

Group 19 LFMT

Automated Planter

Mason Trippel & Lucas Fox



Mason Trippel

Bio/Responsibilities

Major: Computer Engineering

Skills: Microcontroller Programming/Wiring, 3D Design, Circuit & PCB Design

Responsibilities: Budgeting, Hardware & Microcontroller Programming,



Lucas Fox

Bio/Responsibilities

Major: Computer Science

Skills: Software Engineering, Mobile App Development, Web Development, Full-stack

Responsibilities: Handle app development and UX



The problem

Stages of plant ownership

01

You spend \$20-40 on a house plant. It looks nice and you try to take care of it, thinking it will never die under your watch.

02

You forgot to water it for the last two weeks, but it's still green...ish. You give it some water and expect it to come back to full health.

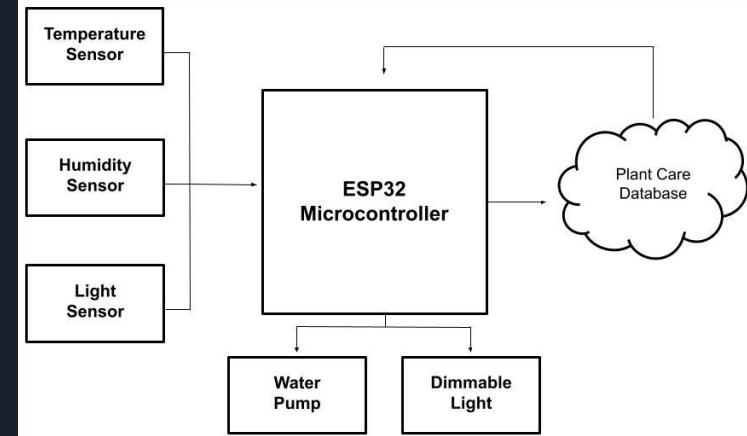
03

The plant is now beyond saving and in an effort to shield yourself from the responsibility you throw it outside to rot away.

Project objective

Design a device that can:

- Ensure plant health by varying the amount of light & water your your plant receives
- Measure important environmental factors
- Use measurements to optimize the environment for the plants health
- Report this data to the user
- Notify the user of any issues and when maintenance is required





Proposed Solution

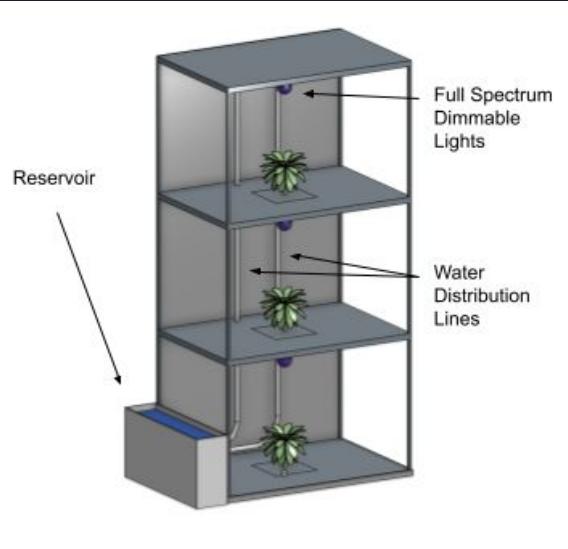
- IOT Device
- Dynamic Application
- Simple UI/UX
- 3D-Printable
- Open Source

Budget

Item	Cost
ESP32 Microcontroller	\$7.00
Water Pump	\$6.00
Misc Sensors/ICs	\$6.50
Misc Hardware	\$25.00
Test Environment/Enclosure	\$20.00
Total	\$64.50

Progress to Date

3D Model



Microcontroller Program Outline

```
planterLogicREVA | Arduino IDE 2.3.6
File Edit Sketch Tools Help
Select Board
planterLogicREVA.ino
1 //include libraries
2 #include <WiFi.h>
3 #include <PubSubClient.h>
4 #include <DHT.h>
5 #include <SoftwareSerial.h>
6
7 #define DHTTYPE DHT22
8 #define DHTPIN DHT11Pin
9 #define RSTPin DHT11RSTPin
10
11 #define LED_PIN D9
12 #define RAIN_PIN D2
13
14 #define minLightIntensity 10
15 #define maxLightIntensity 100
16 #define minHumidity 30
17 #define maxHumidity 100
18 #define minTemp 10
19 #define maxTemp 30
20 #define targetLightLevel 50
21
22 void setup() {
23   WiFiClient http;
24   SoftwareSerial esp8266Serial(10, 11);
25
26   if (esp8266Serial.begin(9600) == 0) {
27     String payload = "http://getaddrinfo";
28     esp8266Serial.println(payload);
29     esp8266Serial.println("at+HTTPINIT");
30     esp8266Serial.println("AT+HTTPGET");
31   }
32
33   float currentLighting = JSON["watering_general"]["backlight"];
34   int dash = String(currentLighting).indexOf(".");
35   int dashHigh = String(currentLighting).length() - dash - 1;
36   int dashLow = dash + 1;
37
38   float avgHigh = (dashHigh * 10) + (dashLow * 1);
39   float avgLow = (dashHigh * 1) + (dashLow * 10);
40
41   maxLightIntensity = 100 - (avgHigh * 1.0);
42   minLightIntensity = 100 - (avgLow * 1.0);
43
44   float sunInt = JSON["WateringInformation"]["Suprise user"]["[1]id"];
45   float sunOut = JSON["WateringInformation"]["Suprise user"]["[1]out"];
46   float sunIn = JSON["WateringInformation"]["Suprise user"]["[1]in"];
47   float targetLightLevel = 100 - sunInt;
48
49   // Temperature range
50   float temp = JSON["WateringInformation"]["Temperature Suprise user"]["[1]in"];
51   float outTemp = JSON["WateringInformation"]["Temperature Suprise user"]["[1]out"];
52   float inTemp = JSON["WateringInformation"]["Temperature Suprise user"]["[1]in"];
53
54   // http.begin();
55
56   WiFi.mode(WIFI_STA);
57   WiFi.begin(ssid);
58   WiFi.setIP(ipAddress);
59   WiFi.setPort(port);
60   WiFi.setAuthMode(WIFI_AUTH_WPA2);
61
62   Serial.begin(9600);
63
64   updateDHT();
65
66   delay(1000);
67
68   float temp = WiFi.readTemperature();
69   float humidity = WiFi.readHumidity();
70
71   float light = analogRead(DHT11Pin);
72
73   Serial.print("Temp: "); Serial.print(temp);
74   Serial.print("Humidity: "); Serial.print(humidity);
75   Serial.print("Light: "); Serial.print(light);
76
77   int lighter = targetLightLevel - light;
78
79   if (lighter >= 0) {
80     analogWrite(LED_PIN, lighter);
81     analogWrite(RAIN_PIN, lighter);
82   }
83
84   if (humidity < minHumidity) {
85     digitalWrite(PUMP_PIN, HIGH);
86   } else if (humidity > maxHumidity) {
87     digitalWrite(PUMP_PIN, LOW);
88   }
89
90   // 20ms interval
91   delay(20000);
92 }
```

Plant Care API (Perenual)

The screenshot shows a dark-themed dashboard for a Plant Care API. At the top, a green button indicates "API Status Active". To the right, a blue box displays "Total Plants 10,000+". Below these are five cards, each representing a different plant with its ID, common name, sunlight requirements, and watering needs.

Image	ID	Common Name	Sunlight	Watering
	155	Monstera Deliciosa	Average	High
	158	Monstera Adansonii	Average	Average - High
	721	Snake Plant	Low	Low
	4068	Peacock Plant	Average	High

Project Timeline

