

## CODE [ags.py] [Python3]

```
from gpiozero import LightSensor
from numpy import interp
import Adafruit_CharLCD as LCD
import RPi.GPIO as GPIO
import time
import spidev
GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)

# Firebase Configuration
import pyrebase

config = {
    "apiKey": "<api-key>",
    "authDomain": "automatic-gardening-system.firebaseio.com", "databaseURL": "https://automatic-
gardening-system.firebaseio.com/gardening-data",
    "storageBucket": "automatic-gardening-system.appspot.com"
}

firebase = pyrebase.initialize_app(config)
db = firebase.database()

def send_data(id, data, parent):
    par = db
    if (len(parent) > 0):
        for p in parent:
            par = par.child(p)
    par.child(id).set(data)
    print("Sent ", id, " = ", data)

def get_data(id):
    data = db.child(id).get().val()
    print(id, " = ", data)
    return data

custom_control = get_data("customControl")
```

```
# Moisture_Sensor_Setup
```

```
threshold = 10
```

```
# Start_SPI_Connection
```

```
spi = spidev.SpiDev()
```

```
spi.open(0,0)
```

```
# Read_MCP3008_Data
```

```
def analogInput(channel):
```

```
    spi.max_speed_hz = 1350000
```

```
    adc = spi.xfer2([1,(8+channel)<<4,0])
```

```
    data = ((adc[1]&3) << 8) + adc[2]
```

```
    return data
```

```
# LCD_Setup
```

```
# Raspberry_Pi_Pin_Setup
```

```
lcd_rs = 25
```

```
lcd_en = 24
```

```
lcd_d4 = 23
```

```
lcd_d5 = 17
```

```
lcd_d6 = 18
```

```
lcd_d7 = 22
```

```
lcd_backlight = 2
```

```
# LCD_Rows_And_Columns
```

```
lcd_rows = 2
```

```
lcd_columns = 16
```

```
lcd = LCD.Adafruit_CharLCD(lcd_rs, lcd_en, lcd_d4, lcd_d5, lcd_d6, lcd_d7, lcd_columns, lcd_rows,  
lcd_backlight)
```

```
# Pin_Declaration
```

```
ldr = 19
```

```
buzzer = 26
```

```
motor = 12
```

```
tank_level = 13
```

```
ldr_red_led = 16
```

```
moisture_blue_led = 20
```

```
tank_green_led = 21
```

### # GPIO\_Setup

```
GPIO.setup(buzzer,GPIO.OUT)
GPIO.setup(motor,GPIO.OUT)
GPIO.setup(tank_level,GPIO.OUT)
GPIO.setup(ldr_red_led,GPIO.OUT) GPIO.setup(moisture_blue_led,GPIO.OUT)
GPIO.setup(tank_green_led,GPIO.OUT)
```

### # Default\_Pin\_Setup

```
GPIO.output(buzzer,GPIO.LOW)
GPIO.output(motor,GPIO.LOW)
GPIO.output(ldr_red_led,GPIO.LOW)
GPIO.output(moisture_blue_led,GPIO.LOW)
GPIO.output(tank_green_led,GPIO.LOW)
```

### # Values

```
ldr_read = LightSensor(ldr)
ldr_value = (ldr_read.value)*100
tank_value = GPIO.input(tank_level)
moisture_value = int(interp(analogInput(0), [0, 1023], [100, 0]))
```

### # Main\_Code

```
lcd.message(" Automatic ")
lcd.message("\nGardening System")
time.sleep(5)
lcd.clear()
while True:
    lcd.clear()
    ldr_value = (ldr_read.value)*100
    send_data("lightIntensity", ldr_value/100, [])
    customControl = get_data("customControl")
    if(customControl):
        led_state = get_data("ledState")
        if (led_state):
            GPIO.output(ldr_red_led, GPIO.HIGH)
            print("Custom control: ON LIGHT")
        else:
            GPIO.output(ldr_red_led, GPIO.LOW)
            print("Custom control: OFF LIGHT")
```

```

        elif (ldr_value < 50):
            GPIO.output(ldr_red_led,GPIO.HIGH)
            print(ldr_value)
            time.sleep(0.5)
        else:
            GPIO.output(ldr_red_led,GPIO.LOW)
            print(ldr_value)
            time.sleep(0.5)

moisture_value = int(interp(analogInput(0), [0, 1023], [100, 0]))
send_data("moisture", moisture_value, [])

if(moisture_value < threshold):
    GPIO.output(moisture_blue_led, GPIO.LOW)
    lcd.message(" Moisture LOW ")
else:
    GPIO.output(moisture_blue_led, GPIO.HIGH)
    lcd.message(" Moisture HIGH ")

tank_value = GPIO.input(tank_level)
send_data("waterLevel", 1, [])

if(tank_value==1):
    GPIO.output(tank_green_led, GPIO.LOW)
    lcd.message("\nTank Level HIGH ")
else:
    GPIO.output(tank_green_led,GPIO.HIGH)
    lcd.message("\n Tank Level LOW ")

if(customControl):
    motor = get_data("landMotor")
    waterLevel = get_data("waterLevel")
    print("Read Water Level = ", waterLevel)
    waterLevel = 1
    while(customControl and motor and waterLevel):
        print("Custom Control: MOTOR ON")
        lcd.clear()
        lcd.message(" Motor ON \n")
        lcd.message(" Tank Filled ")
        GPIO.output(buzzer, GPIO.HIGH)

```

```

time.sleep(1)
GPIO.output(buzzer, GPIO.LOW)
customControl = get_data("customControl")
    if(not customControl):
        break
motor = get_data("landMotor")
waterLevel = get_data("waterLevel")

elif(moisture_value<threshold and tank_value==1):
    while(moisture_value<threshold and tank_value==1):
        lcd.clear()
        lcd.message(" Moisture LOW ")
        lcd.message("\n Motor ON ")
        GPIO.output(buzzer,GPIO.HIGH)
        time.sleep(1)
        GPIO.output(buzzer,GPIO.LOW)
        time.sleep(1)
        GPIO.output(motor,GPIO.HIGH)
        print("Motor On")
moisture_value = int(interp(analogInput(0), [0, 1023], [100, 0]))
send_data("moisture", moisture_value, [])
    if(moisture_value>threshold):
        lcd.clear()
        lcd.message(" Moisture HIGH ")
        lcd.message("\n Motor OFF ")
        GPIO.output(moisture_blue_led, GPIO.HIGH)
        GPIO.output(motor, GPIO.LOW)
        time.sleep(2)
moisture_value = int(interp(analogInput(0), [0, 1023], [100, 0]))
send_data("moisture", moisture_value, [])
    if(tank_value==0):
        lcd.clear()
        lcd.message(" Tank Level LOW ")
        lcd.message("\n Motor OFF ")
        GPIO.output(tank_green_led,GPIO.HIGH)
        GPIO.output(motor,GPIO.LOW)
        time.sleep(2)
        tank_value = GPIO.input(tank_level)
        send_data("waterLevel", tank_value, [])
time.sleep(1)

```