```
#include <Wire.h>
#include <Adafruit_MLX90614.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>
#include "HX711.h"
#include <Servo.h>

// Pin Definitions
#define TRIG_PIN 6
#define ECHO_PIN 7
#define BUZZER_PIN 11
#define SERVO_PIN 10

#define COLOR_R_PIN A0
#define COLOR_G_PIN A1
#define COLOR_B_PIN A2  // If available

#define HX_DT 8
#define HX_SCK 9

// OLED config
#define SCREEN_WIDTH 128
#define SCREEN_HEIGHT 64
Adafruit_SSD1306 display(SCREEN_WIDTH, SCREEN_HEIGHT, &Wire, -1);

// Sensors and modules
Adafruit_MLX90614 mlx = Adafruit_MLX90614();
HX711 scale;
Servo myServo;

// Thresholds (You should calibrate these!)
int red_thresh = 500;     // Adjust based on your RGB sensor readings
int green_thresh = 600;
```

```
int blue_thresh = 400;

void setup() {
  Serial.begin(9600);

  // RGB sensor pins
  pinMode(COLOR_R_PIN, INPUT);
  pinMode(COLOR_G_PIN, INPUT);
  pinMode(COLOR_B_PIN, INPUT);

  // Ultrasonic
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);

  // Buzzer
  pinMode(BUZZER_PIN, OUTPUT);

  // OLED
  if (!display.begin(SSD1306_SWITCHCAPVCC, 0x3C)) {
    Serial.println("OLED failed");
    while (1);
  }
  display.clearDisplay();

  // MLX90614
  mlx.begin();

  // HX711
  scale.begin(HX_DT, HX_SCK);
  scale.set_scale();  // Calibrate this
  scale.tare();

  // Servo
```

```
  myServo.attach(SERVO_PIN);
  myServo.write(90); // Neutral position
}

void loop() {
  // Read RGB sensor
  int red = analogRead(COLOR_R_PIN);
  int green = analogRead(COLOR_G_PIN);
  int blue = analogRead(COLOR_B_PIN);

  // Classify Material (example logic)
  bool isBiodegradable = (green > green_thresh && red < red_thresh);

  // Read distance
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  long duration = pulseIn(ECHO_PIN, HIGH);
  float distance = duration * 0.034 / 2;

  // Read temperature
  float tempC = mlx.readObjectTempC();

  // Read weight
  float weight = scale.get_units(5);

  // Display values on OLED
  display.clearDisplay();
  display.setTextSize(1);
  display.setTextColor(SSD1306_WHITE);
```

```
  display.setCursor(0, 0);
  display.print("Temp: "); display.print(tempC); display.println(" C");

  display.print("Dist: "); display.print(distance); display.println(" cm");

  display.print("Weight: "); display.print(weight); display.println(" g");

  display.print("R: "); display.print(red);
  display.print(" G: "); display.print(green);
  display.print(" B: "); display.println(blue);

  display.print("Class: ");
  display.println(isBiodegradable ? "BIODEGRADABLE" : "NON-BIO");

  display.display();

  // Servo action
  if (distance < 10 && weight > 5) {
    if (isBiodegradable) {
      myServo.write(150); // Rotate right
    } else {
      myServo.write(30);  // Rotate left
    }
    tone(BUZZER_PIN, 1000, 300); // Beep
    delay(1000);
    myServo.write(90); // Reset to middle
  }

  delay(1000); // Wait before next reading
}
```