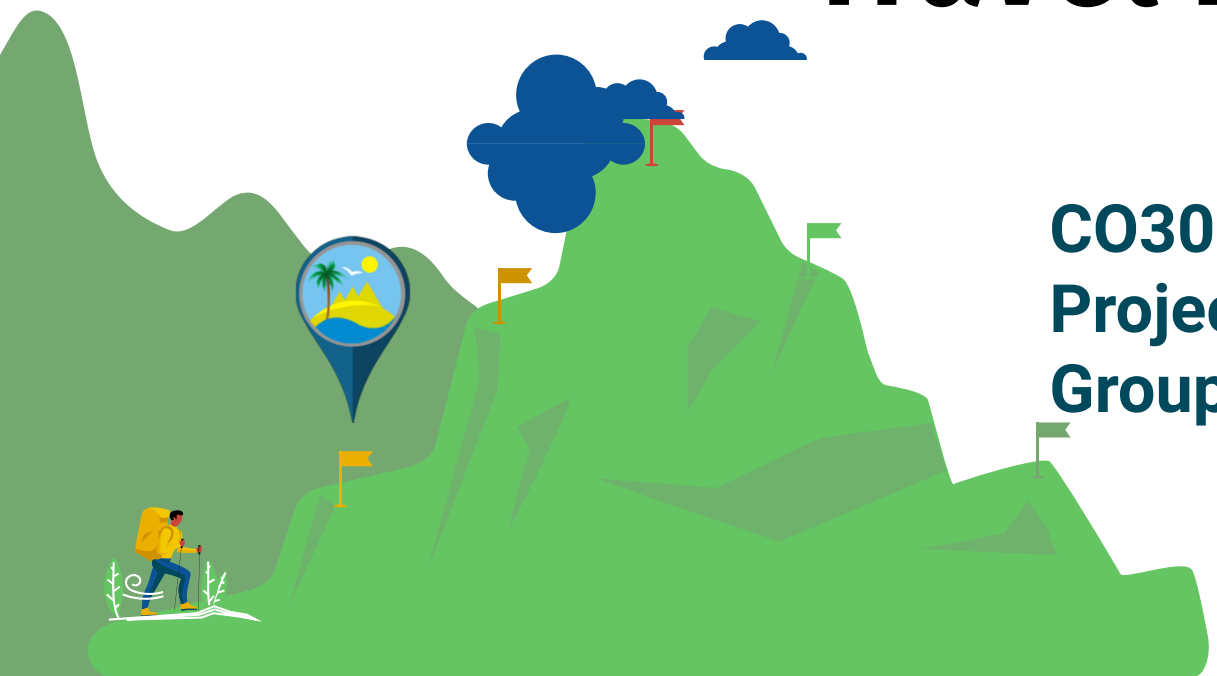
Weather Analytics and Travel Path Guider



CO300 : Third Year Project
Project Progress Review
Group 07

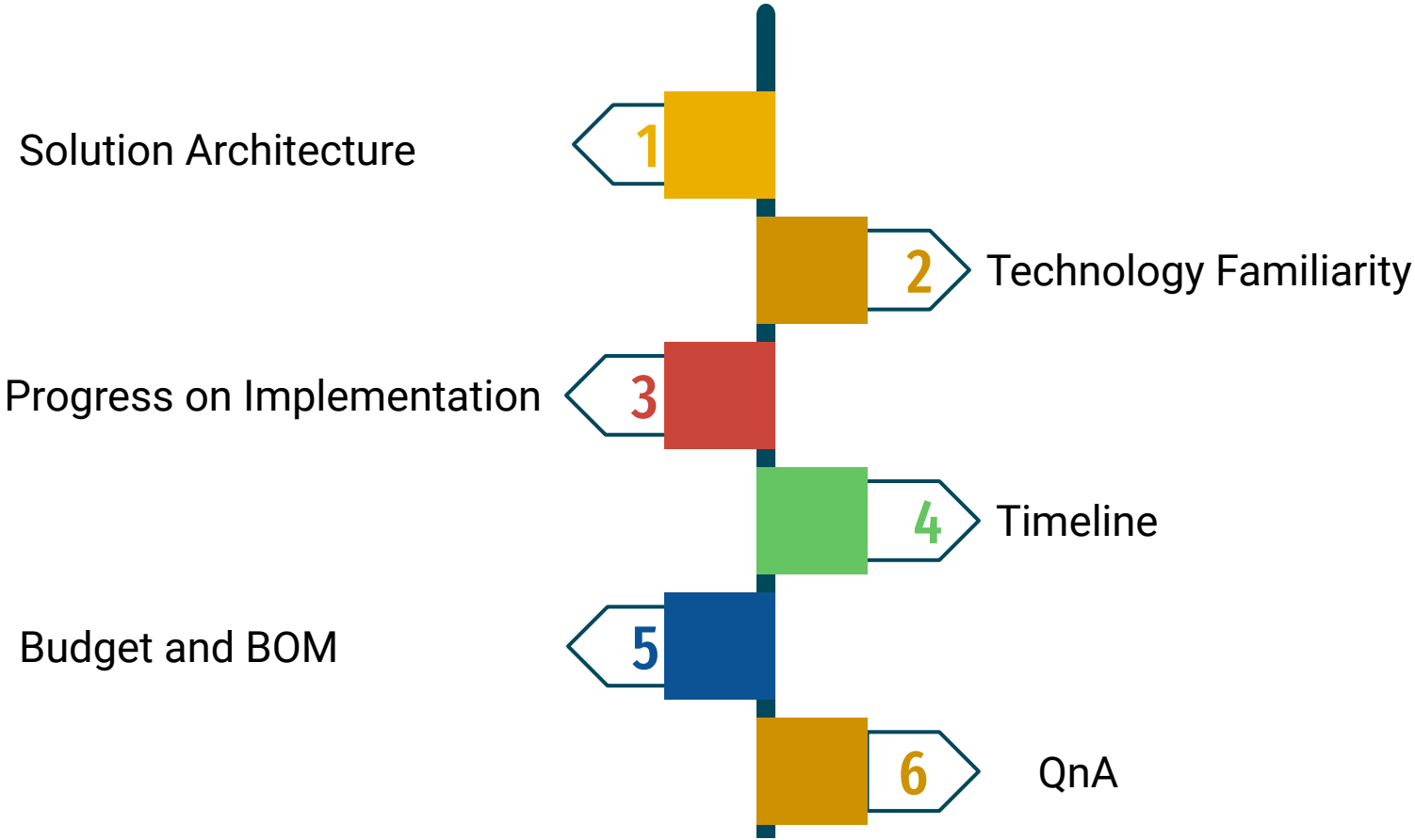
Team Members

Ishan Fernando
E/18/098

Adeepa Fernando
E/18/100

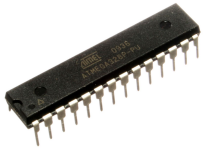
Ridma Jayasundara
E/18/155

Outline

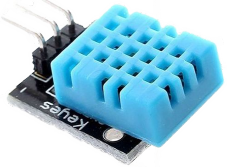

Solution Architecture
1
2
Technology Familiarity
Progress on Implementation
3
4
Timeline
Budget and BOM
5
6
QnA

Solution Architecture - Hardware

Hardware Components

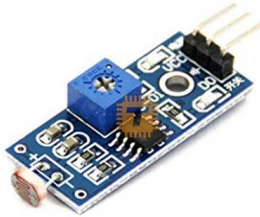


Atmega328P



DHT11 Temperature Sensor

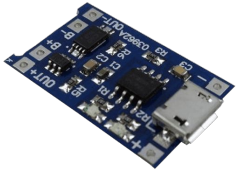
YL-83 FC-37 Rain Sensor



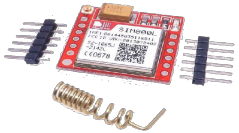
LDR Light Sensor

LED Bulb 7W With Solar Panel

Solar Panel



Battery Charging / Protection Module

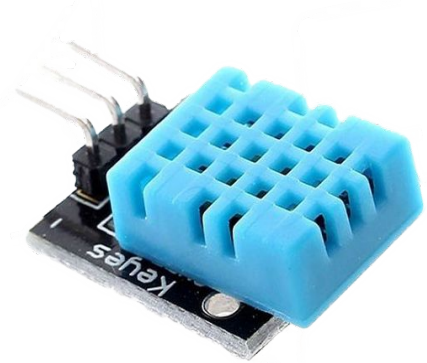


SIM800L GSM Module

Air Quality Sensor

DHT11 - Temperature Sensor

Temperature Range	0°c to 50°c
Humidity Range	20% to 90%
Accuracy	± 1°c and ± 1%
Output	Serial Data
Operating Voltage	3.5V to 5V
Operating Current	0.3mA, 60µA

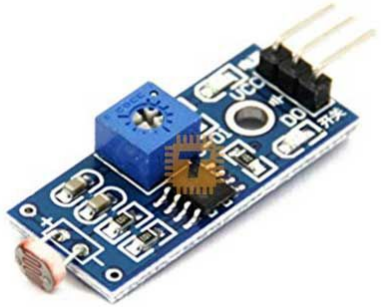


YL-83 FC-37 Rain Sensor

Output	1 Analog, 1 Digital
Operating Voltage	5V
Operating Current for Digital Output	100mA (max)
Dimensions	54x40 mm

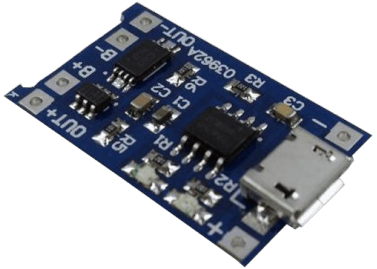
LDR Light Sensor

Output	Digital output
Operating Voltage	3.5V to 5V
Sensitivity	Adjustable
LED Indicator	Output and Power Indicator



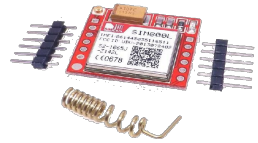
TP 4056 - Battery Charging / Protection Module

Max Charging Current	1A
Input Voltage	4.5V ~ 5.5V
Output Voltage	4.2V
Power	4.2W



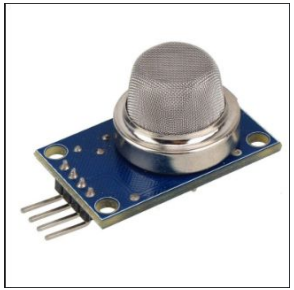
SIM800L GSM Module

Operating Voltage	3.4V ~ 4.4V
Peak Current	2A
Power Consumption	Sleep mode < 2.0mA Idle mode < 7.0mA GSM Transmission (avg) : 350 mA GSM transmission (peek) : 2000mA
Supported frequencies	2G Quad Band (850 / 950 / 1800 /1900 MHz)

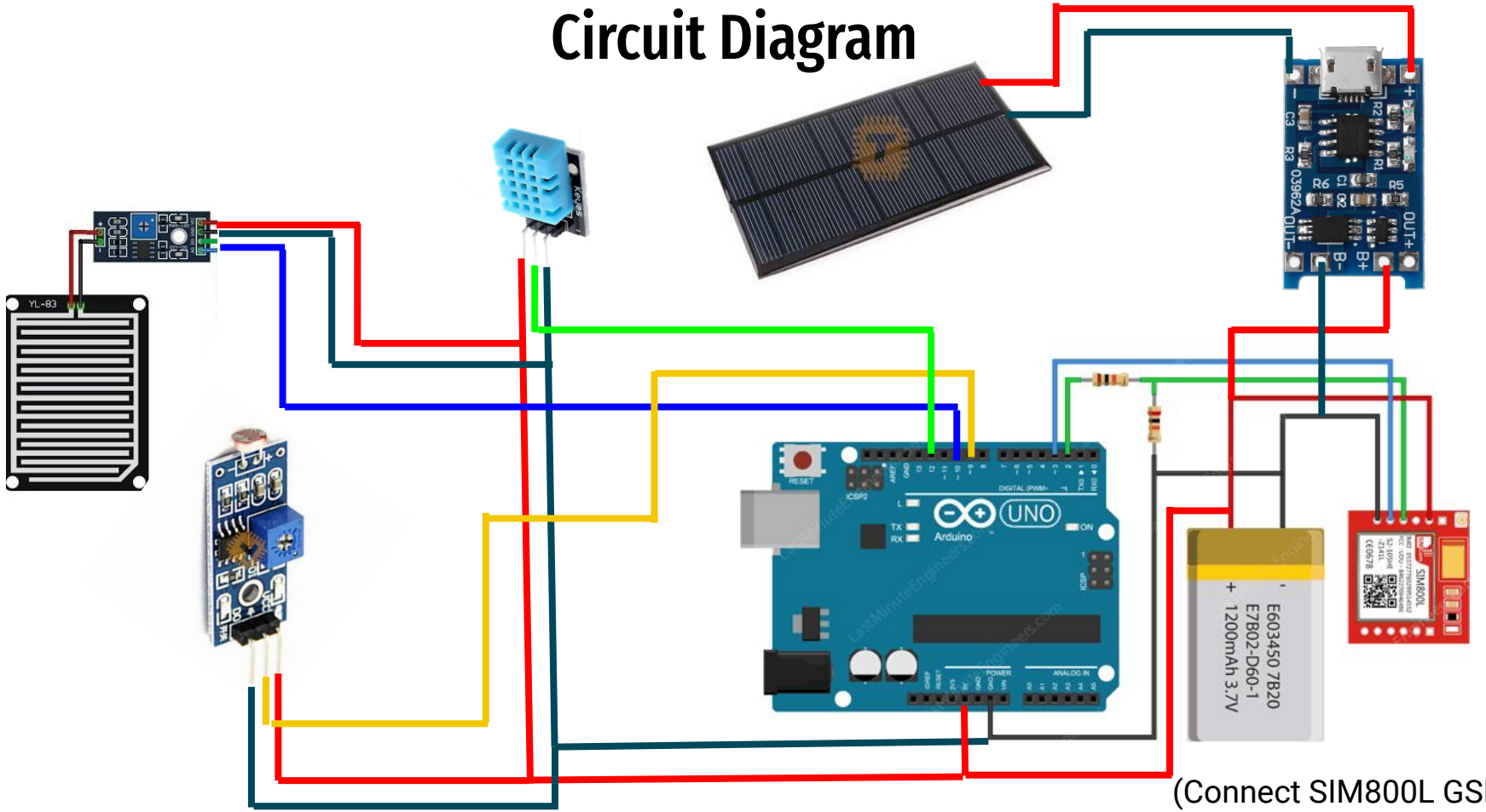


MQ135 - Air Quality Sensor

Operating Voltage	5V
Working Current	150mA
Output	1 Digital, 1 Analog
Operating Temperature	-10°C to 45°C.

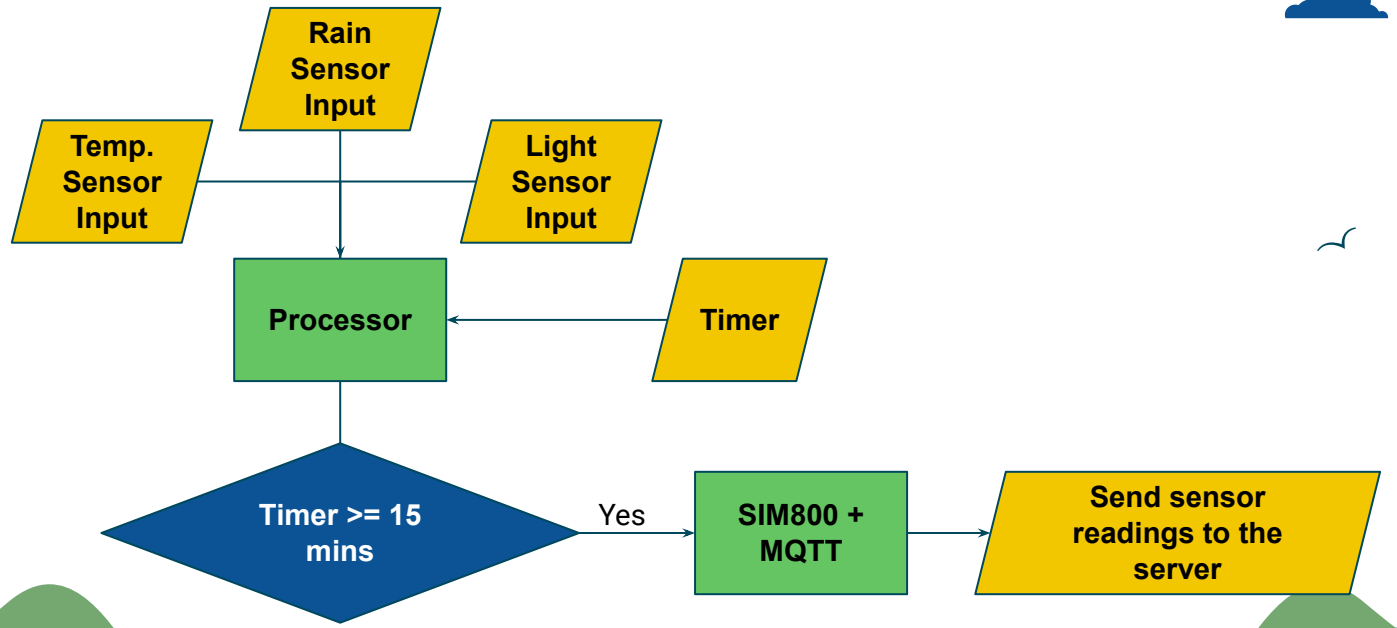


Circuit Diagram



(Connect SIM800L GSM to second battery)

Data flow in Hardware



Solution Architecture - Backend

- Node.js works well with a real-time handling large amount of information
- It can handle multiple requests simultaneously without straining the server.
- Node.js offers relatively higher performance.

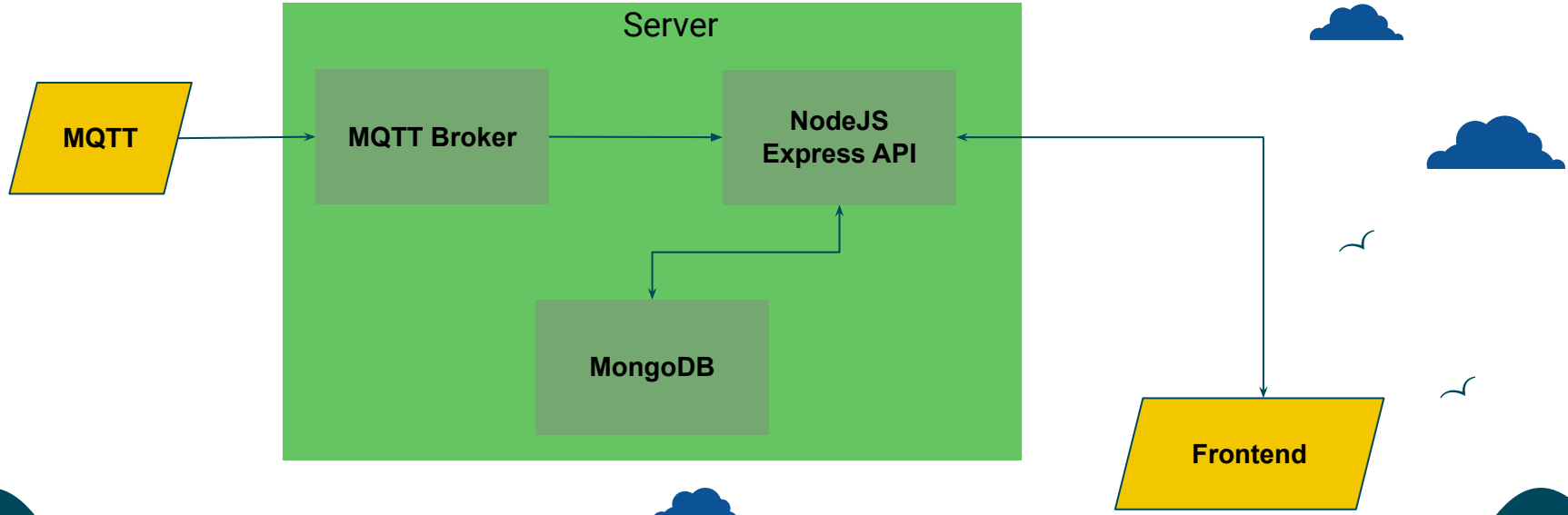
Solution Architecture - Backend

- MongoDB's scale-out architecture

  - can create an application that will handle spikes with traffic grows.
- To guarantee reliability, it uses a replica set mechanism

  - that makes the entire process more secure
- It is free to use
- NoSQL suits IoT database implementation

Dataflow in Backend



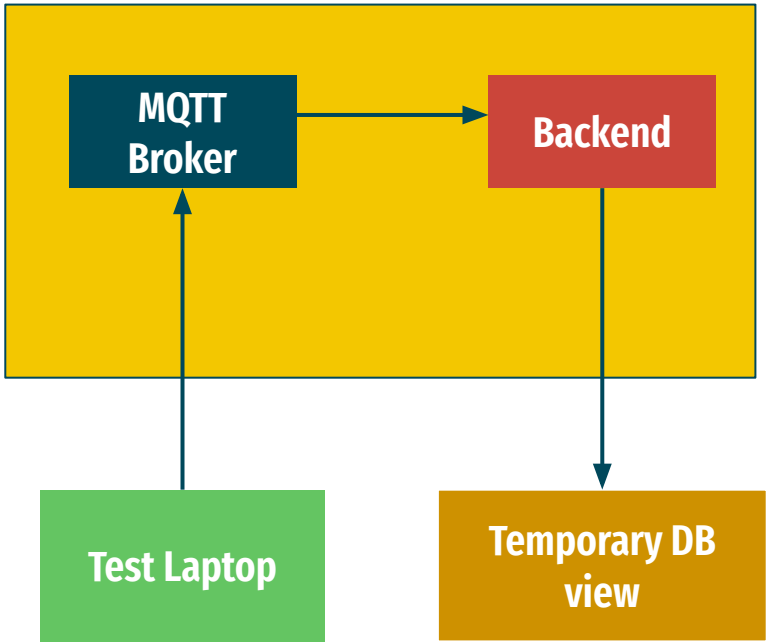
Solution Architecture - Frontend

- Flutter is Cross-Platform.
- Flutter has hot-reloading.
- UI rendering in Flutter is pixel-perfect. We are in charge of every pixel painted on the device screen.

Progress on Implementation Work - Frontend

Now let’s go for a demonstration,

Progress on Implementation Work - Backend



Now let's go for a demonstration,

Testing - Hardware

- What is tested ?

  - Connections to all the modules

  - Internet Connection to SIM800

  - Water proof, dustproof testing

- How to test ?

  - Unit testing library in PlatformIO

  - Physical Testing on the Casing

Testing - Backend

- What is tested ?

  - all the new API endpoints will be tested

- Why Testing ?

  - To make sure old features are working when a new one is implemented

  - Check load Handling capacity and limits

- How to test ?

  - JEST (Library in java to do testing)

  - Artillery (Library in Node.js for load testing)

Testing - Frontend

- What is tested ?

  - all the input fields will be tested

  - all the correct error messages will be thrown

- Why Testing ?

  - to make sure all the components on the screen are working

  - to make sure correct errors are shown to the user

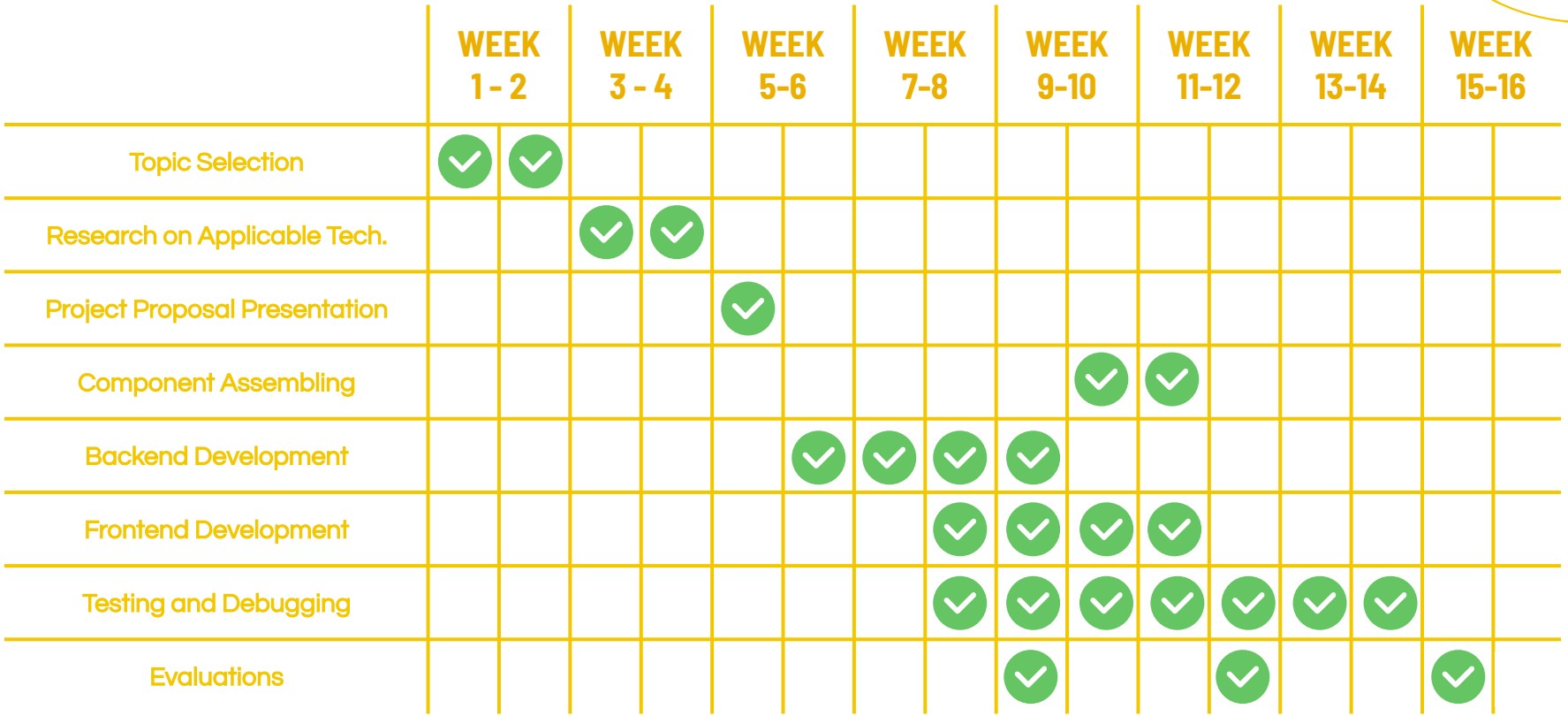
- How to test ?

  - using Flutter in-built testing library

Security

- User Login Authentication
- Firewalls in the Server

TIMELINE


WEEK 1 - 2
WEEK 3 - 4
WEEK 5-6
WEEK 7-8
WEEK 9-10
WEEK 11-12
WEEK 13-14
WEEK 15-16
Topic Selection
Research on Applicable Tech.
Project Proposal Presentation
Component Assembling
Backend Development
Frontend Development
Testing and Debugging
Evaluations

Budget

Equipment Name	Qty	Price
Arduino UNO Normal Development Board	1	3450.00
DHT11 Temperature and Relative Humidity Sensor	1	600.00
Arduino SIM800L GSM GPRS Quad-Band Network Module	1	1690.00
Mini Solar Panel 6V 1W	3	1500.00
18650 Battery	1	840.00
18650 Battery Charging Module	1	350.00
Rain Sensor	1	280.00
LDR Light Sensor	1	200.00
LED Bulb 7W With Solar Panel	1	950.00
Casing	-	4000.00
Miscellaneous	-	5000.00
TOTAL		18860.00

Q & A

Thank You !