Sprint 1 - Endurance Design Document

October 29, 2019

Use this Requirements Specification template to document the requirements for your product or service, including priority and approval (Must do).

This document will also serve as a System Design Document (How to) and will include sections detailing system flow, algorithms, staffing plan, software/hardware, and Test Plan

This document contains instructions and examples which are for the benefit of the person writing the document and should be removed before the document is finalized.

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# Executive Summary

## Project Overview

* The purpose of this project is to see if the robot can be coded to follow the perimeter of the room without going off course.

## 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 what is outside of the scope of these specifications. For example:

In scope

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

* modification of Classification Processing to meet legislative mandate ABC.
* modification of Labor Relations Processing to meet legislative mandate ABC.

Out of Scope

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

* modification of Classification Processing to meet legislative mandate XYZ.
* modification of Labor Relations Processing to meet legislative mandate XYZ.

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

# 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).

## Product Context

* This product is very similar to any kind of robot that can be coded with block coding in a software. The code is very different from what we’ve been working with but it is a lot easier since it is in a simple form.

## User Characteristics

* Edward, Frankie, and Vinny all have the same amount of experience with the code and robot since we are all studying the same thing in the same class.

## Assumptions

* Assumptions to be made are that we will be able to sign out a robot and have enough time to code and test it on the course.

## Constraints

* The constraints of this would only be if a robot is not available or the software is not working properly.

## Dependencies

* The only dependency for this project is the code, if the code doesn’t work out the experiment will fail.

# Requirements

* Describe all system requirements in enough detail for designers to design a system satisfying the requirements and testers to verify that the system satisfies requirements.
* Organize these requirements in a way that works best for your project. See **Error! Reference source not found.Error! Reference source not found.**, **Error! Reference source not found.** for different ways to organize these requirements.
* Describe every input into the system, every output from the system, and every function performed by the system in response to an input or in support of an output. (Specify what functions are to be performed on what data to produce what results at what location for whom.)
* Each requirement should be numbered (or uniquely identifiable) and prioritized.

See the sample requirements in Functional Requirements, and **Error! Reference source not found.**, as well as these example priority definitions:

Priority Definitions

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

* Priority 1 – The requirement is a “must have” as outlined by policy/law
* Priority 2 – The requirement is needed for improved processing, and the fulfillment of the requirement will create immediate benefits
* Priority 3 – The requirement is a “nice to have” which may include new functionality

It may be helpful to phrase the requirement in terms of its priority, e.g., "The value of the employee status sent to DIS **must be** either A or I" or "It **would be nice** if the application warned the user that the expiration date was 3 business days away". Another approach would be to group requirements by priority category.

* A good requirement is:
* Correct
* Unambiguous (all statements have exactly one interpretation)
* Complete (where TBDs are absolutely necessary, document why the information is unknown, who is responsible for resolution, and the deadline)
* Consistent
* Ranked for importance and/or stability
* Verifiable (avoid soft descriptions like “works well”, “is user friendly”; use concrete terms and specify measurable quantities)
* Modifiable (evolve the Requirements Specification only via a formal change process, preserving a complete audit trail of changes)
* Does not specify any particular design
* Traceable (cross-reference with source documents and spawned documents).

## 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 |
| --- | --- | --- | --- | --- | --- |
| ENDUR\_01 | Travel around the room |  |  |  |  |
| ENDUR\_02 | Stay 4 feet away from the walls |  |  |  |  |
| ENDUR\_03 | Should not collide with any objects |  |  |  |  |
| ENDUR\_04 | Start with green light and say “ready set go” |  |  |  |  |
| ENDUR\_05 | Stop within the same box it started |  |  |  |  |
| ENDUR\_06 | Turn red and say “I’m done and I need water” |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| ENDUR\_XX |  |  |  |  |  |

## Security

### 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

### Authorization and Authentication

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

## 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,

* Percentage of components with host-dependent code;
* Percentage of code that is host dependent;
* Use of a proven portable language;
* Use of a particular compiler or language subset;
* Use of a particular operating system;
* The need for environment-independence - the product must operate the same regardless of operating systems, networks, development or production environments.

# 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 |
| 10/26/2019 | Edward (Coder) | confirmed all except ENDUR\_XX |

# System Design

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

## Algorithm

Develop and describe here the algorithm that will be used to provide the required performance of your software

* Attached in Github.

## System Flow

Develop a flowchart (and show here) that accurately depicts how your software application will act to fulfill the algorithm

* Attached in Github.

## Software

The software used to develop this program is Sphero.

## Hardware

The hardware used to develop this program is the Sphero SPRK+ 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** |
| --- | --- | --- | --- | --- | --- |
| To ensure our code works and passes the test. | 10/26/19 | Follow the perimeter around the room and stay on course. | Went around the perimeter of the room with no problem. | Edward | Pass |
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## Task List/Gantt Chart

* Attached in Github.

## 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 |
| --- | --- | --- | --- |
| Edward | Coder | Document Requirements Sheet, Code Robot, and  Test the code | Github |
| Frankie | Planner | Develop Algorithm | Github |
| Vinny | Documenter | Document using Gantt Chart and Test Plan | Github |