



# Development and Test Report

Version 1.0



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Author:

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Berk Önder

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## **Scope:**

### **Identification:**

- Project title is Smart Home Automation System,
- Abbreviation is SHAS,
- Version number is v1.0.

### **System Overview:**

- Purpose and general nature of the system is to make homes safer, technological and simpler.
- Home automation systems allow us to change the functionality of things in the house as we want, using sensors or with the help of tablets, smartphones.
- I made System / Subsystem Design Description in my previous report. In this report, I have cited my System-wide Design Decisions and inputs. I specified my states and modes and set my Design Convention as keep it simple. Also, I drew my Development Status, Requirement Traceability and Component, Deployment and Package Diagrams.
- Operation and Maintenance.
- Sponsor of the project is self-sponsor.
- Acquirer of the project is Berk Önder.
- Developer of the project is Berk Önder.
- User of the system is people who live with my house.

### **Document Overview:**

- My aim in this document is to introduce the arduino I made in terms of software and hardware. Also to explain the libraries and hardware links I have used. Finally, there are test cases and results and logs that I have done on the sensors.
- The confidentiality of this document will remain only between the instructor of the course, Hürkan Orkun Zorba, and myself, Berk Önder, who made the project.

## Referenced Documents:

- "Control LED By Clap Using Arduino And Sound Sensor". Arduino Project Hub, 2021, <https://create.arduino.cc/projecthub/iotboys/control-led-by-clap-using-arduino-and-sound-sensor-e31809>.
- "Displaying Sensor Values On LCD". Arduino Project Hub, 2021, <https://create.arduino.cc/projecthub/Guitarman1/displaying-sensor-values-on-lcd-c0c44f>.
- Campbell, Scott. "How To Set Up The DHT11 Humidity Sensor On An Arduino". Circuit Basics, 2021, <https://www.circuitbasics.com/how-to-set-up-the-dht11-humidity-sensor-on-an-arduino/>.

## Development:

- While developing, I purchased the kit called Arduino Uno Super Starter Kit. There were quite a few parts in this kit. The materials I used while making my project are: 1 x Infrared Receiver, 1 x Arduino Uno R3 SMD CH340 Chip (Clone), 5 x LED Light, 1 x Breadboard, 1 x Female-Male Dupond Line, 1 x Remote Control, 1 x IIC 1602 LCD 1 x Temperature Module, 1 x Sound Module.
- The brands and names I use as Hardware and Software are as follows:
  - Hardware: DHT11 Temperature and humidity sensor, I2C 2X16 LCD Display, HW-484 Sound sensor, USB cable, Breadboard, Arduino UNO R3 SMD CH340 Chip, 8 LEDs, VS18388 Infrared receiver, Remote control (Car MP3)
  - Software: I made all of my codes in Arduino software program using C++. I made all of my codes in Arduino software program using c++. As the library, I used the dht11 library for the temperature and humidity sensor, the LiquidCrystal\_I2C library for the LCD screen, and the IRremote library for remote control and infrared connectivity.

- I connected the long legs of the LED lamps from the 2nd pin to the 12th pin, and the short legs to the GND. I connected the middle leg of the infrared receiver to GND, the left leg to pin 13 and the right leg to 5V. I connected GND of my LCD screen to GND, VCC to 5V, SDA to A4 and SCL to A5. I also connected my temperature and humidity sensor and my sound sensor to 5V and GND in the same way.

## Test Descriptions:

- As a test environment, I will test my LED lamps, sensors, remote control and infrared receiver, LCD screen, USB and cables with C++ written in Arduino software in computer environment.

Test Case: DHT11 Temperature and Humidity Sensor

#	Test Step	Inputs	Expected Outputs
1	USB cable recognized to the system.	Arduino chip, USB cable, LCD Screen and Temperature and Humidity Sensor.	Computer will recognized and energize to the arduino.
2	Open Arduino Software and run the Temperature and Humidity code	Open the code file and run the code.	Code run process successful.
3	Check the LCD screen	See the LCD Screen.	Temperature and Humidity values is seen in the LCD screen

Test Case: HW-484 Sound sensor

#	Test Step	Inputs	Expected Outputs
1	Open Arduino Software and run the Sound Sensor code	Arduino chip, USB cable, Sound Sensor and LED lights	Code run process successful.
2	Make sound and see the LED lights	See that 5 LED lights are on	LED lights turn on when the sound is made and turn back when the sound is over.

Test Case: Infrared receiver and Remote control

#	Test Step	Inputs	Expected Outputs
1	Open Arduino Software and run the Infrared receiver and Remote control code	Arduino chip, USB cable, Infrared receiver, Remote control, 3 LED lights	Code run process successful.
2	Try to turn on the lights with 0,1,2,3,4 keys from the remote	See that LED lights are on and off with the related buttons from the remote control	All LEDs turn on and off with the keys to which they are connected

## Test Results:

#	Test Case	Test Step	Degree	Definition of Defects	Solution Proposal	Status
1	DHT11 Temperature and Humidity Sensor	3	3	There is no Defects	-	Close
2	HW-484 Sound sensor	2	3	There is no Defects	-	Close
3	Infrared receiver and Remote control	2	3	There is no Defects	-	Close

- When we look at the test results, all of the test cases I wrote gave the expected output and it works smoothly.
- Logs:
  - 19:46:24.269-> Hum: %41.00
  - 19:46:24.269-> Temp: 25.00 C
  - 19:49:20.145-> Sound Level: 60
  - 19:51:22.325-> Green Light is open
  - 19:51:23.100-> Green Light is close