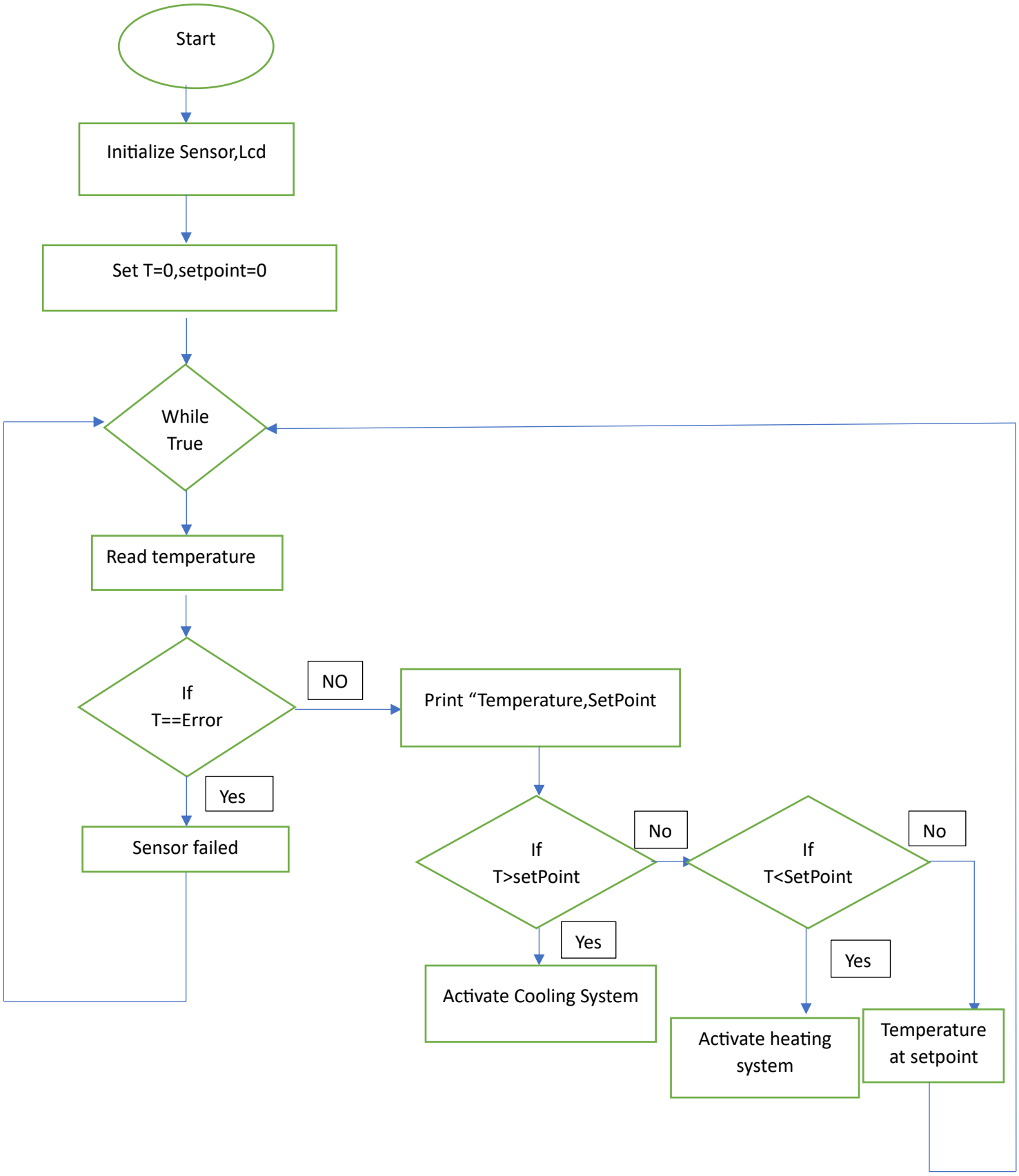
Weekend Assignment

1. Smart Home Temperature Control

Pseudocode

```
Start
Initialize the sensor, LCD;
Set T=0, setPoint=0;
While True (do),
        T=Read temperature from sensor()
        If T==Error Then
                Print “Sensor failed”
        Else
                Print “Current temperature:” ,T
                Print “setPoint temperature:”,T
                If(T>setPoint) then
                        Print “Activate cooling system”
                Else if (T<setpoint) then
                        Print “Activate heating system”
                Else
                        Print”Temperature is at SetPoint”
                End if
        End if
        End While
        End
```

Flowchart

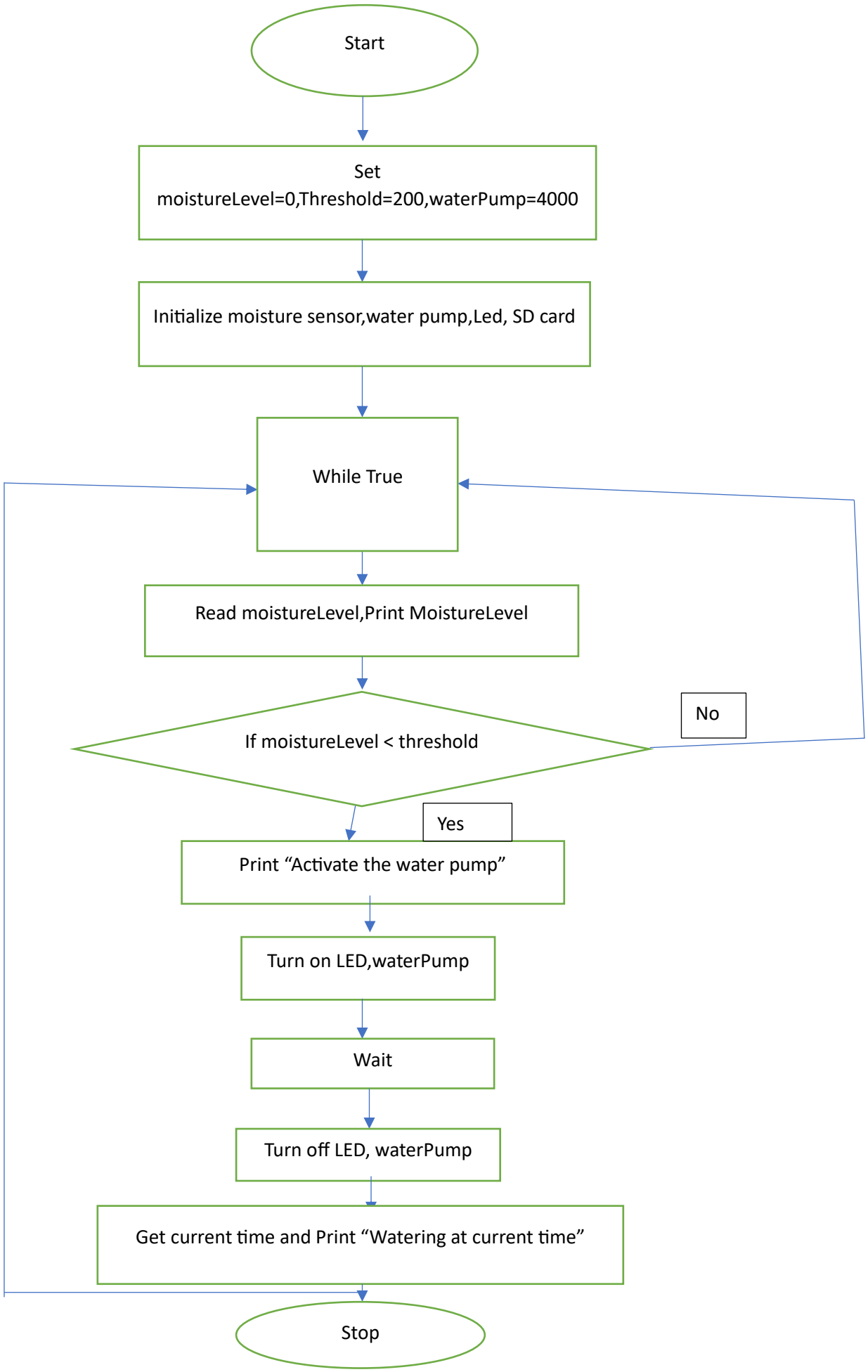

Start
Initialize Sensor,Lcd
Set T=0,setpoint=0
While True
Read temperature
If T==Error
NO
Print “Temperature,SetPoint
Yes
Sensor failed
If T>setPoint
No
If T<SetPoint
No
Yes
Activate Cooling System
Yes
Activate heating system
Temperature at setpoint

2.Automated Plant Watering System

Pseudocode

```
Start
Set moistureLevel=0;
Set threshold=200, pump=4000;
Initialize the sensor, waterpump, Led, SD card;
While True (do),
        moisture=Read moistureLevel from sensor
        Print “Moisture level”, moistureLevel
        If moisture level<Threshold then
                Print “Activate the water pump for a specified duration”
                Turn Led and Water pump on
                Wait
                Turn water pump and led off
                currentTime= Get currentTime
                Print “Watering event at current time:”,currentTime
        End if
End while
End
```

Flowchart

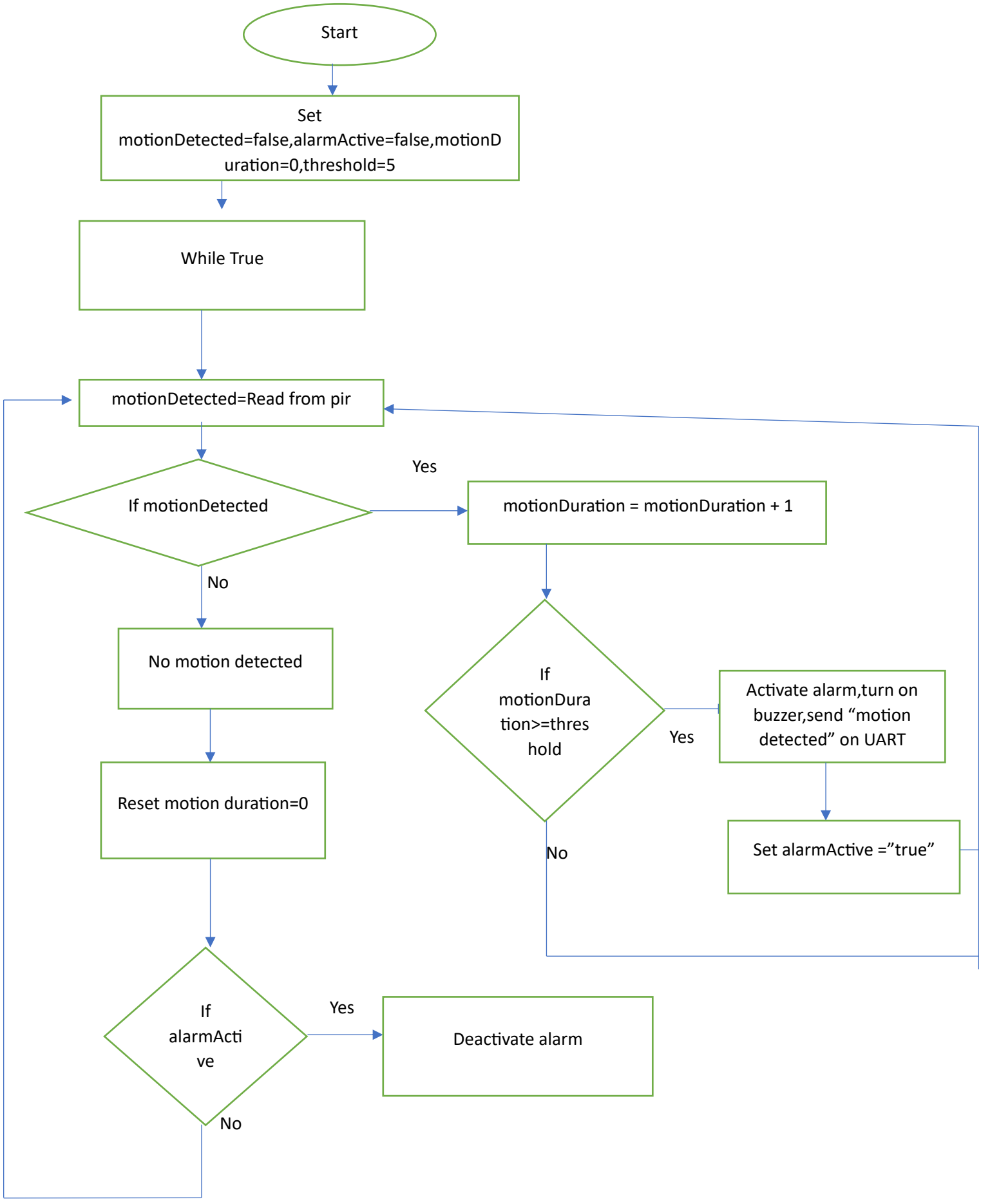

Start
Set moistureLevel=0,Threshold=200,waterPump=4000
Initialize moisture sensor,water pump,Led, SD card
While True
Read moistureLevel,Print MoistureLevel
If moistureLevel < threshold
No
Yes
Print “Activate the water pump”
Turn on LED,waterPump
Wait
Turn off LED, waterPump
Get current time and Print “Watering at current time”
Stop

3. Motion Detection Alarm System

```
Start
Set motionDetected=false;
Set alarmActive=false;
Set motionDuration=0;
Set threshold=5;
Initialize Pir Sensor, Buzzer, UART,Reset;
While True (do),
        motionDetected=Read motion from pir sensor
        If motionDetected then
                motionDuration=motionDuration+1;
                If motionDuration >=threshold then
                Print “Activate Alarm”
                Turn on Buzzer
                Send notification on UART as “Motion Detected”
                Set alarmActive = true;
                End if
        Else
                Print “No motion detected”
                motionDuration=0;
                If alarmActive then
                Print “Deactivate alarm”
                Turn off Buzzer
                Set alarmActive = false;
                End if
        End if
        If isReset then
                If alarmActive then
                Turn off Buzzer
                Send notification on UART “Alarm Resetted”
                Set alarmActive = false;
```

```
                End if
        End if
End While
End
```

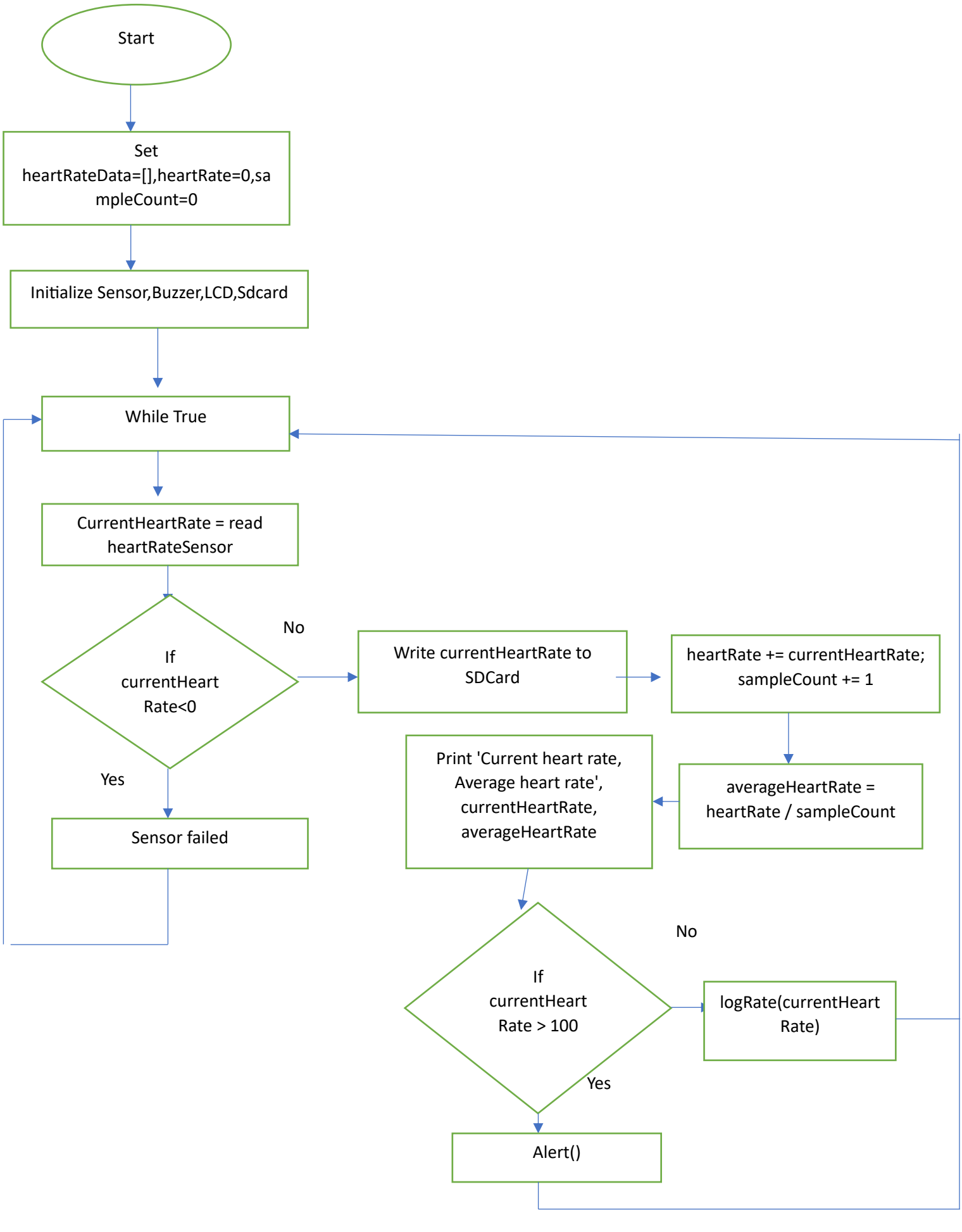
Flowchart


Start
Set motionDetected=false,alarmActive=false,motionDuration=0,threshold=5
While True
motionDetected=Read from pir
If motionDetected
Yes
motionDuration = motionDuration + 1
No
No motion detected
Reset motion duration=0
If motionDuration>=threshold
Yes
Activate alarm,turn on buzzer,send “motion detected” on UART
Set alarmActive =”true”
No
If alarmActive
Yes
Deactivate alarm
No

4.Heart rate monitor

```
Start
Set heartRateData=[]
Set heartRate=0, sampleCount=0;
Initialize heartRateSensor, Buzzer, LCD, SDCard;
While True (do),
        CurrentHeartRate=read heartRateSensor
        If currentHeartRate<0 then
                Print“sensor failed”
        Else
                Write currentHeartRate to SDCard
                heartRate+=current heartRate
                sampleCount+=1
                average heartRate=heartRate/sampleCount
                Print “Current heart rate”,currentHeartRate
                Print “Average heart rate”, averageHeartRate
                If currentHeartRate >100 then
                Alert()
                End if
                logRate(current heartRate)
        end if
end while
 end
```

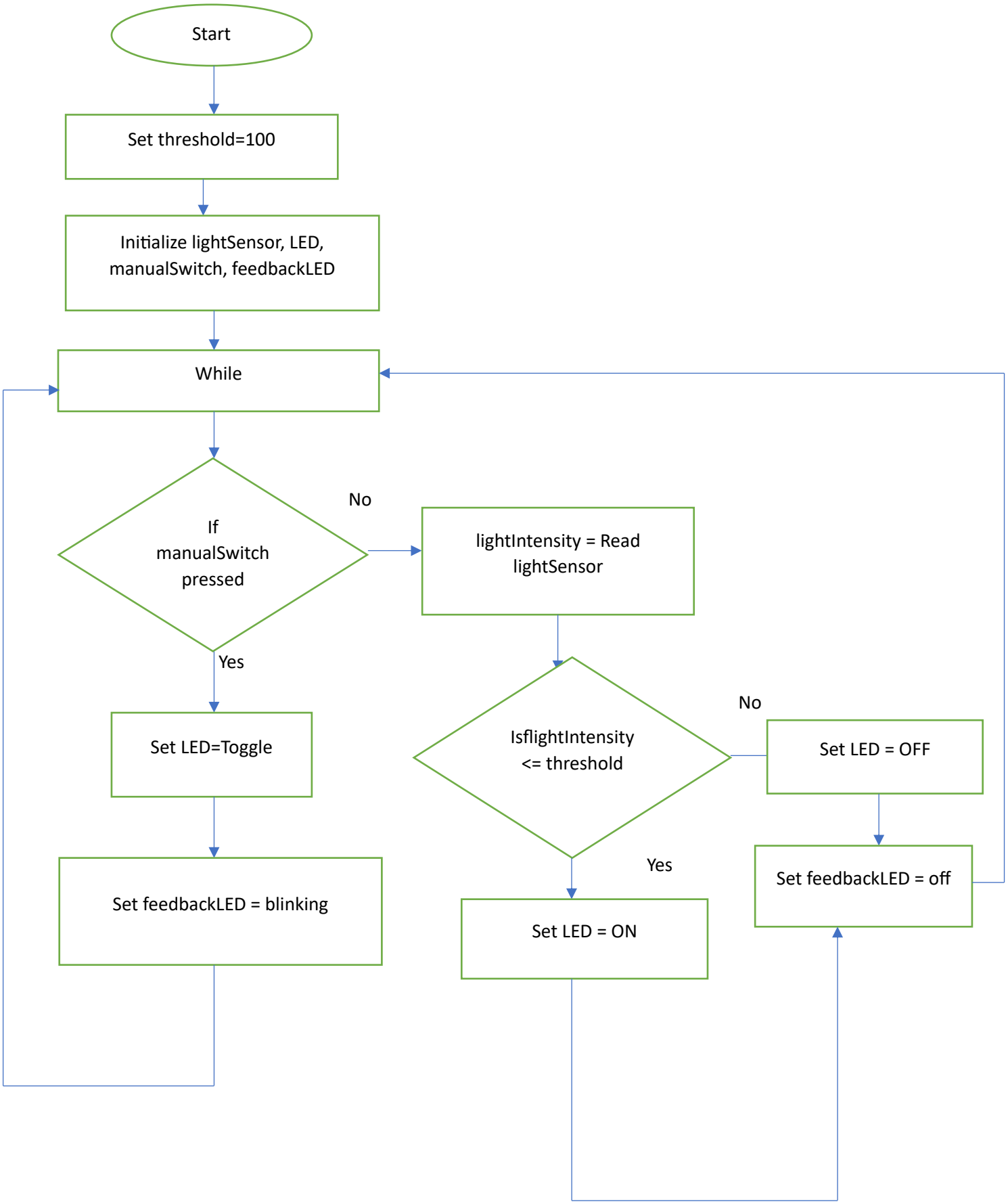
Flowchart


Start
Set heartRateData=[],heartRate=0,sampleCount=0
Initialize Sensor,Buzzer,LCD,Sdcard
While True
CurrentHeartRate = read heartRateSensor
If currentHeart Rate<0
No
Yes
Sensor failed
Write currentHeartRate to SDCard
heartRate += currentHeartRate; sampleCount += 1
averageHeartRate = heartRate / sampleCount
Print 'Current heart rate, Average heart rate', currentHeartRate, averageHeartRate
If currentHeart Rate > 100
No
Yes
logRate(currentHeart Rate)
Alert()

5.LED Control Based on Light Sensor

```
Start
Set threshold=100;
Initialize lightSensor, LED, manualSwitch, feedbackLED ;
While True (do),
        If manualSwitch is pressed
                Set LED=Toggle
                Set feedbackLED=blinking
        else
                Set feedbackLED=off
                lightIntensity= Read lightSensor
                if lightIntensity <=threshold then
                        Set LED=ON;
                        Else
                                Set LED=off;
                        End if
                End if
        End while
        End
```

Flowchart

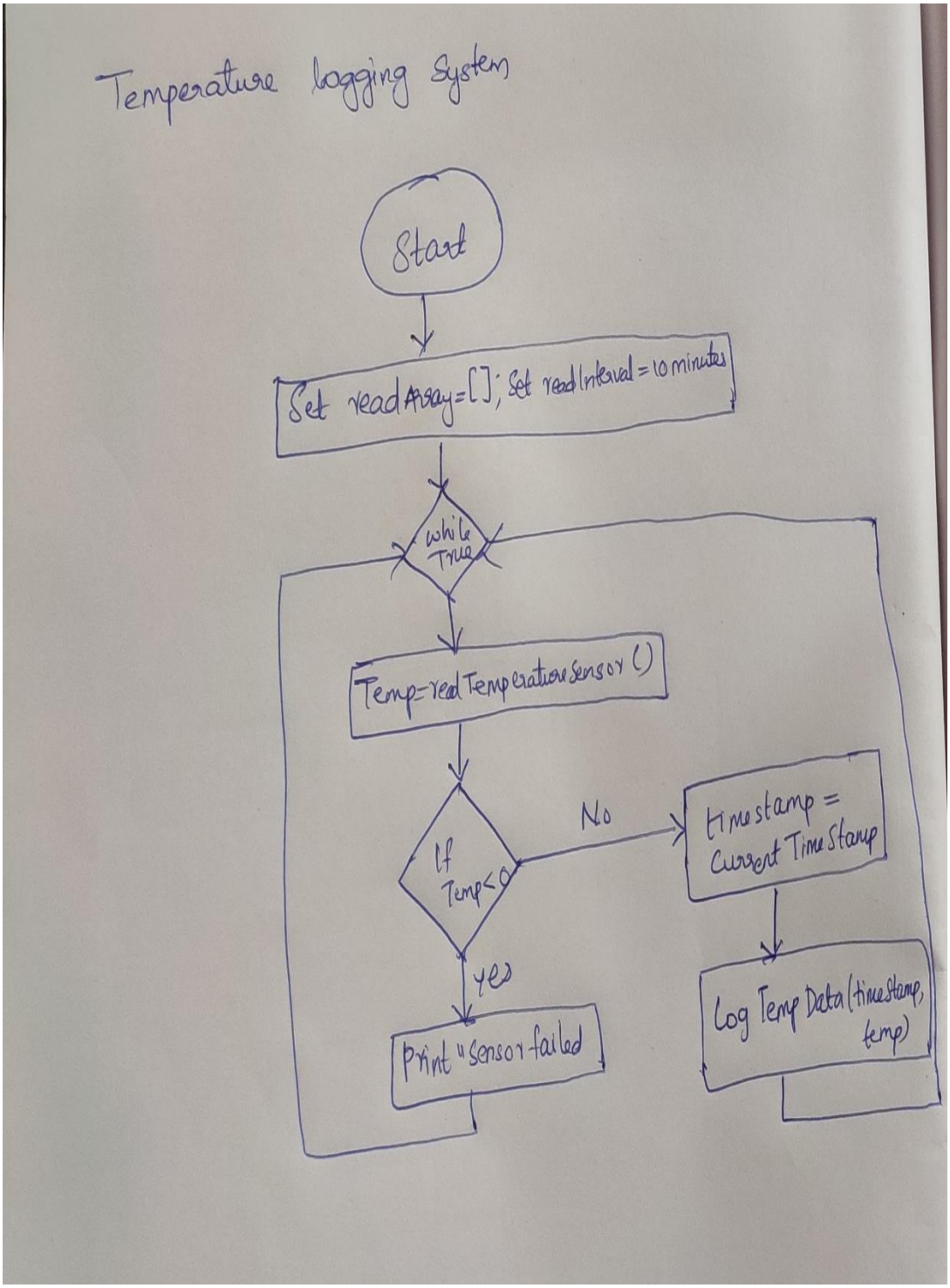

Start
Set threshold=100
Initialize lightSensor, LED, manualSwitch, feedbackLED
While
If manualSwitch pressed
No
Yes
lightIntensity = Read lightSensor
Set LED=Toggle
Set feedbackLED = blinking
IsflightIntensity <= threshold
No
Yes
Set LED = OFF
Set LED = ON
Set feedbackLED = off

7. Temperature Logging System

```
Start
Set readArray=[]
Set readInterval=10 minutes
While True (do),
        Temp=readTemperatureSensor
        If temp<0 then
                Print “Sensor failed”
        Else
                timestamp=currentTimeStamp
                readArray.append((timestamp,temp))
                logTempData(timestamp,temp)
        end if
end while
end
function retrieveHistoricalData()
        Print readArray
End function
```

Flowchart

# Temperature logging System



9.Battery monitoring System

Start

Set thresholdVoltage=11

Set sampleInterval=60 adcResolution=1024, Vref=5;

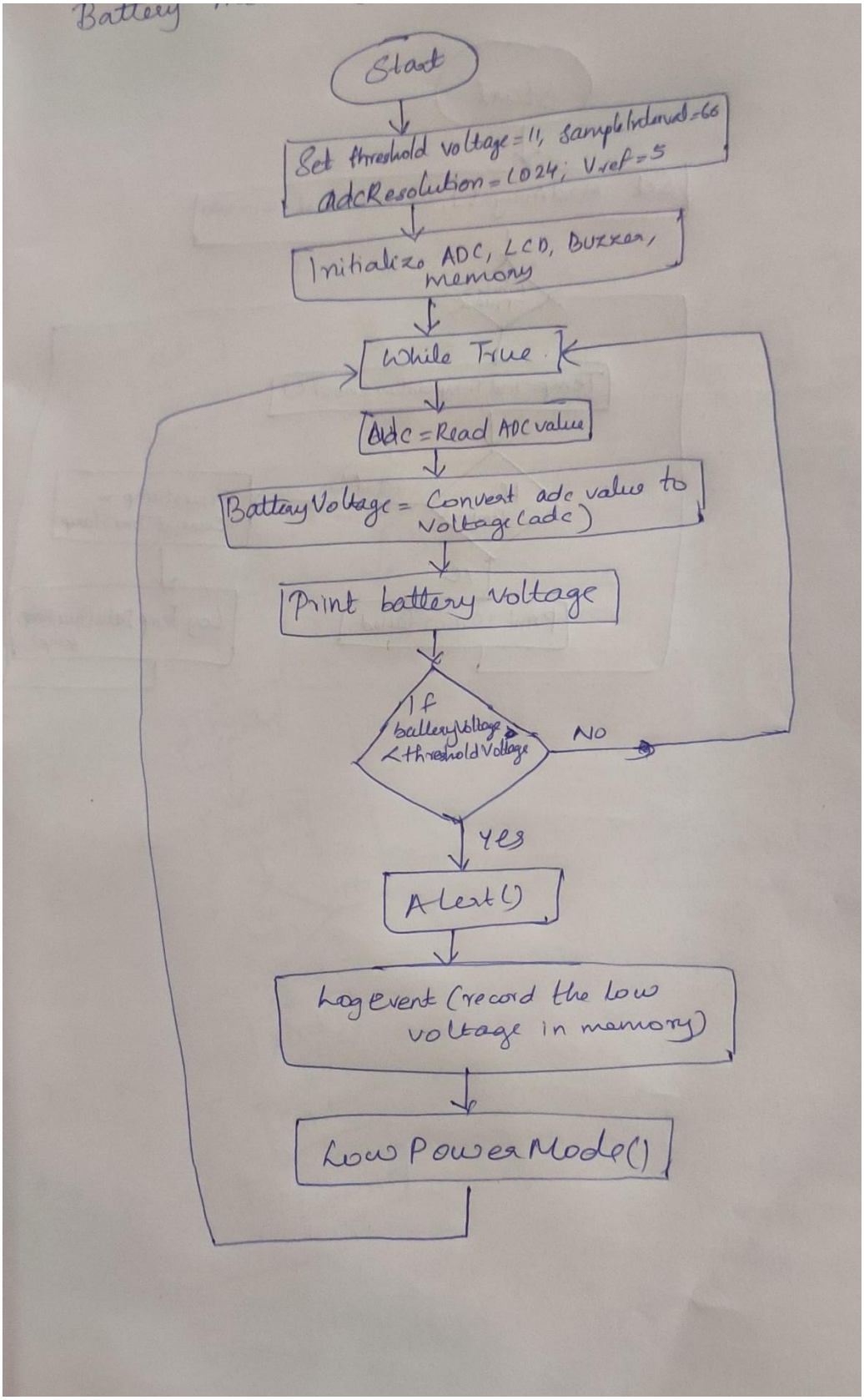
Initialize ADC,LCD,Buzzer,Memory;

While True (do),

```
        adc=Read ADC value
        batteryVoltage=Convert adc value to voltage(adc)
        print batteryVoltage
        if batteryVoltage<thresholdVoltage then
                Alert()
                Log event(record the low voltage in memory)
                LowPowerMode()
        End if
End while
End
Function convert adc value to voltage(adc)
        Return(adc/maxAdc)*Vref*(R1+R2)/R2
End function
Function Alert()
        Turn on buzzer
        Turn off buzzer
End function
Function log Event(message)
Saving message to sd card
End function
Function LowPowerMode()
End function
```

Flowchart

Battery


Start
Set threshold voltage = 11, sampleInterval = 66
AdcResolution = 1024; Vref = 5
Initialize ADC, LCD, Buzzer, memory
While True
Adc = Read ADC value
BatteryVoltage = Convert adc value to voltage(adc)
Print battery voltage
If batteryVoltage < threshold Voltage
No
Yes
Alert()
LogEvent (record the low voltage in memory)
LowPowerMode()