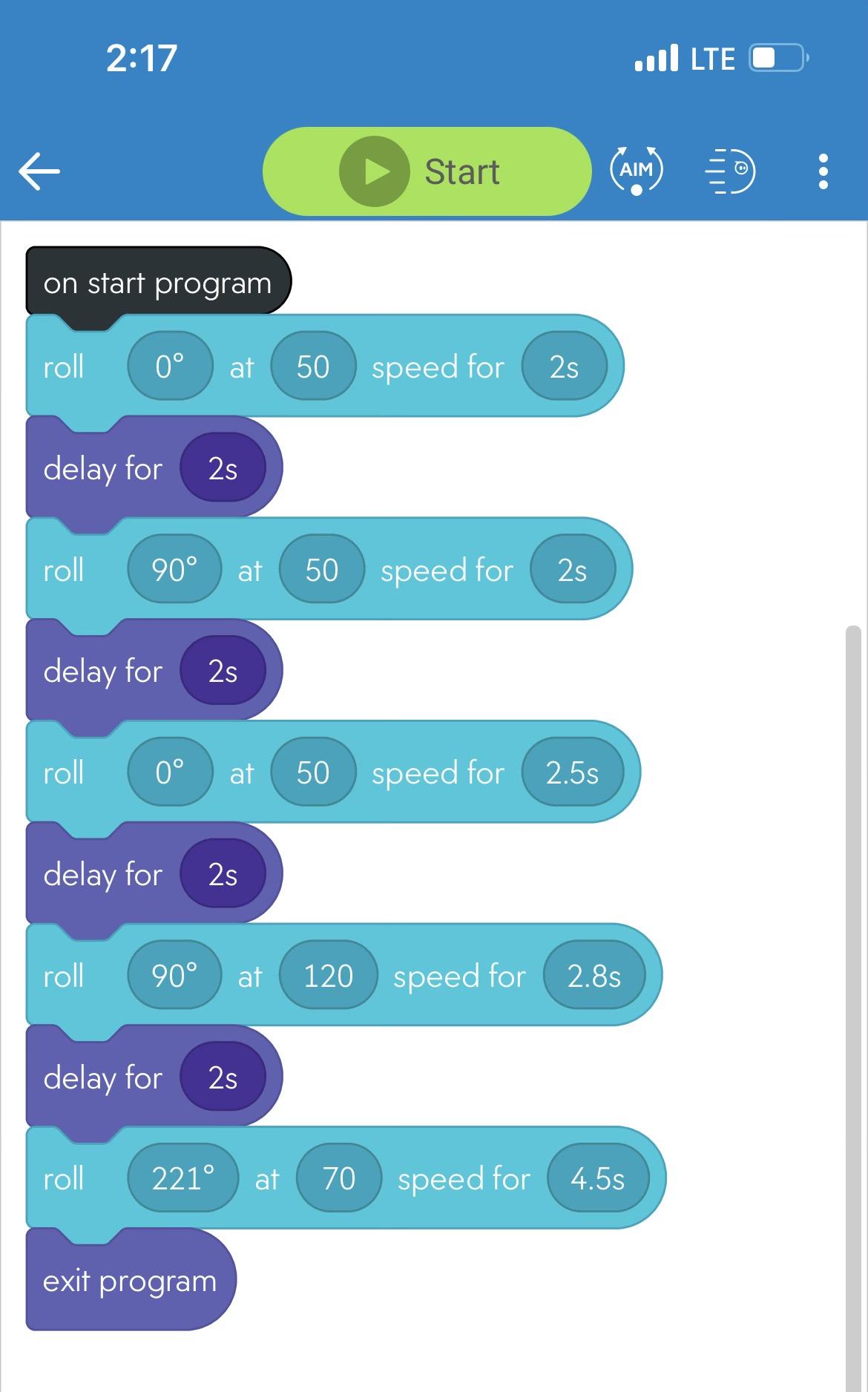
## System Flow

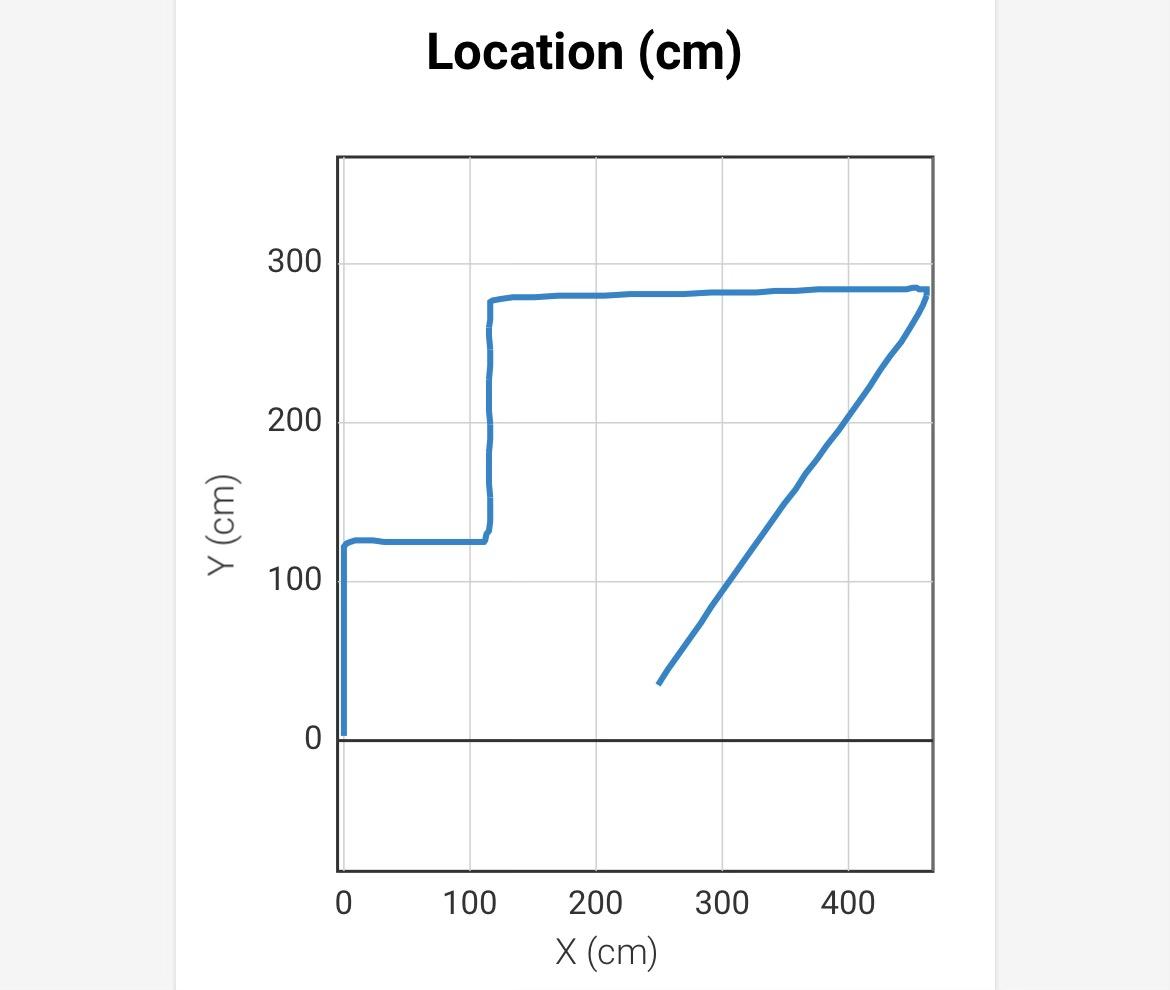


## Software

Describe software languages/platforms/api’s used to develop and deploy this application

* Sphero Edu block code





## Hardware

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

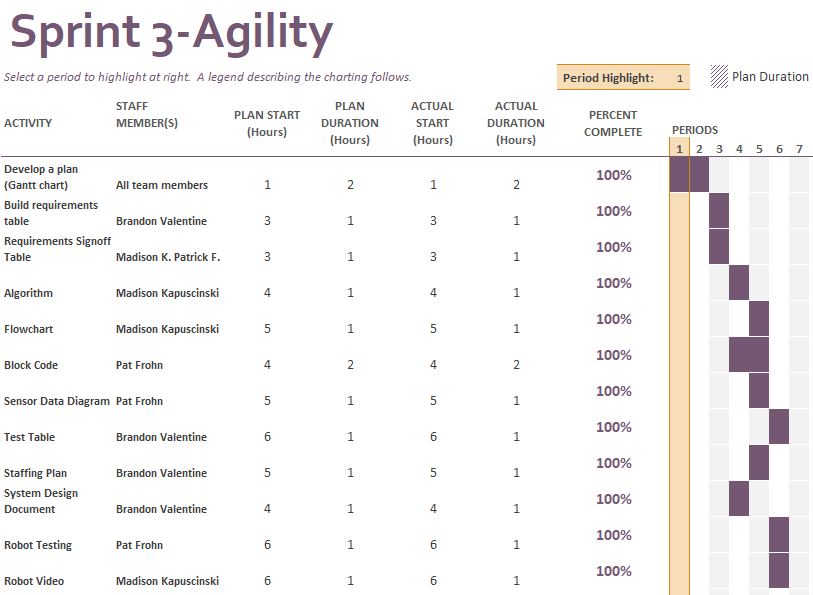
* Sphero mini robot

## 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** |
| Testing code | 12/1 | The robot will avoid the obstacles | The robot hit the second bottle | Patrick F.  Madison K.  Brandon V. | Fail |
| Adjusted angles in code | 12/1 | The robot will avoid bottle 2 | The robot avoided bottle 2 | Patrick F.  Madison K.  Brandon V. | Pass |
| Testing code for ramp | 12/1 | The robot will go over the ramp and stop on the line | The robot went over the ramp and went past the line | Patrick F.  Madison K.  Brandon V. | Fail |
| Testing revised code for ramp | 12/1 | The robot will go over the ramp and stop on the line | The went over the ramp and past the line again | Patrick F.  Madison K.  Brandon V. | Fail |
| Testing revised code for ramp | 12/1 | The robot will go over the ramp and stop on the line | The robot went over the ramp and stopped on the line | Patrick F.  Madison K.  Brandon V. | Pass |
| Testing code for whole course | 12/1 | The robot will avoid the objects go over the ramp and knock down the pins | The robot avoided the 3 obstacles went over the ramp and knocked down the pins | Patrick F.  Madison K.  Brandon V. | Pass |

## Task List/Gantt Chart



## 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 |
| Patrick Frohn | Programmer | * Block Code * Sensor Data Diagram * Gantt Chart * Robot Testing * Requirements Sign Off Table | Madison K.  Brandon V. |
| Madison Kapuscinski | Plan Designer | * Algorithm * Flowchart * Gantt Chart * Robot Video * Requirements Sign off table | Patrick F.  Brandon V |
| Brandon Valentine | Information Recorder | * System Design Document * Test Table * Staffing Plan * Gantt Chart * Requirements Table | Madison K.  Patrick F. |