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CS 104

Sprint 1 - Endurance Design Document

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1. Executive Summary

1.1 Project Overview

The Robot must successfully travel around the periphery of HH208 (circumnavigate).The Robot will start from the yellow square with blue tape. The Robot starts with a green light and will speak "ready set go" and stop with a red light and say " I'm done and I need water". The Robot travels to each of the yellow floor tiles and turns right at the center of each tile. The Robot returns to its starting location at the end of the program. The Robot does not collide with any objects as it goes around the room

1.2 Purpose and Scope of this Specification

In scope
- Testing for Endurance course

Out of Scope
- Testing for agility course
- Testing of accuracy course

2. Product/Service Description

2.1 Product Context

This is the Endurance sprint which is the first leg of 3 total sprints including an agility and accuracy course to follow

2.1 User Characteristics

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

- Students will use this product to fulfil course needs.
- The professor will use the product to check functionality.
- This product can be used for mapping out a perimeter of a rectangular room, field, or area.

2.3   *Assumptions*

- Robot Srk+ should be fully charged and available for testing.
- Room HH208 should be open and available for testing.
- Group members should be available and ready for testing.
- Course should be placed intact.

2.4   *Constraints*

Describe any items that will constrain the design options, including

- Robot cannot go off course
- Room HH208 not being open at certain times
- Robot died mid course
- Meeting with groups was difficult at times due to different schedules

2.5   *Dependencies*

List dependencies that affect the requirements.
- Depending on the availability of the room, testing of the course may not be possible
- Other groups may limit the amount of time we have for testing
- Furniture may obstruct the course
- The floor tape may disrupt how the robot runs the course

3. Requirements

3.1   *Functional Requirements*

Req#	Requirement	Comments	Priority	Date Rvwd	SME Reviewed/Approved

ENDUR_01	Start at corner	Make sure it is aligned correctly	yes	11/05	*Approved*
ENDUR_02	Light up green		Yes	11/05	*Approved*
ENDUR_03	Speak "Ready Set Go"		yes	11/05	*Approved*
ENDUR_04	Travel to next corner	Travel at 0 degrees	yes	11/05	*Approved*
ENDUR_05	Turn and accelerate	Travel 90 degrees	yes	11/05	*Approved*
ENDUR_06	Turn and accelerate	Travel 180 degrees	yes	11/05	*Approved*
ENDUR_07	Turn and accelerate	Travel 270 degrees	yes	11/05	*Approved*
ENDUR_08	Turn red		yes	11/05	*Approved*
ENDUR_09	Speak "I'm done and I need water"		yes	11/05	*Approved*
ENDUR_10	End		yes	11/05	*Approved*

3.2 *Security*

3.2.1 *Protection*

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

- Block code is protected by Sphero Edu User and password log in
- App is protected by personnel login information

3.2.2 *Authorization and Authentication*

- Only personnel working on the Endurance course have access to the code.
- Program could only run if logged into a personal device and Sphero edu app.

3.3 *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,

- Robot can only run on course in room HH208
- Robot cannot function if not connected to a nearby device

4. Requirements Confirmation/Stakeholder sign-off

11/05/21	Amy (Organizer, Jelissa (Organizer), Rahfat (Organizer)	Worked on ghantt chart, requirements table, algorithm, and on SDD document
11/09/21	Jelissa and Rahfat	Worked on block code, took video, ran the robot, worked on ghantt chart and SDD Document
11/09/21	Jelissa, Rahfat, and Amy	Worked on flow chart, worked on ghantt chart, worked on SDD Document

5. System Design

5.1 *Algorithm ()*

Start at the yellow square with the robot being green.

The robot will say, "Ready set go," and then wait.

It will start it's course by rolling at 0 degrees at 63 speed for 10.5 seconds.

The robot will be delayed for 1 second.

Then the robot will roll at 90 degrees at 61 speed for 6 seconds.

The robot will be delayed for 1 second.

Then the robot will roll at 180 degrees at 63 speed for 10.5 seconds.
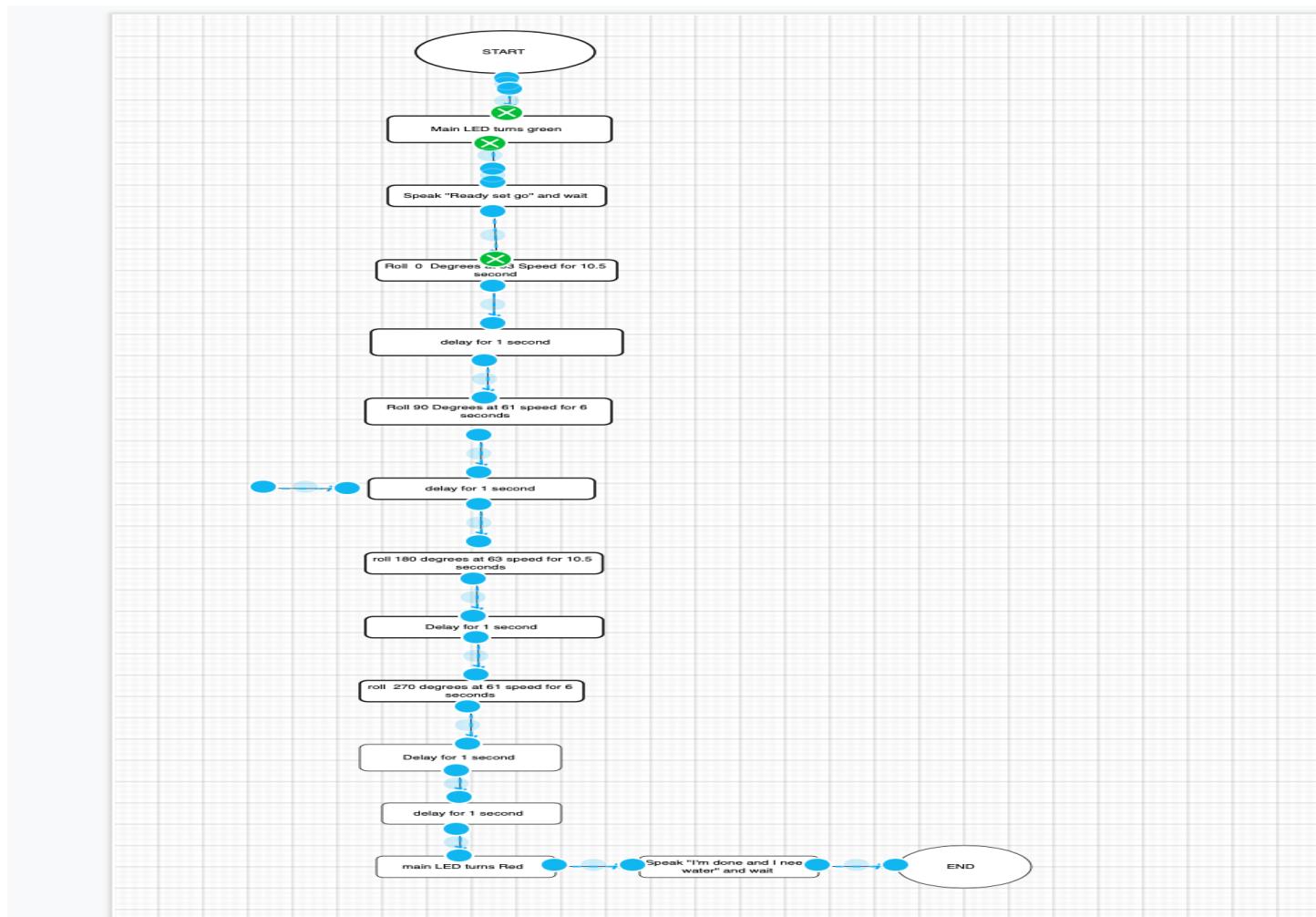
The robot will be delayed for 1 second.

Then the robot will roll at 270 degrees at 61 speed for 6 seconds.

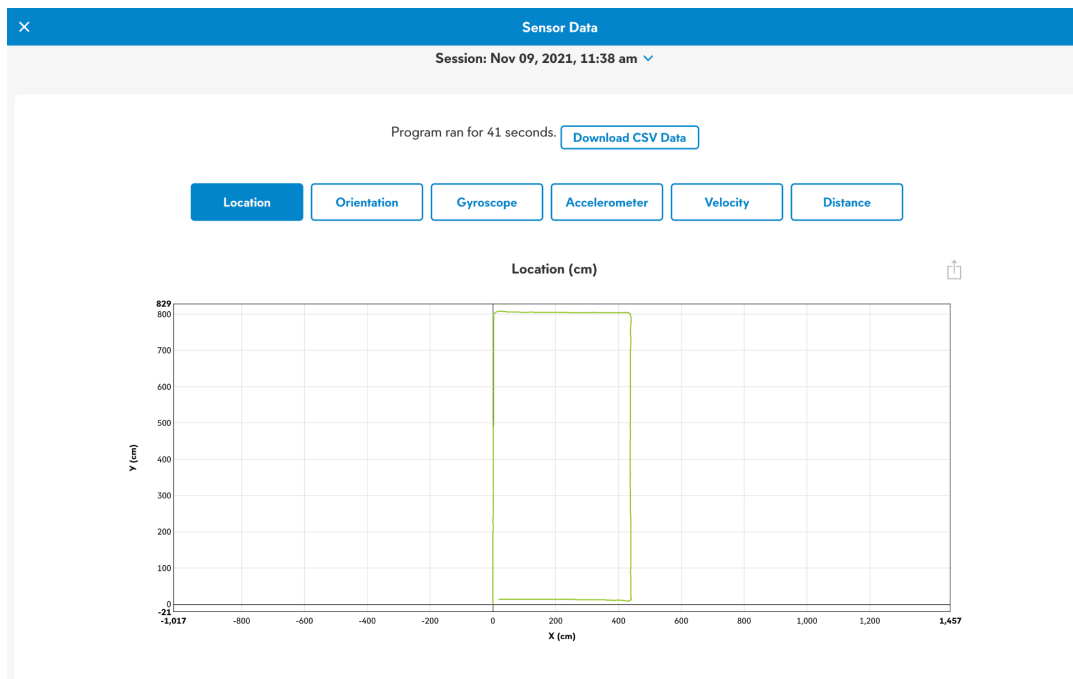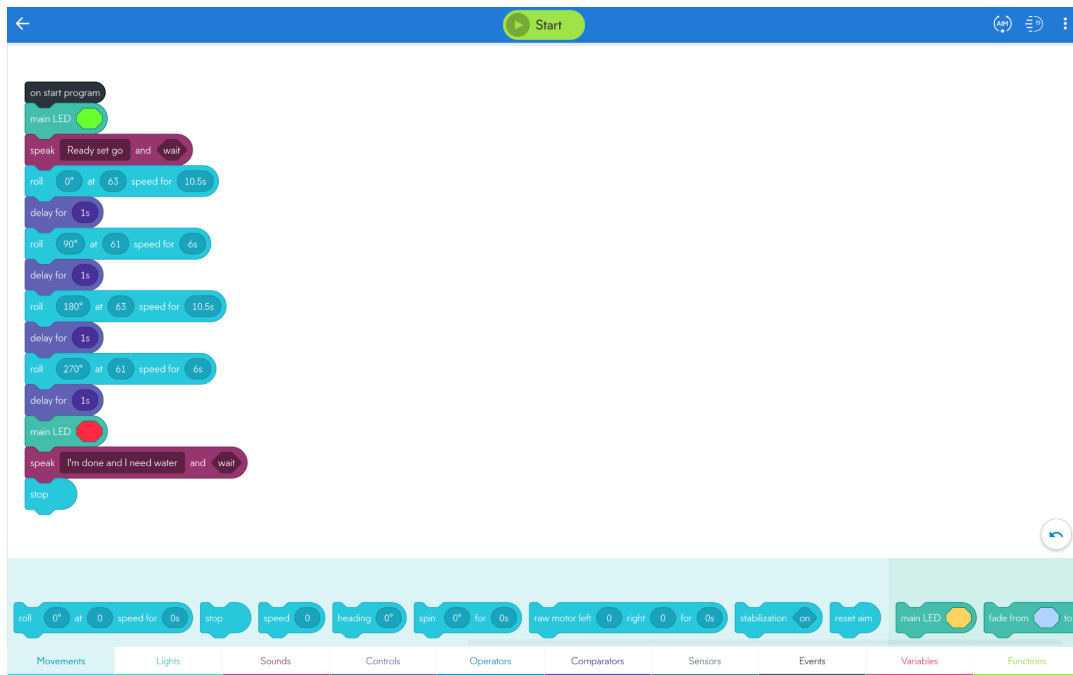*The robot will be delayed for 1 second.*

Then we will change the robot's color to red.

Finally, the robot will say, "I'm done and I need water," and it will stop.
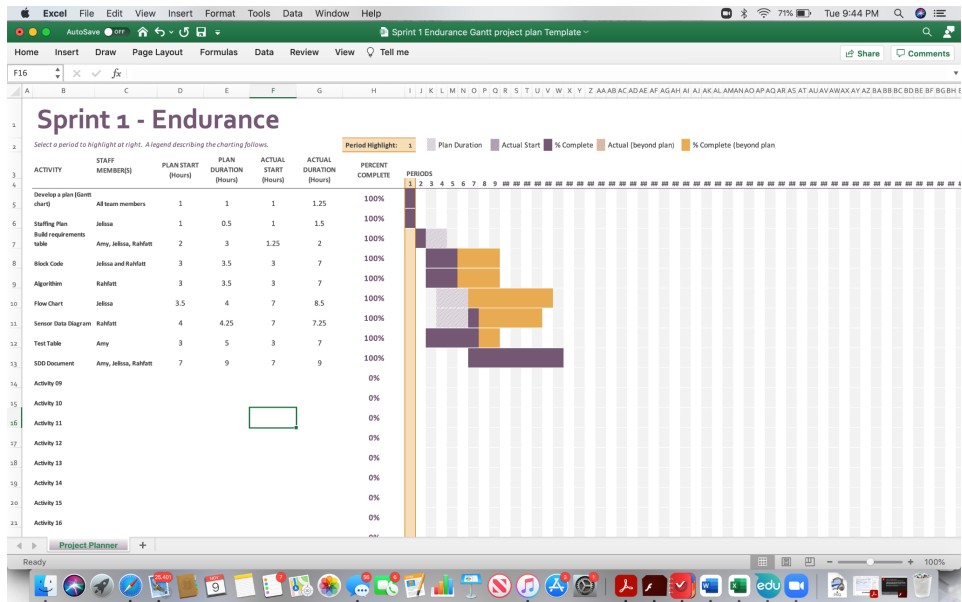
5.2   System Flow

5.3   *Software*

5.4   *Hardware*

Sphero Sprk+ Robot

Laptop

5.5   Test Plan

Reason for Test Case	Test Date	Expected Output	Observed Output	Staff Name	Pass/Fail
Test for speed	11/05	It would go in a timely manner	Too slow	Rahfat	Fail
Test for time	11/05	It would go far enough	Too long	Rahfat	Fail
Test for speed and time	11/05	Would end at first corner	Too far	Rahfat	Fail
Test for angle	11/05	Would go straight	Wrong angle	Jelissa/ Rahfat	Fail
Test for angle	11/09	Would go straight	Wrong angle	Jelissa/ Rahfat	Fail
Test for angle	11/09	Would go straight	Went straight, and got to corner, perfect speed	Jelissa/ Rahfat	Pass
Tried again	11/09	Would repeat	Did the opposite	Jelissa/ Rhafat	Fail
Tried with a new calibration	11/09	Would work perfectly	Worked perfectly	Jelissa/ Rahfat	Pass

5.6   Task List/Gantt Chart

5.7   *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
Jelissa	Organizer	Coding, requirements table, flowchart, staffing plan	Amy who is making the SDD
Rahfat	Organizer	Coding, Sensor Data Diagram, taking video	Amy who is making the SDD
Amy	Organizer	SDD, held robot, test table, and gathered all information	Rahfat and Jelissa when doing test table and when SDD was set up