

<b>Project Name</b>	IoT Based Home Automation Solution
<b>Project Sponsor</b>	Emertxe Information Technologies (P) Ltd
<b>Project Mentor</b>	Jayakumar Balasubramanian Mubeen Jukaker Jayalakshmi N Dhanyal Nagaratha Harikant
<b>Project done by</b>	Rakshaa Madhuri K
<b>Institution</b>	SSN College of Engineering
<b>Internship Period</b>	16-Nov-2022 to 14-Dec-2022
<b>Responsibilities</b>	<ul style="list-style-type: none"><li>• To be able to simulate the home automation system on the PICSIMLAB simulator and use Blynk IoT application to control the devices.</li><li>• To be able to control the lights, temperature of the home, inflow and outflow of water in the water tank.</li></ul>



# PROBLEM STATEMENT:

To control common home appliances like lights, temperature and water flow using a remote interface like a web or mobile application to provide security, energy efficiency and ease of use.

Called as “IoT based Home Automation System”

## IMPLEMENTATION:

Development  
Environment  
Arduino IDE

Simulating  
tool  
PicSimLab

Virtual  
Port Pairs  
Virtual Null  
Modem  
Cables

Remote  
Control  
Blynk  
IoT App

# BUSINESS BENIFITS

- **Saves Energy:** By turning ON and OFF the equipment at the scheduled times, energy is saved.
- **Improved Security:** Incorporating safety features on remote devices can get security alerts if needed.
- **Convenience factor:** Managing all the devices in one place improves efficiency to a great extent.
- **Insights from collected data:** Provides valuable data from which one can manage one's energy consumption.



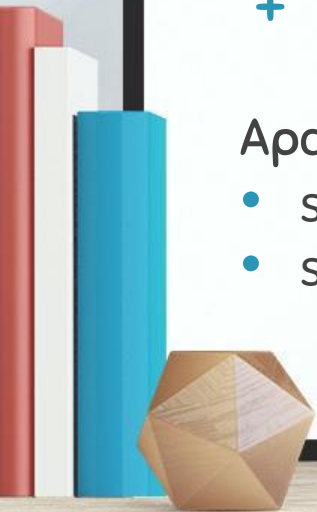
# USE CASES



- + Lighting control – Can control wall switches, blinds, lamps etc
- + Temperature control – Control the heater/ cooler based on surrounding temperature
- + Garden and overall water system control – Control inlet and outlet valves based on water availability

Apart from these, **other use cases** are listed here:

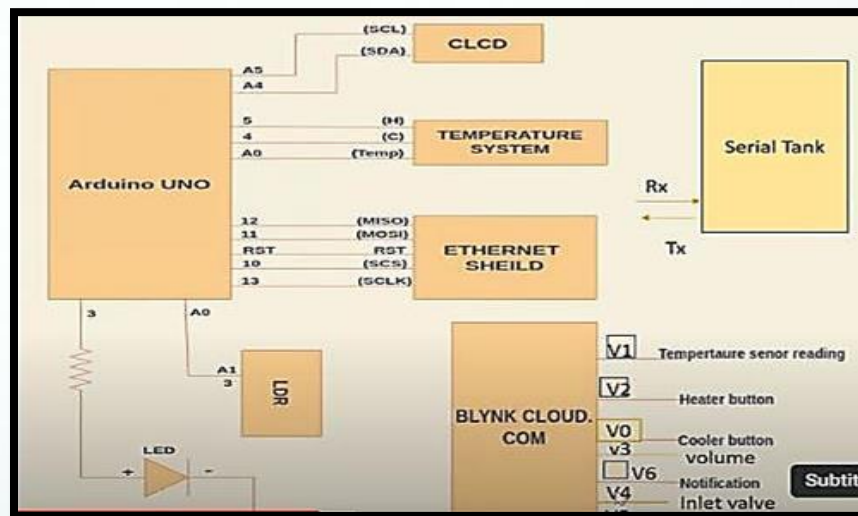
- Safety and Security systems embedded with surveillance features
- Smart appliances in homes





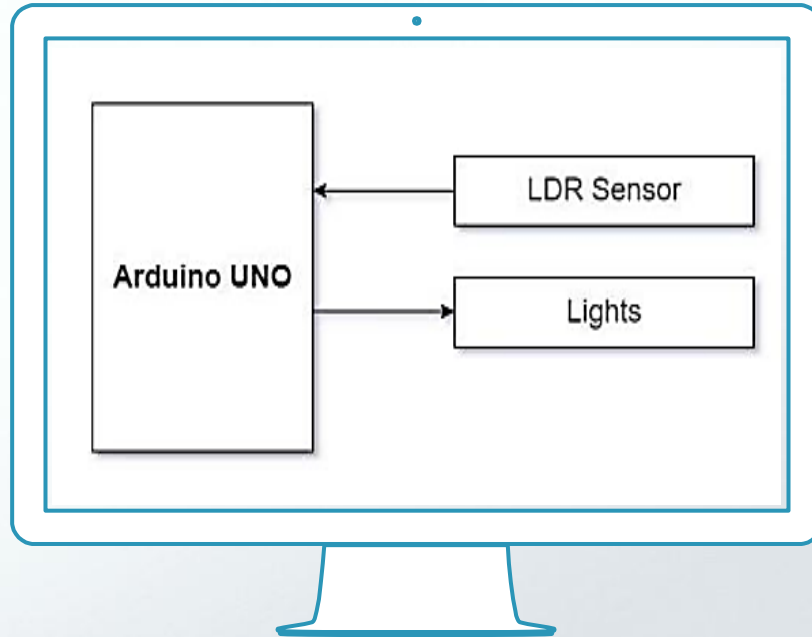


## Connection Diagram



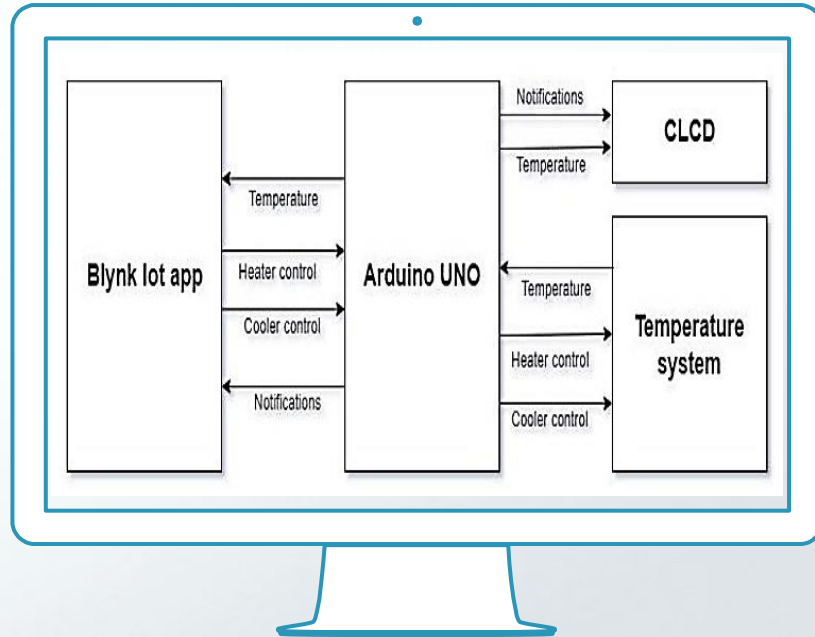
## GARDEN LIGHTS CONTROL

- > Based on the reading from **LDR sensor**, the **brightness of the LED** is varied, which resembles controlling the garden lights based on the availability of sunlight.
- > LDR sensor has **variable resistance** where the resistance of the LDR is inversely proportional to voltage or light present.
- > **Pulse Width Modulation (PWM)** is a technique used to achieve average voltages by varying the active time and inactive time in a fixed period.



## TEMPERATURE CONTROL SYSTEM

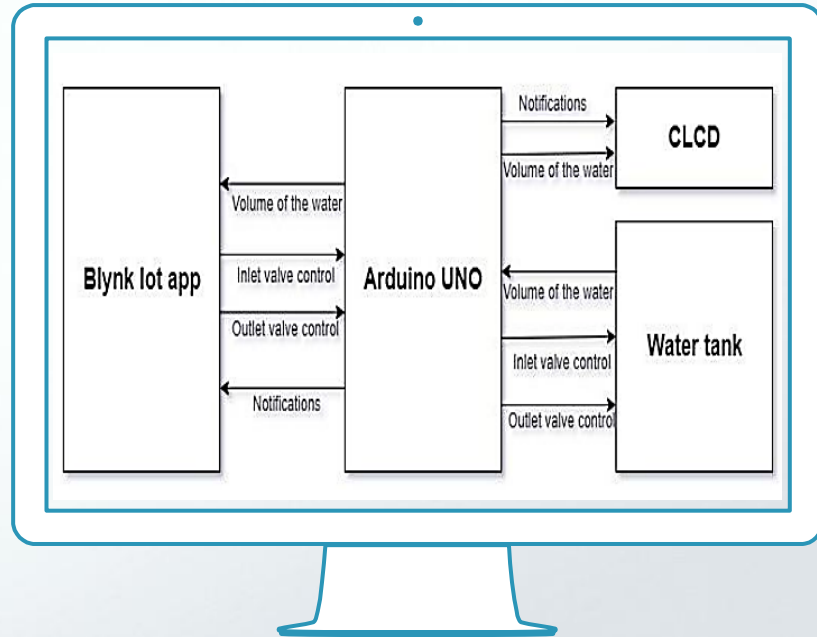
- > The temperature control system consists of a heating resistor, an LM35 temperature sensor, and a cooler.
- > The temperature is read from the sensor and displayed on **CLCD** and **gauge widget**.
- > The temperature of system is controlled by turning **ON/OFF the heater and cooler** through the Blynk IOT mobile app.
- > Also, the temperature is compared against a **threshold value of 35°C**, if temperature exceeds the value, the heater is turned OFF and the notification is displayed in the app and CLCD.





## WATER TANK CONTROL

- > The volume of water in the tank is read through **Serial Communication interface** and it is displayed on the CLCD and gauge widget.
- > The **volume of the water** in the tank is controlled by controlling the inlet and outlet valve by sending commands through serial communication interface.
- > The **inlet valve and outlet valve** is controlled through the Blynk IoT app by turning ON/OFF the inlet/ outlet valve button.
- > Also, the volume is compared against a **threshold value of 2000 ltrs**, if volume is less than the value, the inlet valve is turned ON and the notification is displayed in the app and CLCD.





## BLYNK APPLICATION



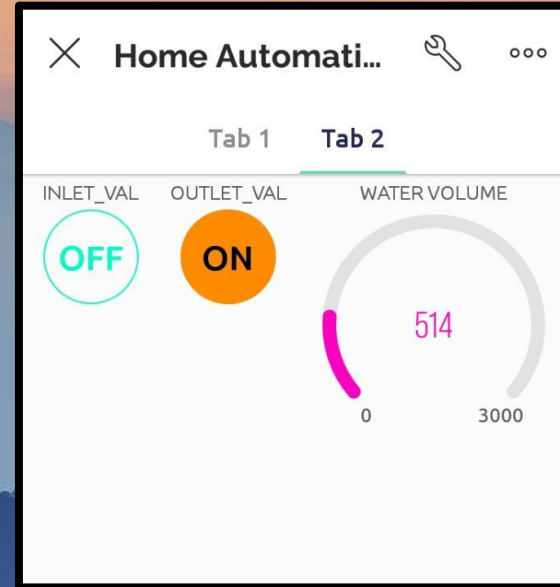
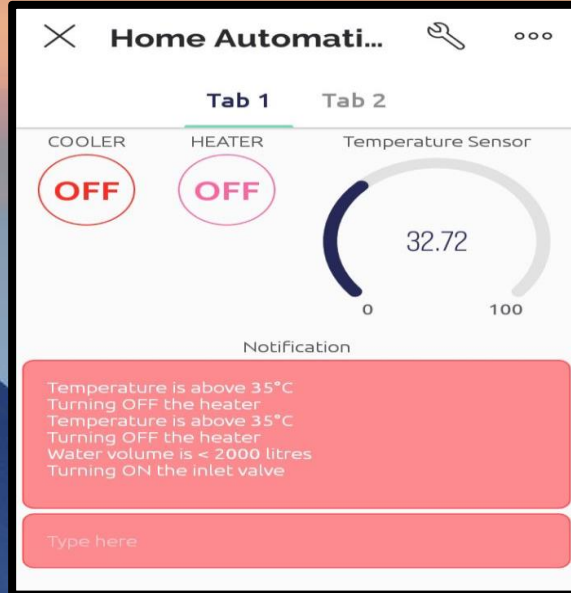
Blynk app is used for controlling electronic devices remotely. It can control hardware remotely, it can display, store and visualize sensor data. The *template id*, *device name* and *authentication token* is used to identify each of the unique devices and applications.

- + **Button widgets** are created to control heater, cooler, inlet valve and outlet value.
- + **Gauge widgets** are used to display temperature and volume of the water in the tank.
- + **Terminal widgets** are utilized to display the notifications whenever threshold is crossed.



(TAB 1) **BUTTON WIDGETS** – HEATER & COOLER, **GAUGE WIDGET** – TEMPERATURE  
**TERMINAL** – NOTIFICATIONS

(TAB 2) **BUTTON WIDGETS** – INLET & OUTLET VALVE, **GAUGE WIDGET** – VOLUME,





# PICSIMLAB SCREENSHOTS





# WHAT I'VE LEARNED THROUGH THIS INTERNSHIP PROGRAM

## Technical Learning

- C programming
- Programming Arduino board using C in Arduino IDE
- Using PICSIMLAB to simulate Arduino UNO

## Additional Learning

- To use Blynk IoT app
- Learnt about IoT architectures
- Got insights on resume building

## Personal Growth

- Learnt about how projects are implemented using IoT
- Understood how to effectively manage time
- Learnt how to make an effective presentation



# CHALLENGES FACED & HOW I HANDLED IT

Got multiple  
queries in code

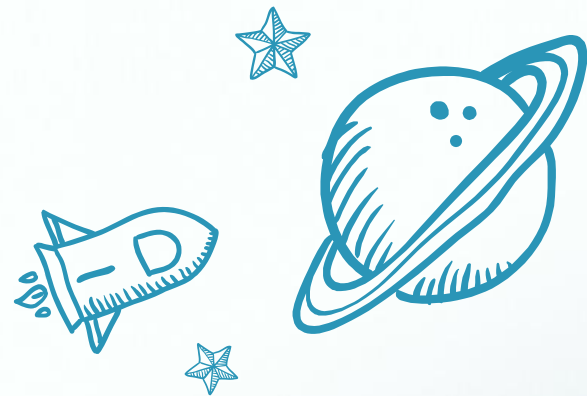
Resolved  
through LMS  
portal

Difficult to  
manage college  
and internship  
work

Effective time  
management  
helped

Null modern  
emulator's trial  
period got  
ended

Downloaded a  
different software



THANK YOU!

