

## **Project name:**

Baby Care

## **Project Credits:**

- final Java project for Java course
- Embedded Systems Department in ITI-Information Technology Institute- smart village internship Intake 43
- **Supervised by:**
  - Dr. Eman Hesham
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- **Programming Languages:**
  - Java for application
  - C++ for Arduino

## **Technologies:**

The project is implemented using:

- Java developer kit: JDK 8
- Apache NetBeans IDE version: 12.6
- Scene Builder GLUON version: 8.5.0
- Medusa library version: 8.0

## **Documentation Submission:**

<https://drive.google.com/drive/folders/1GBvEJYUPPWDBmFszMI3CocPvuqLeLKoX>

## **Video Submission:**

# Baby Care

## Purpose:

The project aims to check that the room temperature and humidity are appropriate for the baby. For peace of mum's mind, she can check the room temperature and humidity change every 1 sec using her mobile. Also, it will generate a light and sound alarm to let her know if it's a huge change.

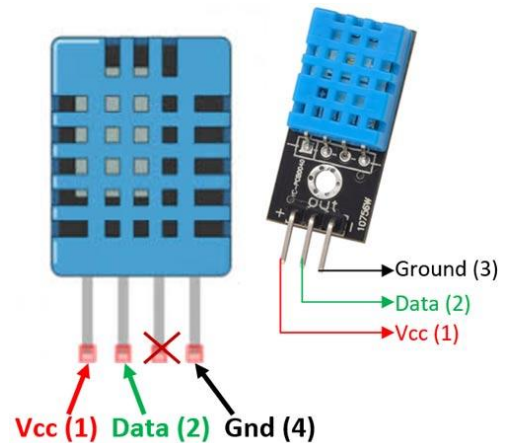
## Hardware:

We use the DHT11 Sensor with Arduino to measure the temperature and humidity and print them on the Arduino serial monitor. Connecting the serial monitor to the Java IDE to control the application.

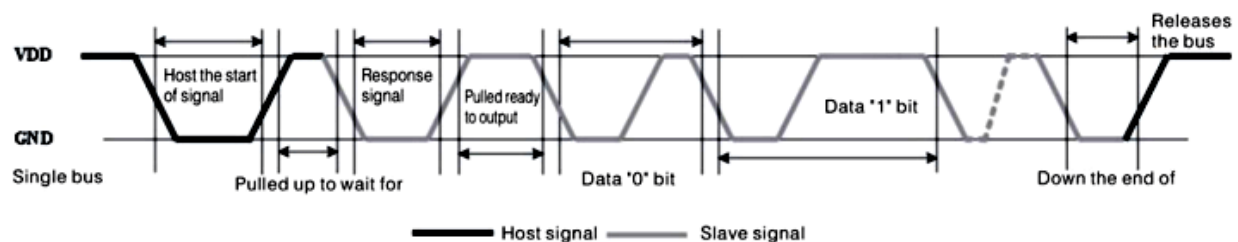
## DHT11 Configuration

### DHT11 Specifications

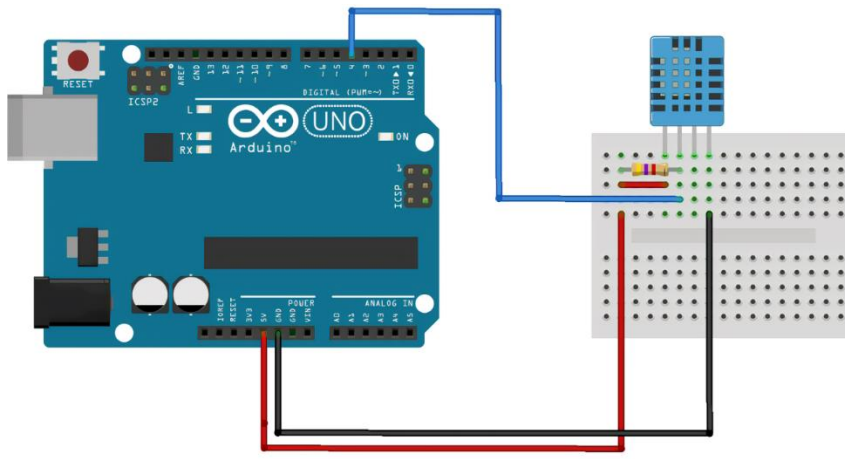
- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Output: Serial data
- Temperature Range: 0°C to 50°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy:  $\pm 1^\circ\text{C}$  and  $\pm 1\%$



The output given out by the data pin will be in the order of 8-bit humidity integer data + 8-bit humidity decimal data + 8-bit temperature integer data + 8-bit fractional temperature data + 8-bit parity bit. To request the DHT11 module to send these data the I/O pin has to be momentarily made low and then held high as shown in the timing diagram below



## DHT11 wiring connection with Arduino:



## Code Explanation:

### 1. communication package:

#### Serial Comm Class:

jSerialComm is a Java library designed to provide a platform-independent way to access standard serial ports without requiring external libraries, native code, or any other tools. It is meant as an alternative to RxTx and the (deprecated) Java Communications API.

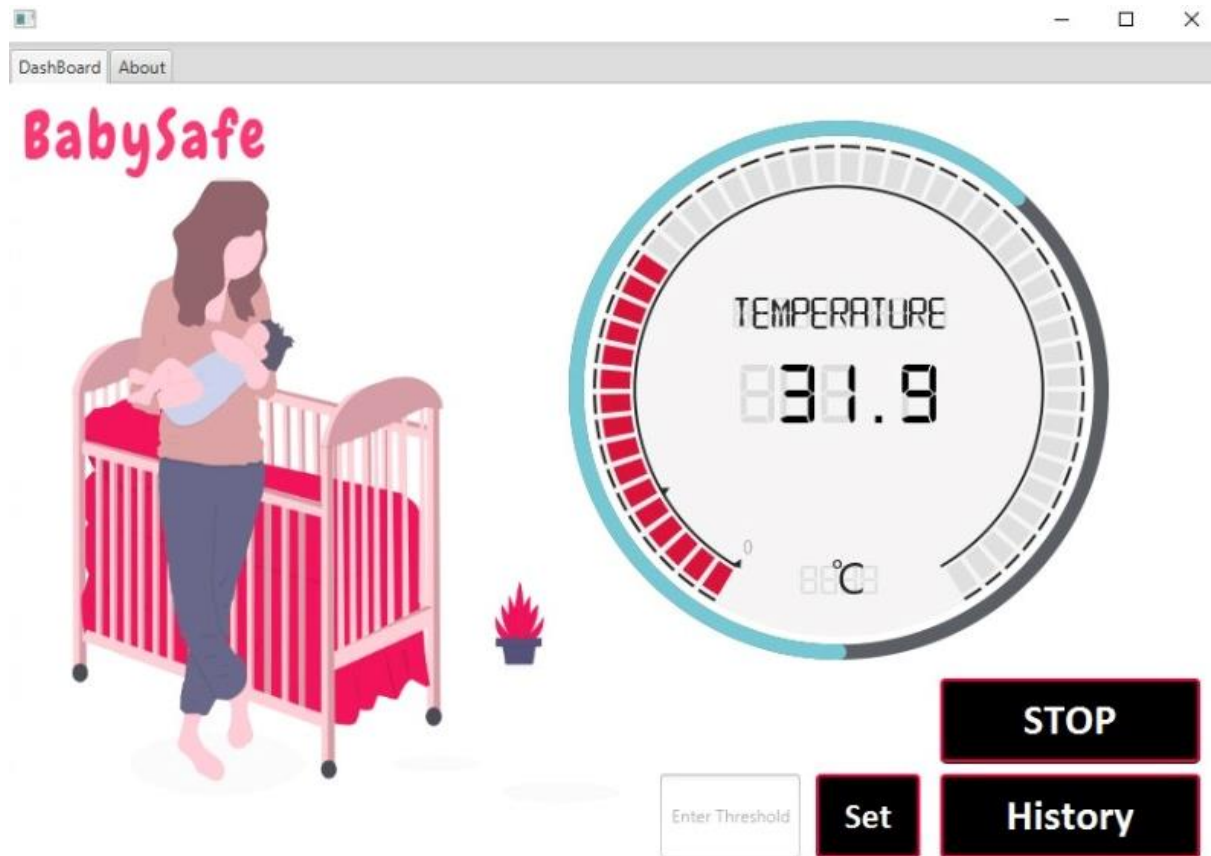
The java application receives the input stream from the Arduino serial monitor to the "Receive thread" in java to get the temperature and humidity with a time margin equal to 50 msec. Then sends the output every 1 second through the communication port to the Arduino.

```
/*check using of send thread*/
```

### 2. Alarm package (main package):

#### GUI:

We use FXML for defining the user interface of a JavaFX application. FXML presents an alternative to designing user interfaces using procedural code and allows for abstracting program design from program logic.



### **FXML Document Controller class:**

Contains the Update thread and the main thread containing an object from Fire Action Class responsible for checking the temperature and also the FXML object handlers.

### **Fire Action Class:**

Contains actions if the current temperature exceeds the threshold temperature and prints the current temperature and humidity on the Java IDE screen.

### **V3 Class:**

Contains the main method responsible for launching the GUI.