

## Vision Documentation

### Homedork – Interactive Smart House

#### Project Members

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#### Revision History

| Date       | Version | Description   | Author     |
|------------|---------|---|------------|
| 29/09/2021 | 1.0     | Initial Vision  | A, B, C    |
| 19/10/2021 | 1.1     | Modified - Temperature controller, alarm system, slight modification to the text and description for the other prior sections<br>Added – Sub sections in Temperature Controller to include temperature sensors and Radiators (Heating Elements) and Alarm System to include Security Alarm and Fire Alarm, Twilight Automatic System, Water Leakage, Timers Electricity Consumption, Power Cut Off, Stove, and Window | A, B, C, D |
|            |         |   |            |
|            |         |   |            |

# Product Overview

## 1. Smart House concept

### 1.1 Stakeholders

Stakeholders are members of the HKR Staff they are interested in creating a system that can be used to improve the lives of persons with disabilities using communication between devices and a friendly user interface.

### 1.2 Introduction

The smart house concept is a technical system for everyone, including people who might struggle using normal technical features. The system is, in that sense, accessible for many types of disabilities and will in all stages of production keep in mind the accessibility and ease of use for its users. The devices that will be apart of the system are lights, fans, stove, window, electricity consumption measurer, timers, curtains, radiators, temperature control, and alarms.

## 2. Basic Technical Features of Devices

The device system will be implemented using the Arduino as the hub or control center connected to a server system that will send instructions or commands for the Arduino to execute. If the command was received it should execute the operation and send a response back to the server notifying of success or failure of the executed command. This is to ensure that the database can be updated to the state if a response is a failure the database need not update but the server should handle the error.

### 2.1 Lights

The lights will have a couple main features one being the turning of the specified light on or off. If the light is dimmable then it will also include a feature to dim the light to a specified level.

### 2.2 Fans

The fans will also have multiple features, but it will be based on the capabilities of the fan. All the fans will have the capability to turn on/off, if the fan has multiple modes the device controller will be able to set the mode based on the command received for the desired speed of the fan. The other feature would be for oscillation if the fan has oscillation built in the command will execute the use of oscillation.

### 2.3 Temperature Control

The temperature controller will have the capability to get the temperature in the house for the end-user and relay that information. The device controller will also be able to adjust the desired temperature based off the user input for their desired temperature. The temperature control will use the temperature sensor located inside the house and the radiators

#### 2.3.1 Temperature Sensors

There are temperature sensors located on the inside and the outside of the house the outside temperature sensor will not be used in the temperature controller, the other 2 inside temperature sensors will be used to determine where the temperature needs to increase or decrease to meet the desired temperature of the user for the areas in the smart house they select.

#### 2.3.2 Radiators

The temperature controller will have the capability to adjust the voltage of the 4 radiators located inside the smart house. The radiators are divided into 2 groups of within the house and will be adjusted according to the temperature of the area they oversee.

## **2.4 Curtains Control**

The curtains control can open and close the curtains based off the commands received from the server.

## **2.5 Water Leakage**

The water leakage detector is a sensor that detects whether a leak is present. When a leak is present a notification will be sent to the end user to inform them of the leak.

## **2.6 Twilight Automatic System**

The twilight automatic system will use an external light sensor that will based off the amount of light will set the outdoors lights automatically to on in the case where the lights are getting low and moving into night or off when the light is brighter, and the day is beginning.

## **2.7 Alarm System**

There will be 2 types of alarms a security alarm and an automatic fire alarm.

### **2.7.1 Security Alarm**

The alarm system will allow the end-user to arm and disarm their home alarm system with a command sent by the end user once the system is armed when the smart house door sensor is triggered the alarm will sound with a light located at the chimney and a siren. While the alarm is disarmed the system will not sound.

### **2.7.2 Fire Alarm**

The fire alarm system will activate when a sensor is tripped the smart house model, we are using will use a switch to simulate this activity.

## **2.8 Timers**

The user will have the capabilities to set a timer with a command, the house will contain 2 timers both will operate the same but the output when finished will be associated with a specific lamp.

## **2.9 Electricity Consumption**

The electricity consumption will be measured through the supply voltage that is being delivered to the house this is measured in volts which will be converted to kilowatts and the information will be available to the end user.

### **2.10 Power Cut Off**

The power cut off will be capable to control the supply voltage to either allow the flow of electricity or cut off the electricity to all components.

### **2.11 Stove**

The stove will have the capability to turn on and off this will be a simulated with a switch.

### **2.12 Window**

The window will have the capability to open and close this will be simulated with a switch.

### **3. Other Requirements**

The other requirements are for the devices is for the system should start and run without errors crashing it. There should be some inherent security features to ensure to the user that the system will not be accessed by unauthorized users. The system should be well optimized to handle the operations so that the performance ensures a smooth and seamless response without over taxing the limited memory. The code shall be well structured to ensure maintainability, understandability, and allow for expansion. The code will also contain doc-strings and comments to ensure that anyone who will come to the systems source code will be able to work on it with understanding and confidence in what they are working on. The participants in the group shall follow a code of conduct that everyone had agreed upon.