

L&T MID-COURSE PROJECT

TOPIC: IOT



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ASSIGNED PROBLEM DESCRIPTION:

Industrial Internet of Things

6.Problem Description

Design and simulate a real-time clock and temperature monitoring system. This system will monitor the temperature and display a warning message when the temperature exceeds a predefined limit

Upload the following (please generate your GitHub account):

- Aim
- Problem statement
- Scope of the solution
- Required components to develop solutions (Like software, Hardware and cloud environment)
- Flowchart of the code
- Simulated circuit (Wokwi) and
- Video of the demo

AIM: To design and simulate a real-time clock and temperature monitoring system using Arduino, which continuously measures the ambient temperature and displays both the current time and temperature on an LCD display, along with a warning message when the temperature exceeds a predefined threshold.

PROBLEM STATEMENT : Manual monitoring of temperature in critical environments, such as laboratories, cold storage facilities, or server rooms, is inefficient and prone to human error. There is a need for an automated system that can accurately measure and display the real-time temperature along with the

current time, and immediately alert the user when the temperature exceeds a specified threshold. This project addresses the problem by designing a microcontroller-based solution using Arduino, which integrates a real-time clock (RTC) module, a temperature sensor, and an LCD display to provide continuous monitoring and timely warnings.

SCOPE OF THE SOLUTION:

The solution involves designing and simulating a temperature monitoring system integrated with a real-time clock using Arduino. The system performs the following functions:

- Reads the current time from the RTC module.
- Continuously measures ambient temperature using a digital temperature sensor.
- Displays both the current time and temperature on a 16x2 LCD screen.
- Compares the measured temperature against a predefined threshold value.
- Displays a visual warning message on the LCD when the temperature exceeds the threshold.
- Simulates the complete setup in Wokwi for demonstration and testing purposes.
- Provides well-documented Arduino code and a demonstration video to showcase the working system.

COMPONENTS USED(HARDWARE,SOFTWARE AND CLOUD):

HARDWARE:

- **Arduino Uno** – Microcontroller board to process sensor data and control the display.
- **DS3231 RTC Module** – Provides real-time clock functionality.
- **LM35 Temperature Sensor** – Measures ambient temperature.
- **16x2 LCD Display with I2C Module** – Displays time, temperature, and warning messages.
- **Jumper Wires** – For electrical connections.
- **Breadboard** – For prototyping the circuit.

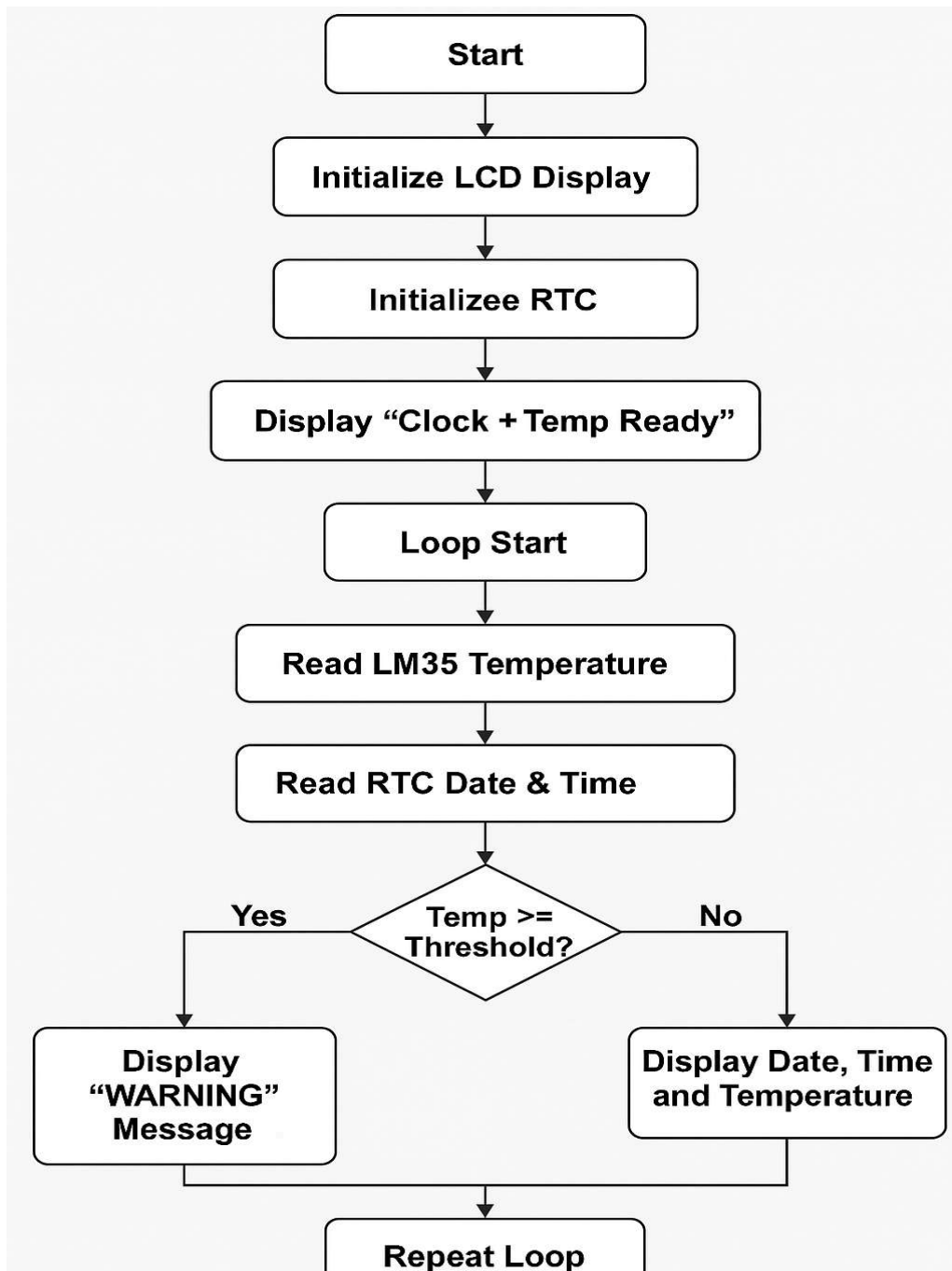
SOFTWARE:

- **Arduino IDE** – To write and upload code to the Arduino.
- **Wokwi Simulator** – To design and test the circuit virtually.

CLOUD:

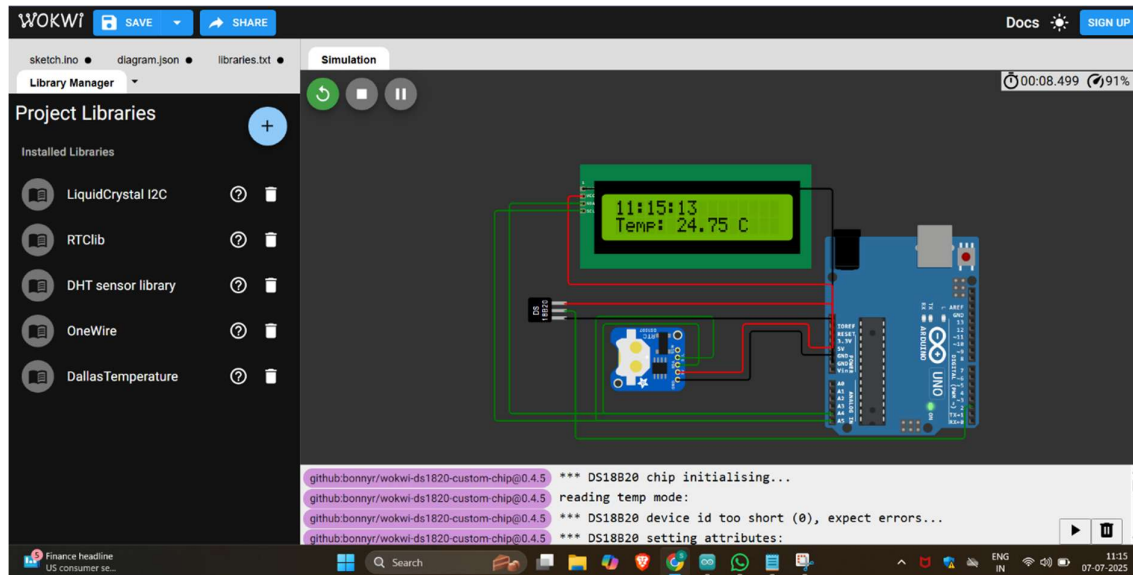
GitHub – For version control, code hosting, and sharing the project repository link.

FLOWCHART OF THE CODE:

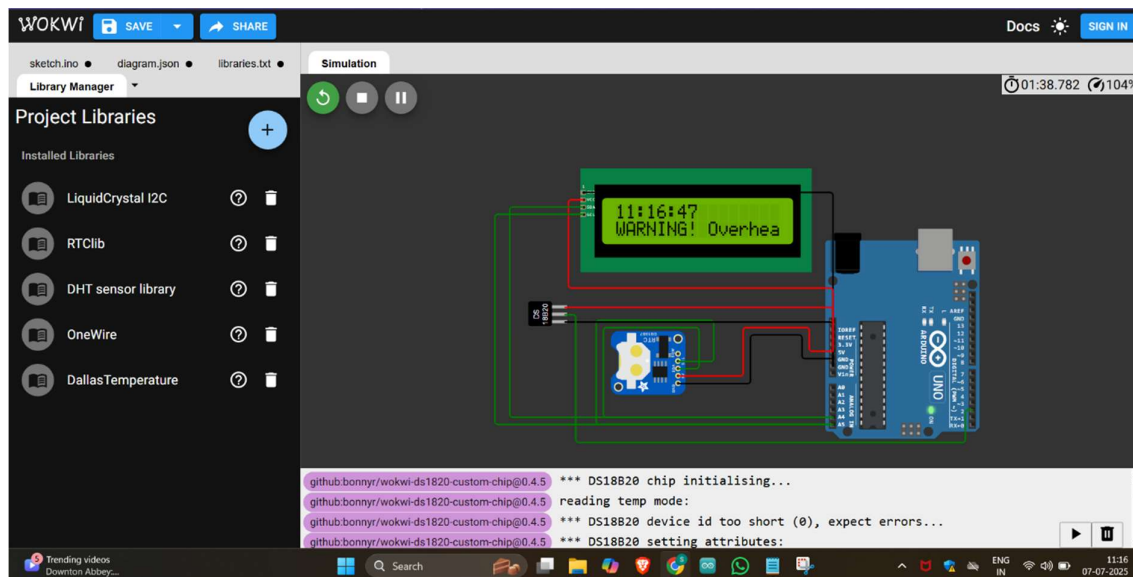


SIMULATION SCREENSHOTS (WOKWI):

WHEN THE TEMPERATURE IS NORMAL:



WHEN THE TEMPERATURE EXCEEDS THE THRESHOLD:



GITHUB REPOSITORY LINK:

<https://github.com/SumanthSriramA/rtc-temperature-monitor>