Smart Green-House Controller

BY-

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PROBLEM STATEMENT

- Smart Greenhouse System is a IOT based system that can control green house using Android App remotely

- Monitor and Control Temperature and Humidity based on set points

- Monitor and Control internal Light and adjusts b/w Natural light

REQUIREMENT / TASK SPECIFICATION

- Control and monitoring system shall be employed with a Tiva Microcontroller, Temperature Soil Moisture sensors and LDRs and server is implemented with WAMP open source architecture and end user interface with an Android App.

- Shall monitor Temperature and Soil Moisture of the Green House using sensors and provide real-time updates to Android App and Server database.

- Shall control Temperature and Soil Moisture automatically based on the user profile settings set on the Android App by the user.

- The System shall be able to control devices (switch on/off) on Green House - Lights, Fans, Bulbs, Water Pumps instantaneously and timer based control based on inputs from Android App.

PROJECT PLAN

The project was divided and implemented in three separate parts - Android App Development, WAMP Server and database management, Microcontroller Programming and Interfacing.

- The Android App Development and MySQLite database implementation to store data from WAMP server was assigned to Vinay Teja Koona

- WAMP server implementation, PHP and python code development and Android App - Server connection through Android volley library was assigned to Anbarasan

- Microcontroller programming and H/W connections to sensors and interface for PHP communication with MC was assigned to Naman Rastogi

WORKING OF SYSTEM
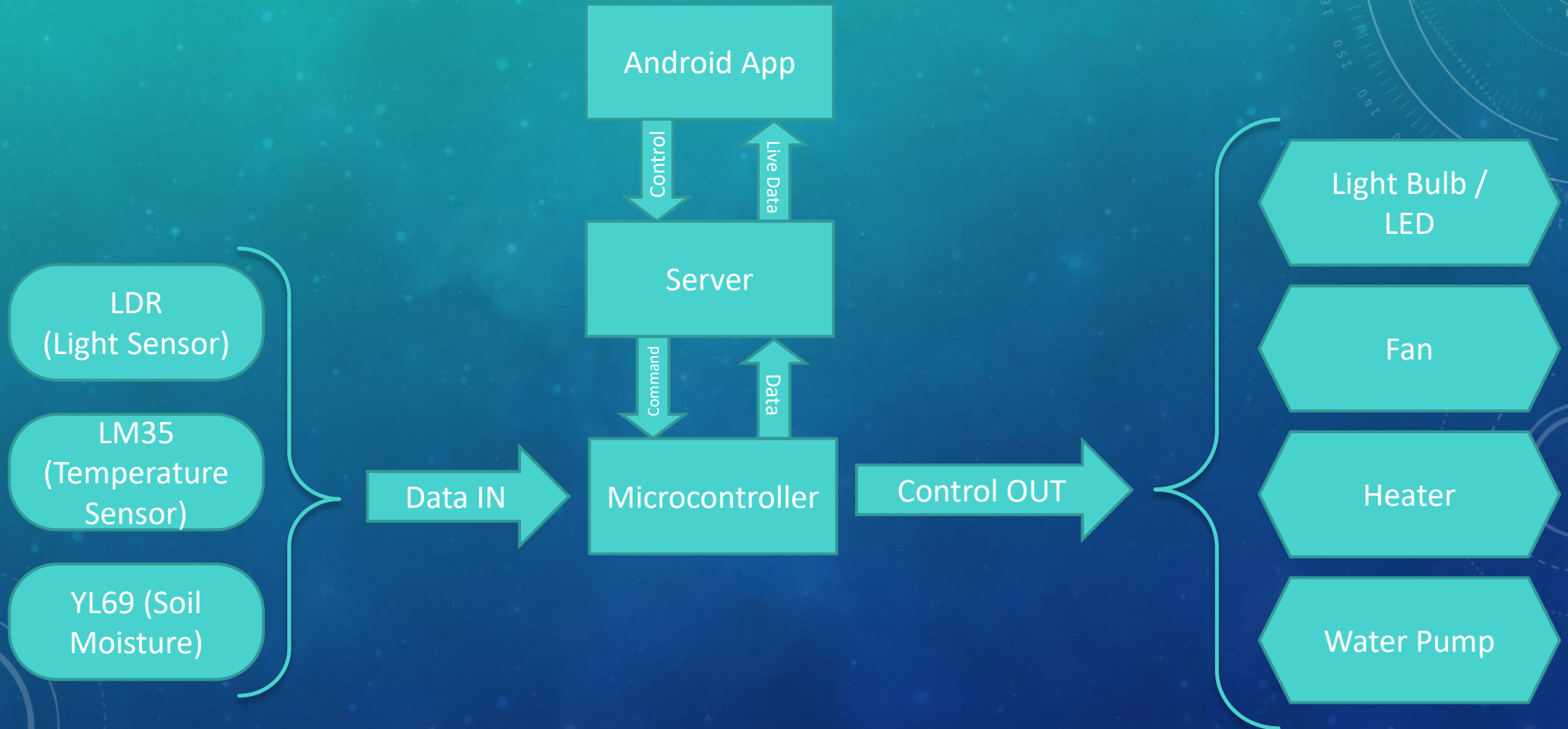
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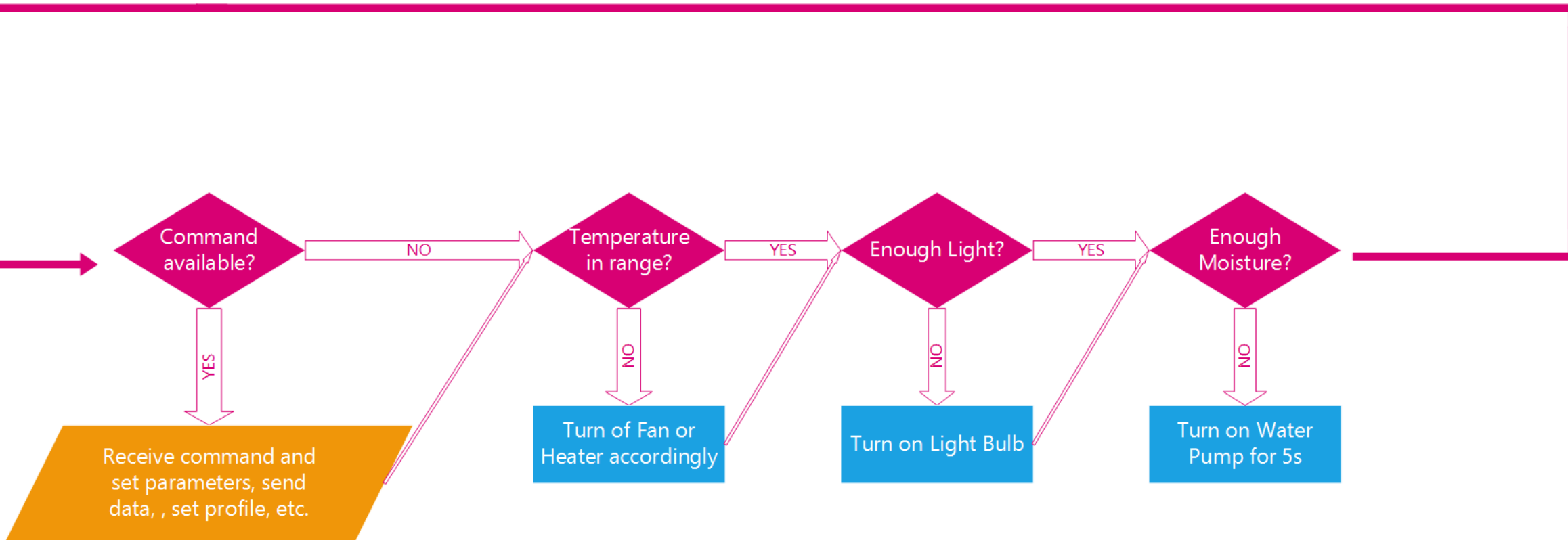
TASK COMPLETED

- Measuring humidity and temperature and transfer live data to android app

    - Problem : Transferring serial data periodically to android app

- Turn devices on/off using android app

    - Problem : Interfacing AC devices using relay circuit

TASK COMPLETED

- Turn a device on/off based on a specific timer

  - Problem: Schedule a separate process to wait for a specific time

- Control Temperature and Humidity based on set points given by user

  - Problem: Interfacing AC fan and AC water motor

REVIEW, TEST PLAN

Controlling Temperature

Test Plan: Set a temperature set point

Required Result:

1. Fan should turn on when temperature is more than given set point and turn off otherwise

2. Light Bulb should turn on when temperature is below set point and turn off otherwise

REVIEW, TEST PLAN

Controlling Humidity

Test Plan: Set a humidity set point

Required Result:

1. Water motor should turn on when the humidity value is below a given set point for 5 seconds at a time, and never when the humidity is sufficient.

REVIEW, TEST PLAN

Controlling Light inside Green-House

Test Plan: Have a minimum amount of light inside the green-house.

Required Result:

1. Artificial Light should turn on when there is not enough light inside the green-house, and turn off and remain off when there is enough natural light inside.

PERFORMANCE METRICS

- Instantaneous turn on/off of devices when input from phone.

- Slight delay (0.5 – 1.5 sec) in timer as new process is created for each request.

- Live data is updated every 2 seconds from server to the mobile app.

RE-USABLE FEATURES

- API made to enable serial communication from PHP to Microcontroller, enabling much simple commanding from PHP, to send data and receive data from microcontroller.

- Android app can be reused with some modifications to control any other device.

FUTURE ENHANCEMENTS

- The system can be enlarged to a large scale, consisting of 100s of lights, many fans, many appliances, etc.

- The system can be used in hospitals, enabling the doctors to monitor the patients remotely, recommending medicines, etc.