GOKHALE EDUCATION SOCIETY'S

Above Self... Above Politics

N. B. MEHTA (V) SCIENCE COLLEGE
ACHARYA BHISE VIDYANAGAR, BORDI
TAL - DAHANU, DIST. PALGHAR, 401701, Tel. 02528 - 254357

DEPARTMENT OF INFORMATION TECHNOLOGY
AND
COMPUTER SCIENCE

Certificate

Class ______________ Year _____________

This is to certify that the work entered in this journal is the work of Shri/Kumari ____

Of ___________________ division_____________________ Roll No. ________________________

Uni. Exam No. ______________________ has satisfactorily completed the required University of Mumbai Practicals on Subject PSCSP204: Embedded and IoT Technology and worked for the Master of Computer Science 1st term / 2nd term/ both the terms of the Year _________________ in the college laboratory as laid down by the university.

________________________	_______________________	______________________
Head of the Department	External Examiner	Internal Examiner Subject teacher

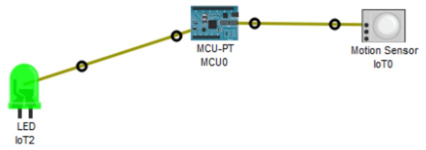
Date: / / 2023 Department of IT-CS

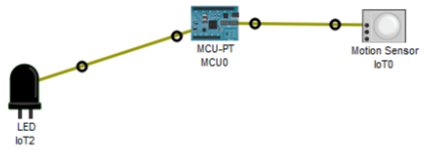
INDEX

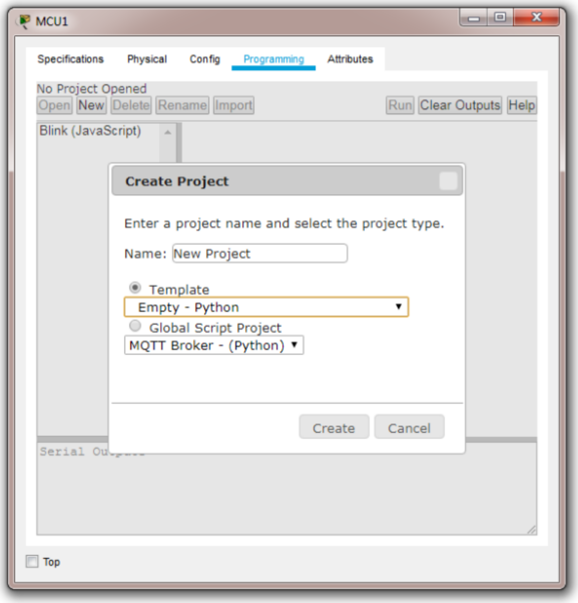
Practical No:1

Aim: Design and implement basics embedded circuit

1. Automatic alarm system – alarm shoud get tigger by sensor
2. Time base buzzer
3. Sensor base counting device







No Project Opened

Create Project

Enter a project name and select the project type.

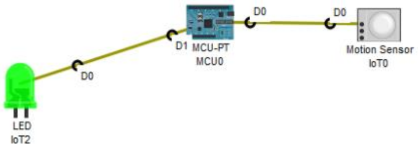
Name: New Project

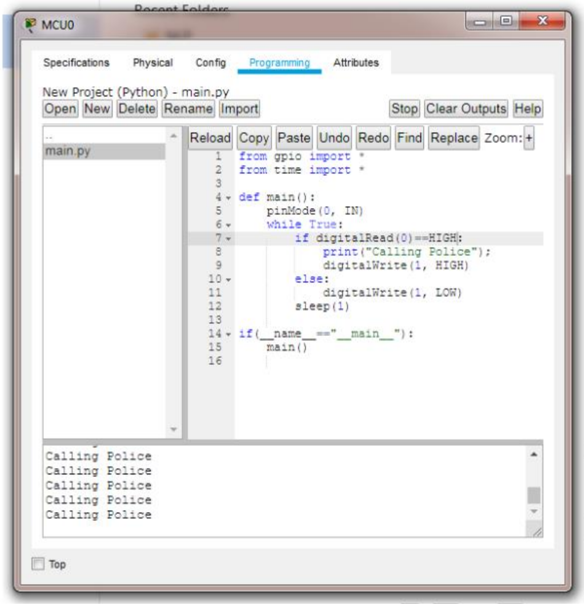
● Template

Empty - Python

○ Global Script Project

MQTT Broker - (Python)



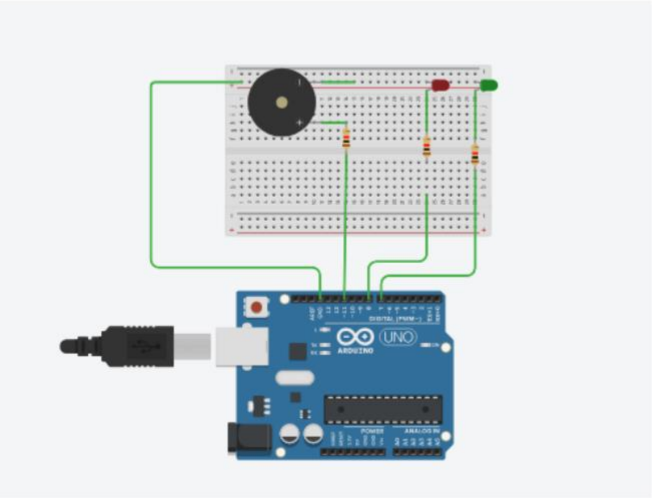


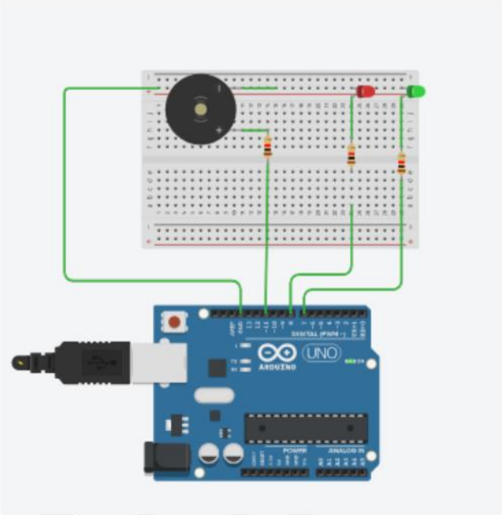
New Project (Python) - main.py

```
from gpio import *
from time import *

def main():
    pinMode(0, IN)
    while True:
        if digitalRead(0)==HIGH:
            print("Calling Police");
            digitalWrite(1, HIGH)
        else:
            digitalWrite(1, LOW)
        sleep(1)

if(__name__=="__main__"):
    main()

```

```
Calling Police
Calling Police
Calling Police
Calling Police
Calling Police
```

2) Time base buzzer





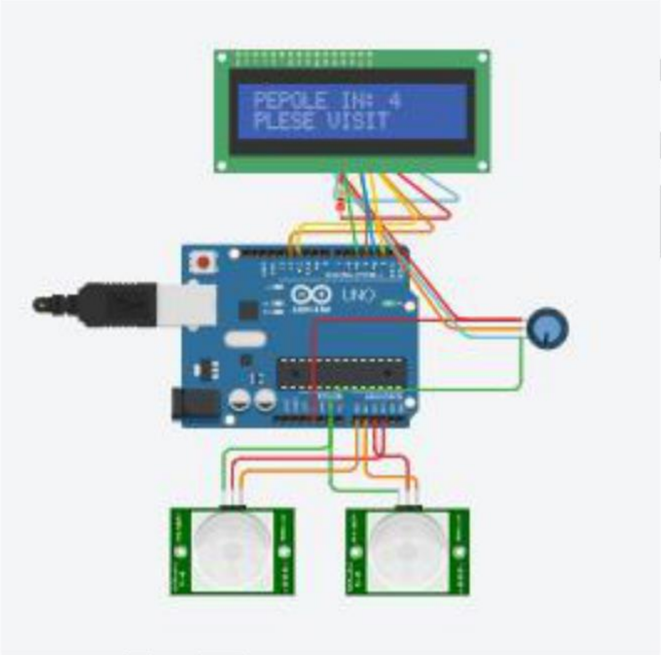
Circuit off:

circuit on:

Code:

```
int led1=7;
int led2=8;
unsigned long time;

void setup()
{
pinMode(led1,OUTPUT);
pinMode(led2,OUTPUT);
pinMode(11,OUTPUT);
Serial.begin(9600);
}

void loop()
{
digitalWrite(led1,HIGH);
Serial.print("Time:");
time =millis();
Serial.println(time);
delay(500);

if(time>7000)
 {
Serial.print("Time has ended");
digitalWrite(led2,HIGH);
tone(11,5000,1000);
  }
else
digitalWrite(led1,LOW);
delay(500);
}
```

3) Sensor base counting device



Code:

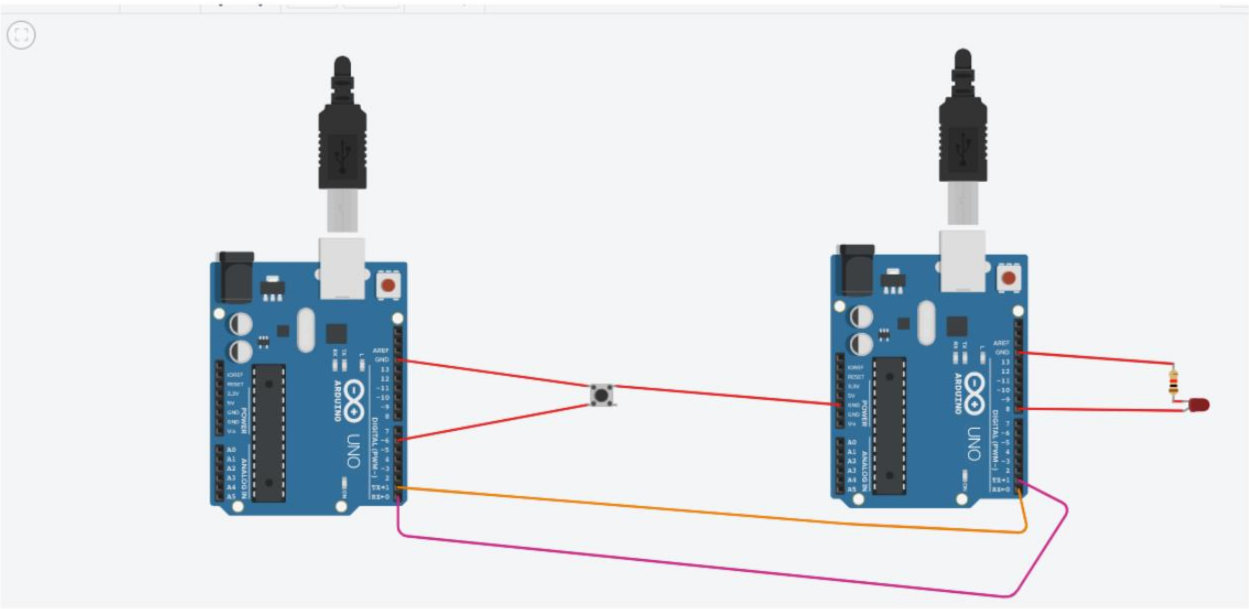
```
#include <LiquidCrystal.h>
int in = 15;
intinpr = 16;
int out = 14 ;
intoutpr = 17;
intppl = 0;
LiquidCrystallcd(12,11,5,4,3,2);
bool pi =0;
boolpo = 0;
void setup(){
pinMode(15,INPUT);
pinMode(14,INPUT);
pinMode(16,OUTPUT);
pinMode(17,OUTPUT);
lcd.begin(16,2);
}

void loop(){
lcd.clear();
digitalWrite(outpr,HIGH);
digitalWrite(inpr,HIGH);
pi = digitalRead(in);
po = digitalRead(out);
if (pi == 1){
ppl--;
delay(500);
  }
else if (po == 1){
ppl++ ;
delay(500);
  }
ppl = constrain(ppl,0,50);
lcd.setCursor(0,0);
lcd.print("PEPOLE IN:");
lcd.setCursor(11,0);
lcd.print(ppl);
if(ppl>=20){
lcd.setCursor(0,1);
lcd.print("PLEASE WAIT");
delay(1000);
  }     if (ppl<+19){
lcd.setCursor(0,1);
lcd.print("PLESE
VISIT"); delay(1000);

  } }
```

Practical No.2

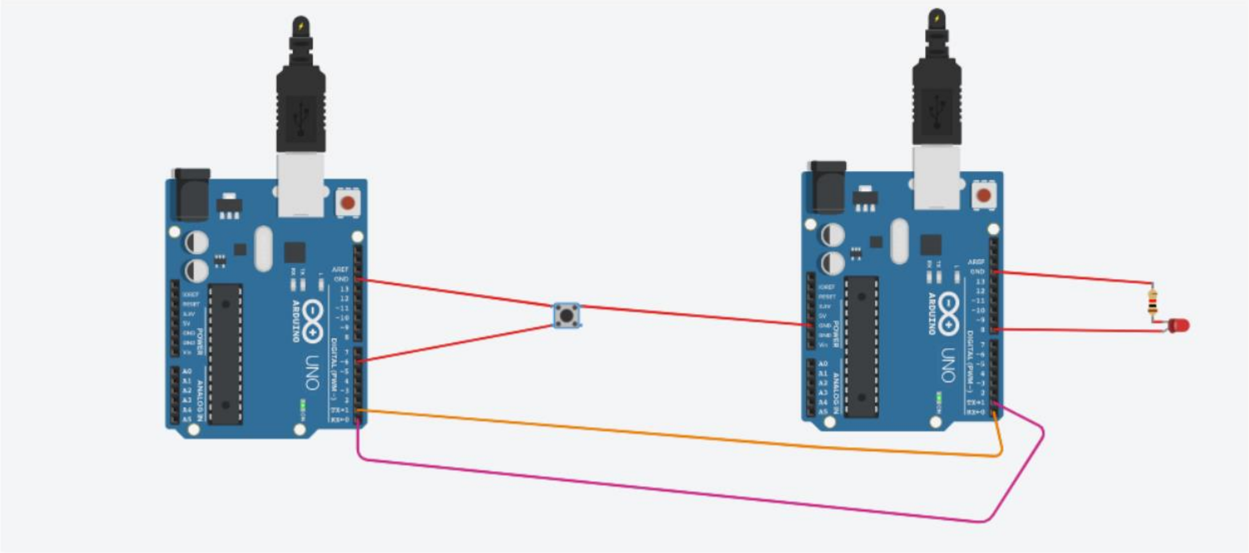
Aim: Communication between two embedded devices using UART port with code

Components required

1) Arduino Uno R3 (x2)
2) Push Button
3) Resistor 220 Ohm
4) Breadboard Mini (x2)
5) Led



When Button is push led is blowing



Arduino 1

```
void setup() {
  //set push button pin as input
  pinMode(6, INPUT_PULLUP);
  //initialize UART with baud rate of 9600 bps
  Serial.begin(9600);
}


void loop()
{
  {
            if (digitalRead(6) == HIGH)
    {
      Serial.write('0');
      Serial.println("HIGH");
    }
            else
    {
      Serial.write('1');
              Serial.println("LOW");
    }
  }
  delay(100);
}
```

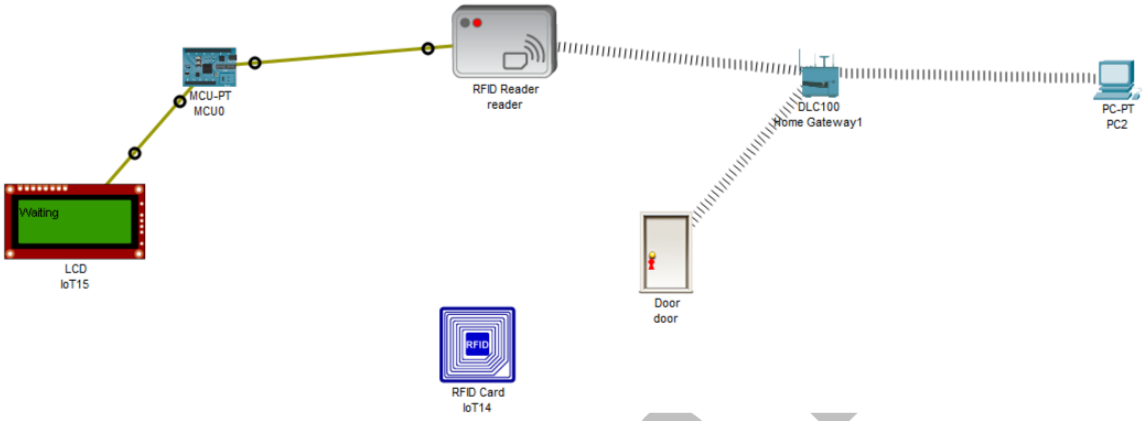
Arduino 2

```
void setup() {
  //set LED pin as output
  pinMode(8, OUTPUT);

  //initialize UART with baud rate of 9600 bps
  Serial.begin(9600);
}

void loop() {
  if(Serial.available())
  {
    //read one byte from serial buffer and save to
    data_rcvd char data_received = Serial.read();

    //if push button pressed switch LED On
    if(data_received == '1') digitalWrite(8, HIGH);
    //if push button is not pressed switch LED Off
    if(data_received == '0') digitalWrite(8, LOW);
  }
}
```

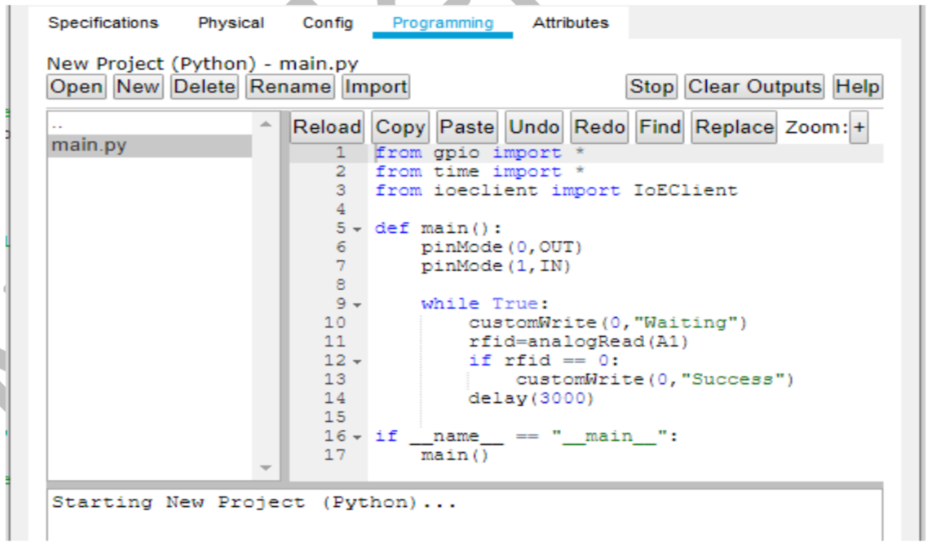
Practical No:03

Aim: Build an IOT system to send ticket before entering the

bus 1. We give all devices



2. All connect to gateway with wireless connection and also one PC connect to gateway
3. Train MCU with condition

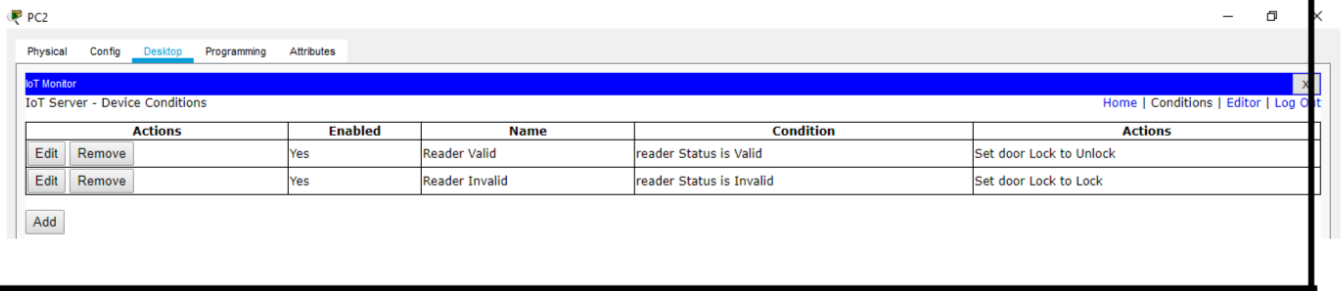


New Project (Python) - main.py

```
from gpio import *
from time import *
from ioeclient import IoEClient

def main():
    pinMode(0,OUT)
    pinMode(1,IN)

    while True:
        customWrite(0,"Waiting")
        rfid=analogRead(A1)
        if rfid == 0:
            customWrite(0,"Success")
        delay(3000)

if __name__ == "__main__":
    main()
```

```
Starting New Project (Python)...
```

4. Give all condition to PC

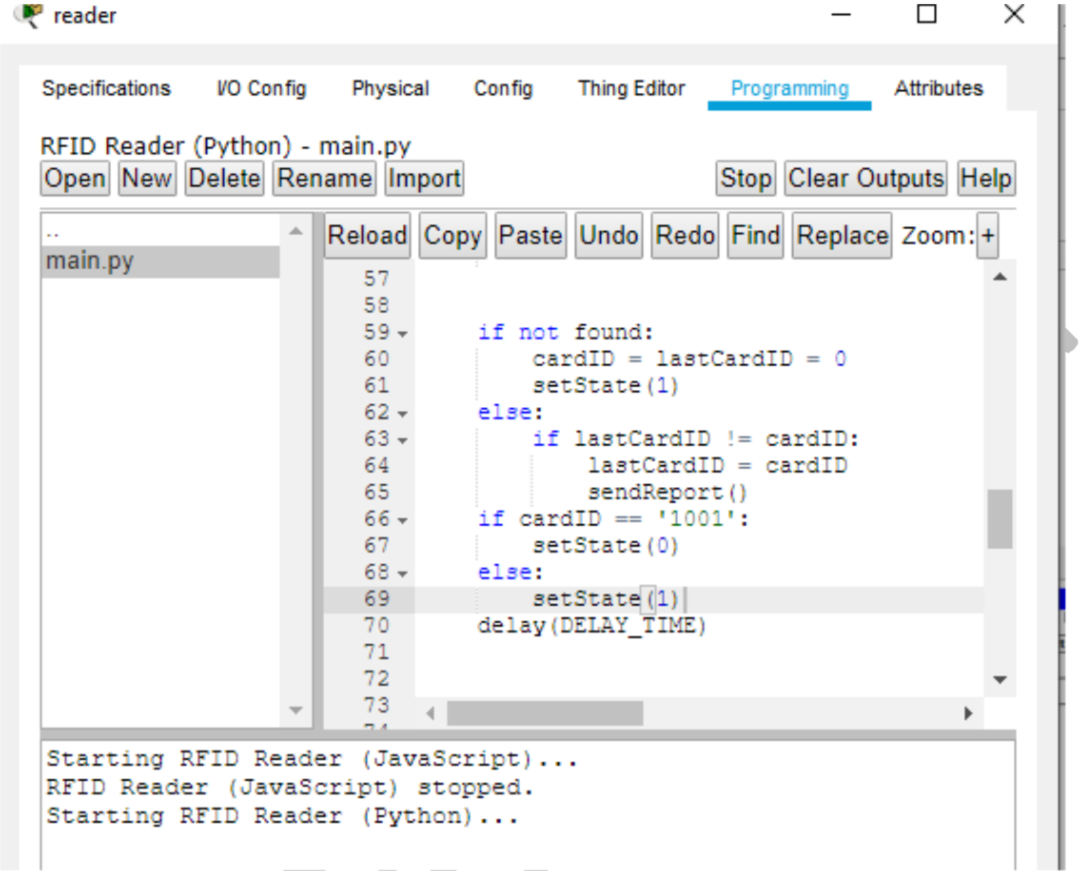


IoT Server - Device Conditions

Actions	Enabled	Name	Condition	Actions
Edit Remove	Yes	Reader Valid	reader Status is Valid	Set door Lock to Unlock
Edit Remove	Yes	Reader Invalid	reader Status is Invalid	Set door Lock to Lock

Add

5. Make some changes reader in

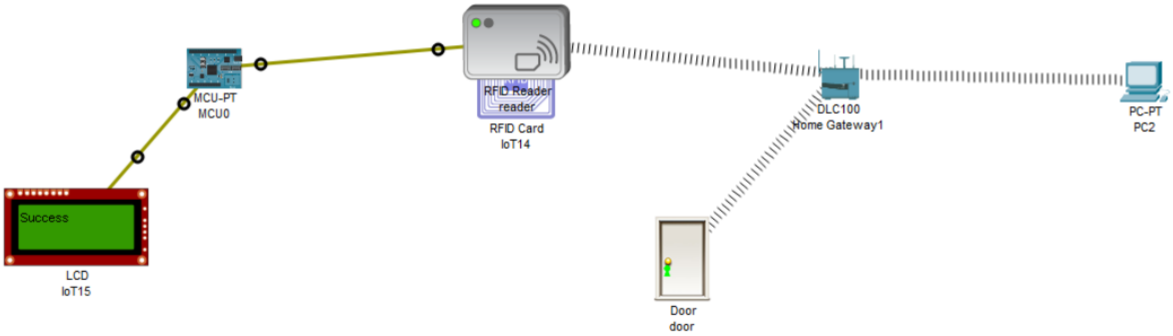


```

    if not found:
        cardID = lastCardID = 0
        setState(1)
    else:
        if lastCardID != cardID:
            lastCardID = cardID
            sendReport()
    if cardID == '1001':
        setState(0)
    else:
        setState(1)
    delay(DELAY_TIME)
```

```
Starting RFID Reader (JavaScript)...
RFID Reader (JavaScript) stopped.
Starting RFID Reader (Python)...
```

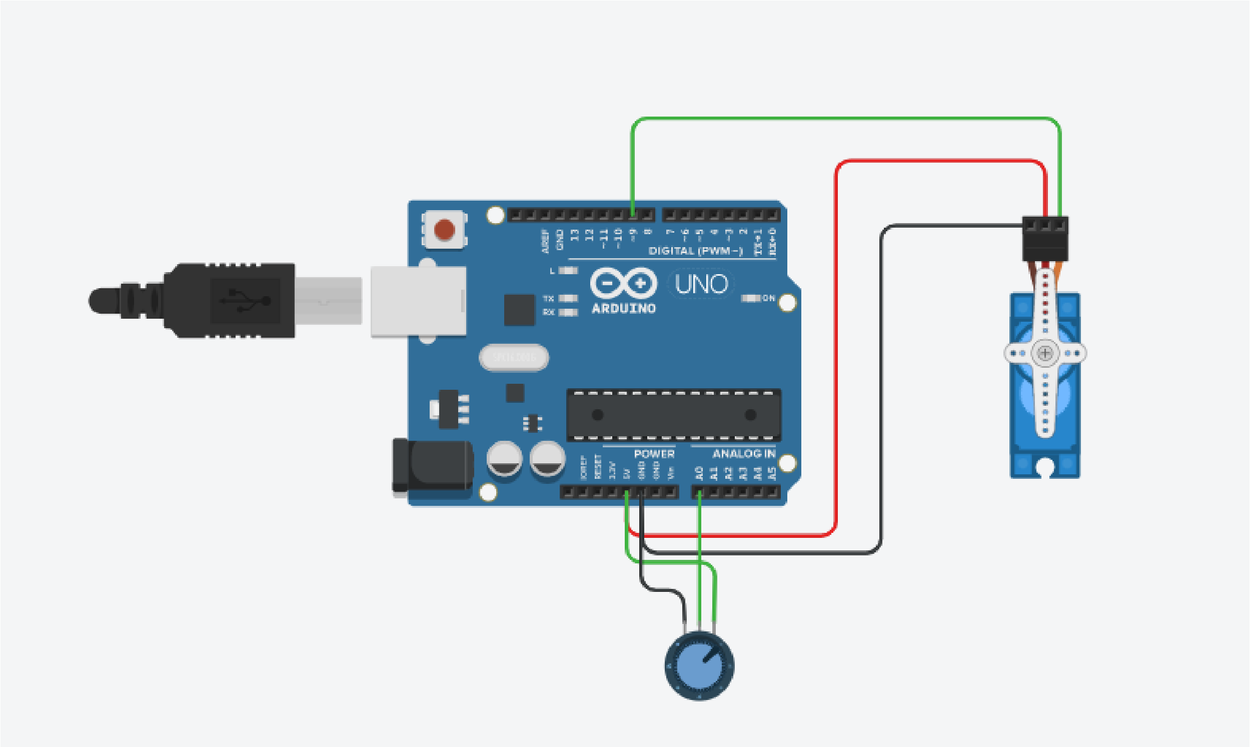
6. Run the Program

7. When RFID card scan on reader if it is valid then he give command to door and door will be open



Practical no: 5

Aim: Develop a iot application which will record the movement and orientation of your phone and given the data back to the PC



Date: 06-05-2023 sign:

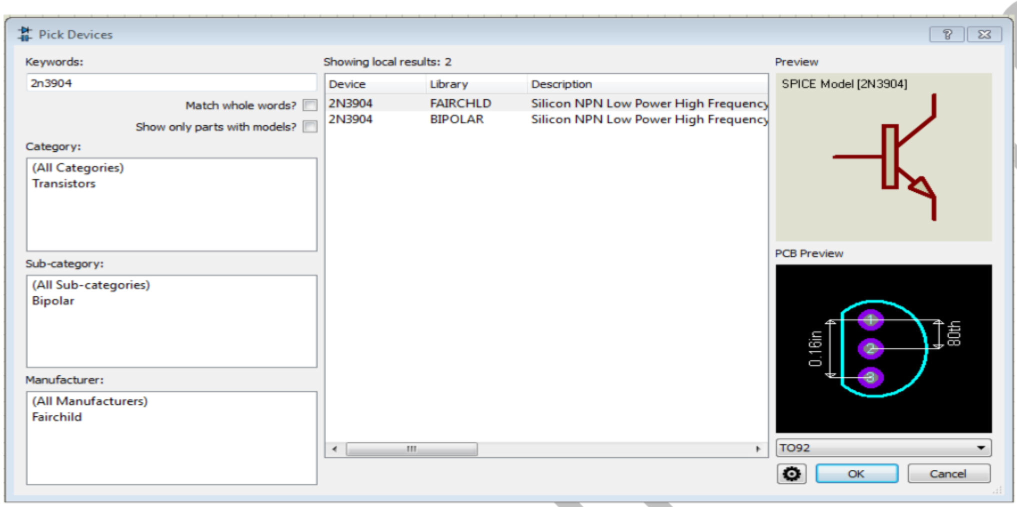
Code:

```
#include<Servo.h>
#include<SoftwareSerial.h>

int pos=0;
int sensorValue=0;
int i=0;
```

```
Servo servo_9;

void setup(){
  servo_9.attach(9);
  pinMode(A0,INPUT);
  pinMode(1,OUTPUT);
  Serial.begin(9600);
}

void loop(){

  sensorValue=analogRead(A0);
  pos=map(sensorValue,0,1023,0,180);

  for(i=0;i<=pos;i++){
     if(i==90){
     Serial.println("landscape");
  }else if(i==180||i==0){
   Serial.println("Portait");
  }
  servo_9.write(i);
  delay(15);
 }
 for(i=pos;i>=0;i--){
   if(i==90){
     Serial.println("Landscape");
   }
   servo_9.write(i);
   delay(15);
  }
}
```

Practical No: 6

Aim: Develop an IoT application for monitoring water level in tanks and automatically start the motor to fill the tank if the water level goes below the critical level



Pick Devices

Keywords: 2n3904

Match whole words? □

Show only parts with models? □

Category: (All Categories) Transistors

Sub-category: (All Sub-categories) Bipolar

Manufacturer: (All Manufacturers) Fairchild

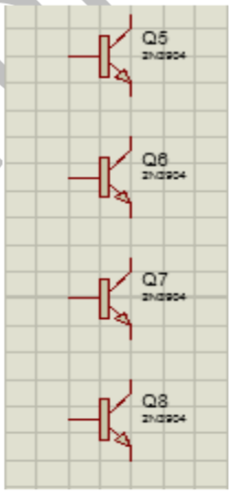
Showing local results: 2

Device	Library	Description
2N3904	FAIRCHLD	Silicon NPN Low Power High Frequency
2N3904	BIPOLAR	Silicon NPN Low Power High Frequency

Preview: SPICE Model [2N3904]

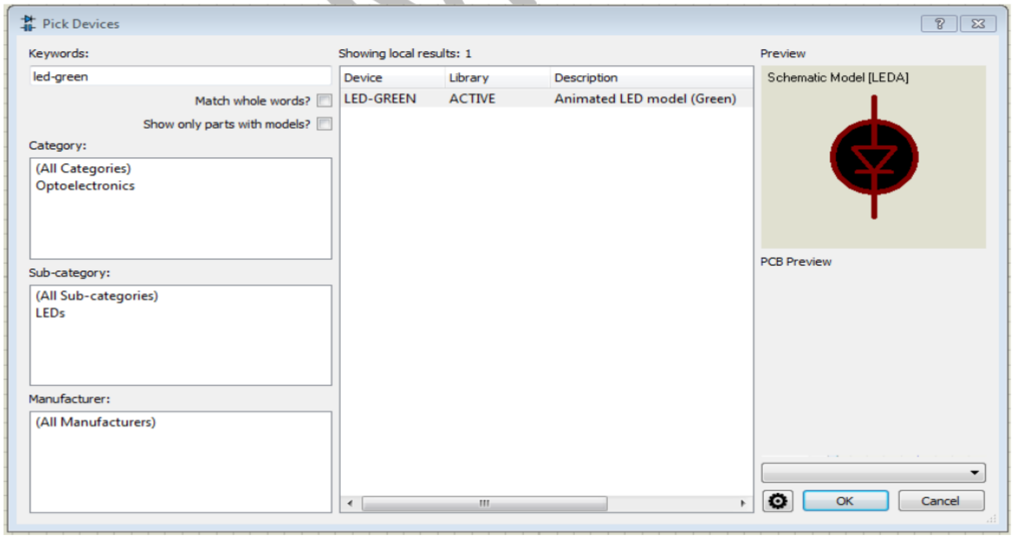
PCB Preview

TO92



In component mode > P >Selected 2N3904

In component



Pick Devices

Keywords: led-green

Match whole words? □

Show only parts with models? □

Category: (All Categories) Optoelectronics

Sub-category: (All Sub-categories) LEDs

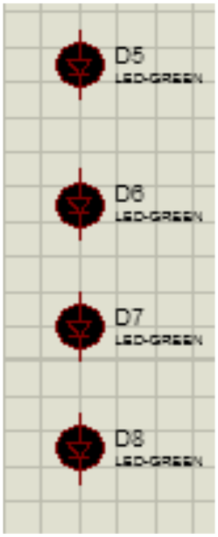
Manufacturer: (All Manufacturers)

Showing local results: 1

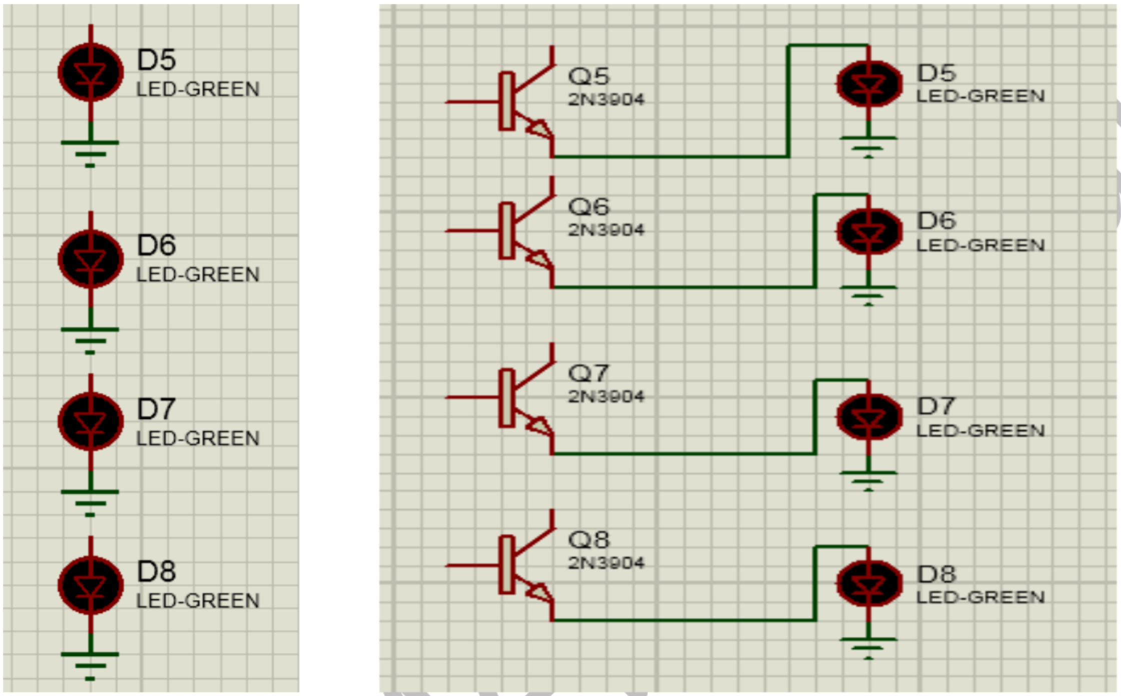
Device	Library	Description
LED-GREEN	ACTIVE	Animated LED model (Green)

Preview: Schematic Model [LEDA]

PCB Preview

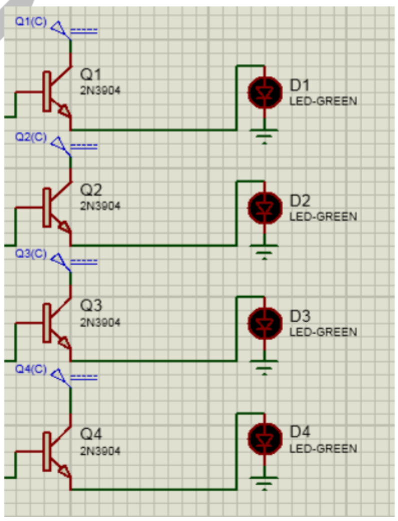


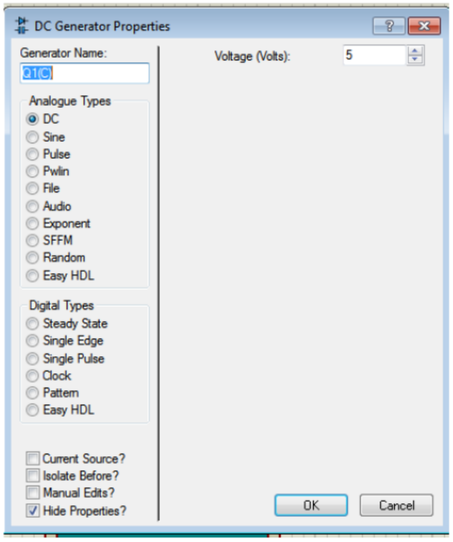
mode > P >Selected LED-GREEN



In Terminal Mode> Ground and Connected 2N3904 and LED-GREEN

In Generator Mode > DC





DC Generator Properties

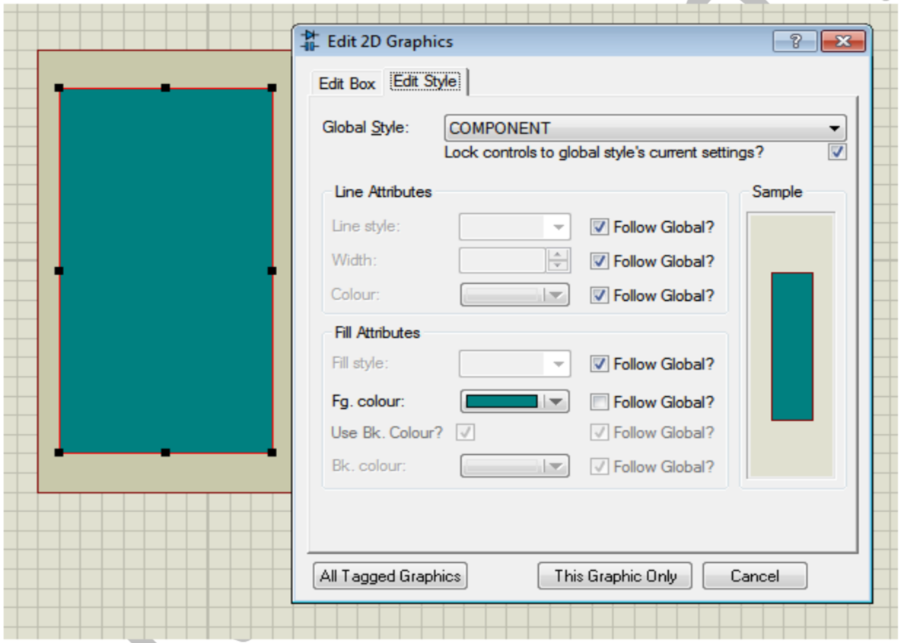
Generator Name: Q1(C)

Voltage (Volts): 5

Analogue Types
- ● DC
- ○ Sine
- ○ Pulse
- ○ Pwlin
- ○ File
- ○ Audio
- ○ Exponent
- ○ SFFM
- ○ Random
- ○ Easy HDL

Digital Types
- ○ Steady State
- ○ Single Edge
- ○ Single Pulse
- ○ Clock
- ○ Pattern
- ○ Easy HDL

- □ Current Source?
- □ Isolate Before?
- □ Manual Edits?
- ☑ Hide Properties?



Edit 2D Graphics

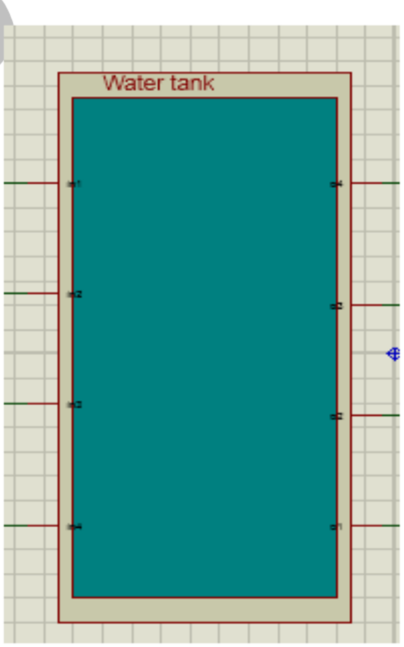
Edit Box | Edit Style

Global Style: COMPONENT

Lock controls to global style's current settings? ☑

Line Attributes
- Line style: ☑ Follow Global?
- Width: ☑ Follow Global?
- Colour: ☑ Follow Global?

Fill Attributes
- Fill style: ☑ Follow Global?
- Fg. colour: 🟦 □ Follow Global?
- Use Bk. Colour? ☑ ☑ Follow Global?
- Bk. colour: ☑ Follow Global?

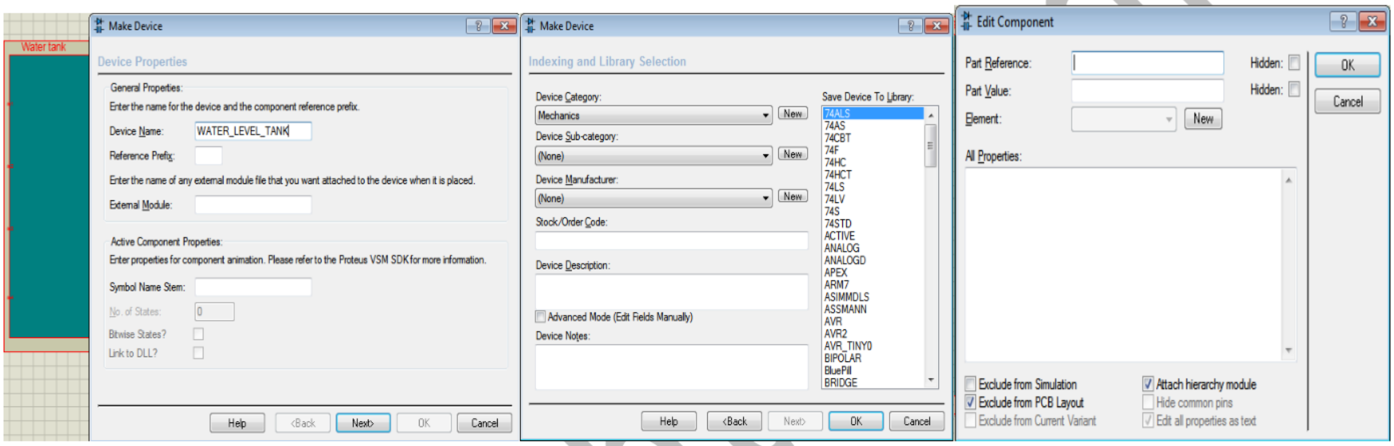


In DC change voltage to 5

Using Component create a water tank

By right clicking on water tank click on make device

Set everything to default and choose device category as mechanics Check attach hierarchy module



Make Device

Device Properties

General Properties:
Enter the name for the device and the component reference prefix.
Device Name: WATER_LEVEL_TANK
Reference Prefix:
Enter the name of any external module file that you want attached to the device when it is placed.
External Module:

Active Component Properties:
Enter properties for component animation. Please refer to the Proteus VSM SDK for more information.
Symbol Name Stem:
No. of States: 0
Bitwise States? □
Link to DLL? □

Make Device

Indexing and Library Selection

Device Category: Mechanics
Device Sub-category: (None)
Device Manufacturer: (None)
Stock/Order Code:
Device Description:
□ Advanced Mode (Edit Fields Manually)
Device Notes:

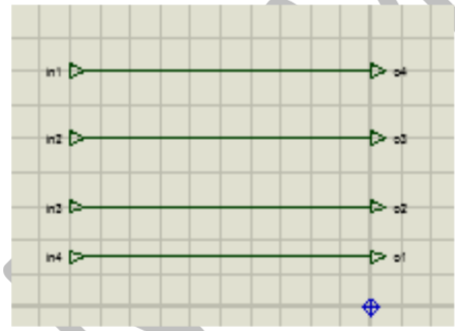
Save Device To Library:
74ALS
74AS
74CBT
74F
74HC
74HCT
74LS
74LV
74S
74STD
ACTIVE
ANALOG
ANALOGD
APEX
ARM7
ASIMMDLS
ASSMANN
AVR
AVR2
AVR_TINY0
BIPOLAR
BluePill
BRIDGE

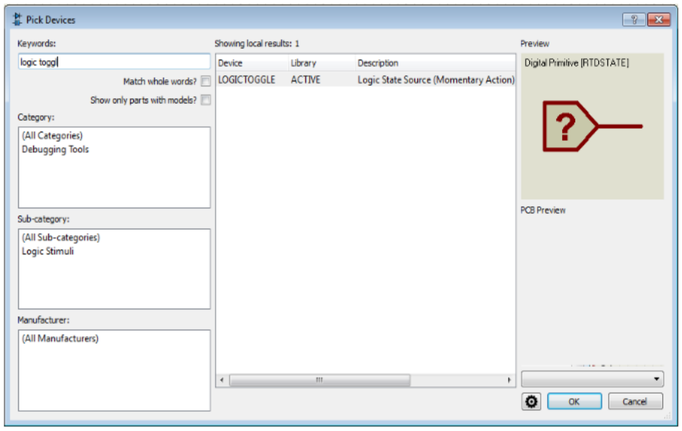
Edit Component

Part Reference: Hidden: □
Part Value: Hidden: □
Element:
All Properties:

□ Exclude from Simulation
☑ Exclude from PCB Layout
□ Exclude from Current Variant
☑ Attach hierarchy module
□ Hide common pins
☑ Edit all properties as text

Go to child area and choose 4 inputs and 4 outputs and connect them





Pick Devices

Keywords:

logic toggl

Match whole words? □

Show only parts with models? □

Category:

(All Categories)
Debugging Tools

Sub-category:

(All Sub-categories)
Logic Stimuli

Manufacturer:

(All Manufacturers)

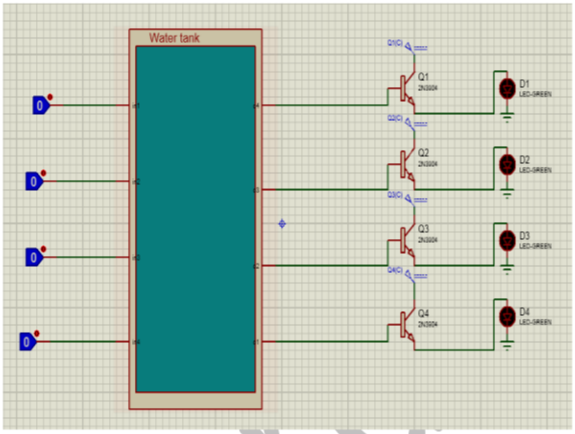
Showing local results: 1

Device	Library	Description
LOGICTOGGLE	ACTIVE	Logic State Source (Momentary Action)

Preview

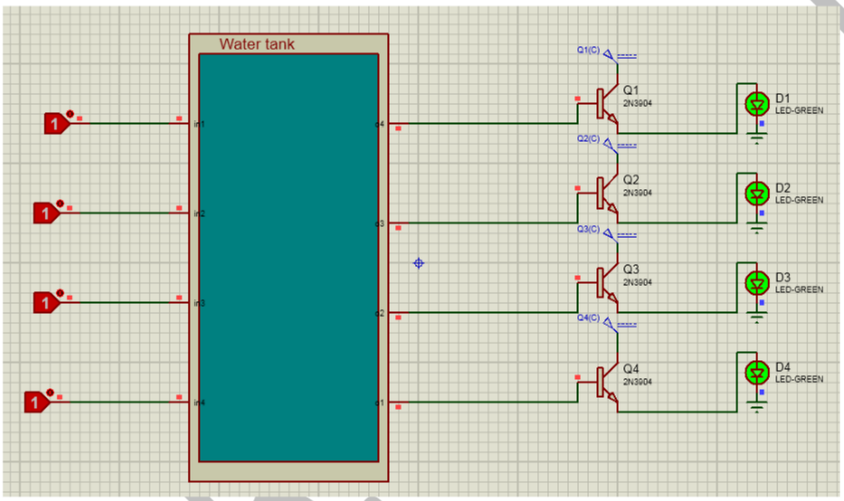
Digital Primitive [RTDSTATE]

PCB Preview



In component mode > P >Select Logic Toggle& connect them

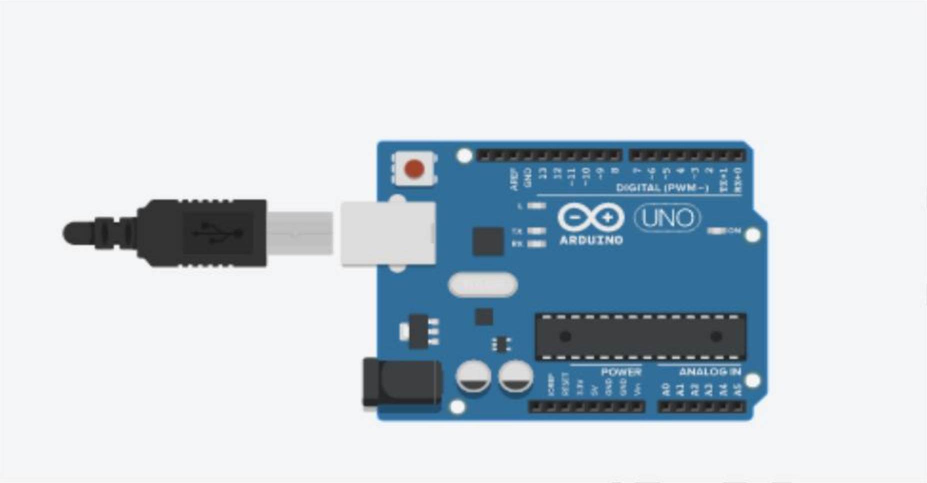
Play the simulation



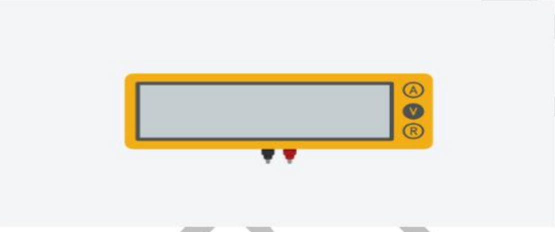
Practical no:7

Aim: developed an IOT module to which measure the intensity of light and send the same to your PC/phone

arduino uno r3:

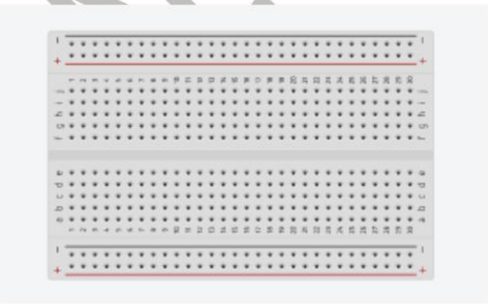


Multimeter:

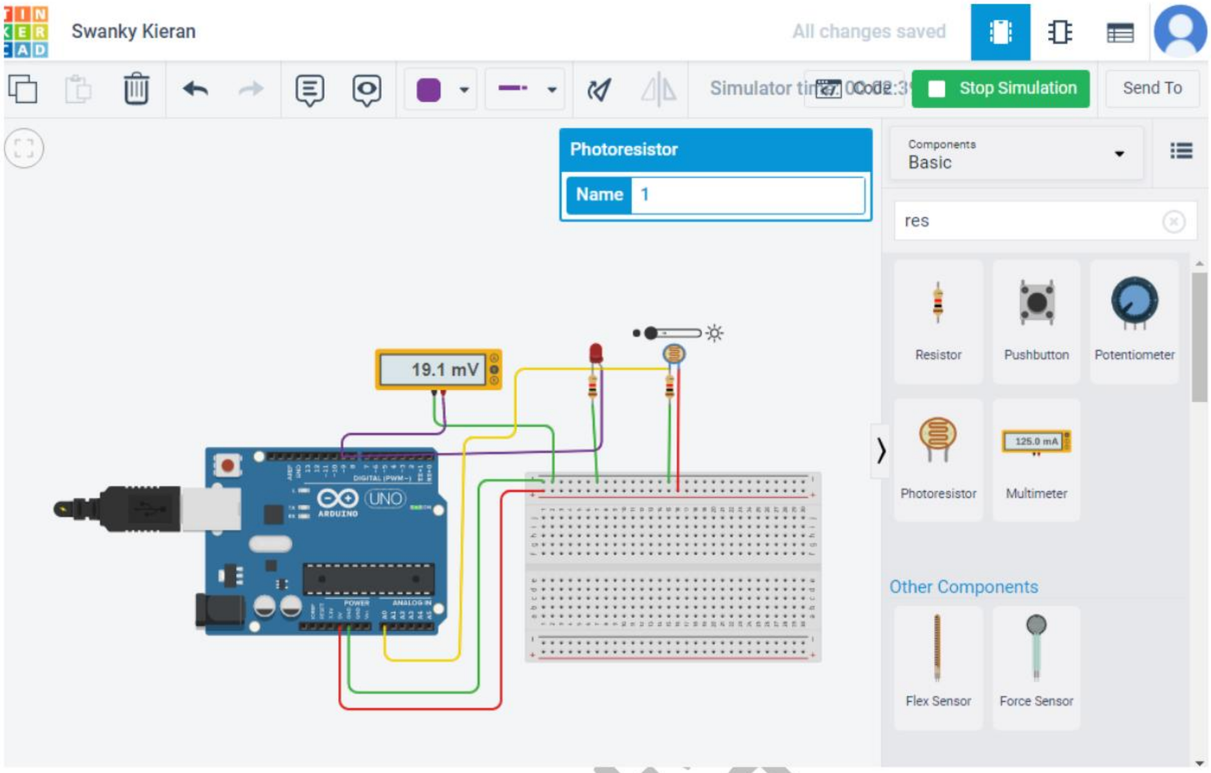


LED

Breadboard:



Resister



Photoresistor

Name 1

Code:

```
int sensorValue=0;
void setup()
{
pinMode(A0,INPUT);
Serial.begin(9600);
pinMode(9,OUTPUT);
}
void loop()
{
sensorValue=analogRead(A0);
Serial.println(sensorValue);analogWrite(9,map

(sensorValue,0,1023,0,255));
delay(100); }
```

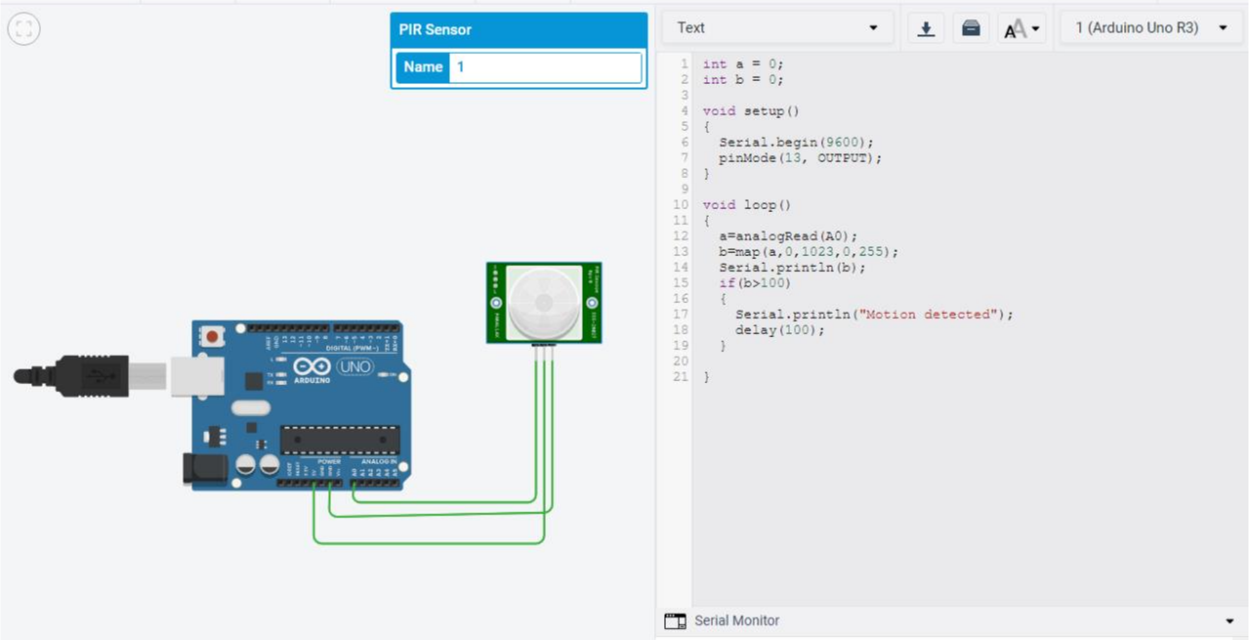
Practical no :8

Aim: Develop an application for Motion detection.

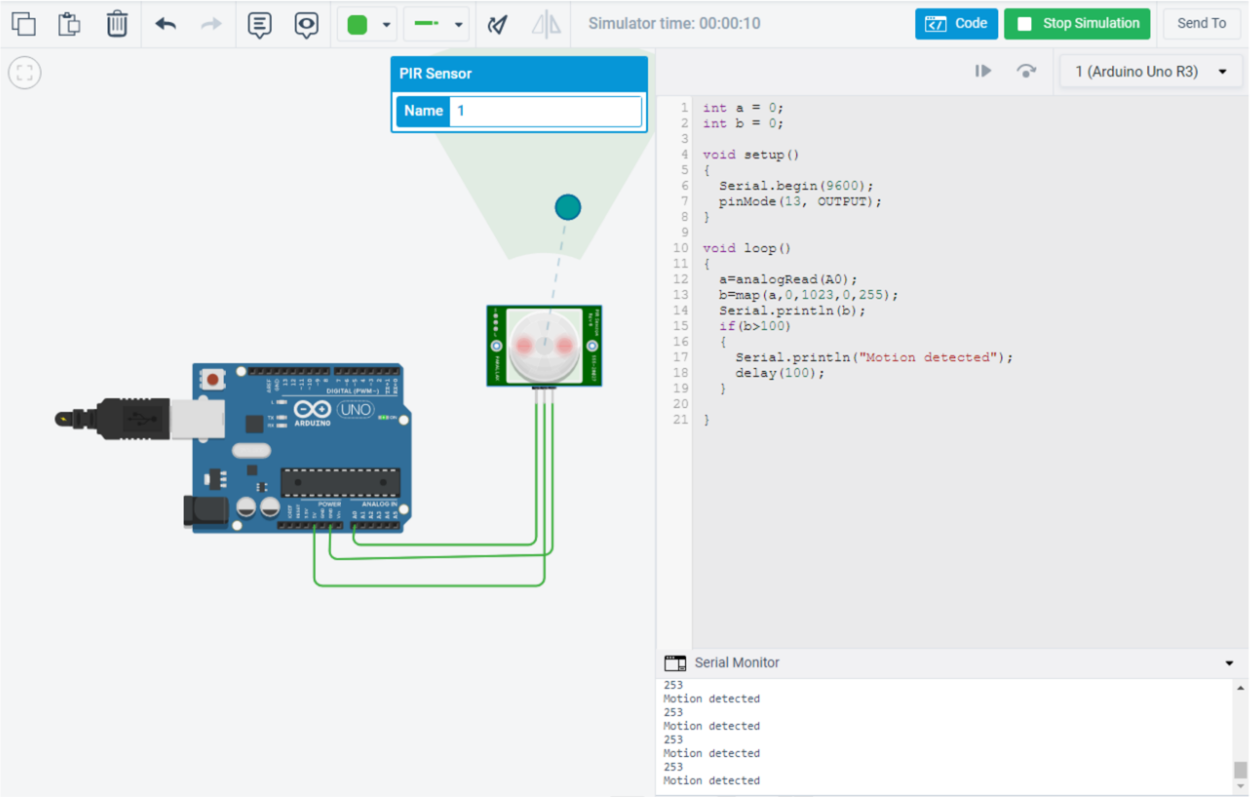
Code:

```
int a = 0;
int b = 0;
void setup()
{
Serial.begin(9600);
pinMode(13, OUTPUT);
}
void loop()
{
  a=analogRead(A0);
  b=map(a,0,1023,0,255);
Serial.println(b);
if(b>100)
  {
Serial.println("Motion detected");
delay(100);
}
}
```

Output:



```
int a = 0;
int b = 0;

void setup()
{
  Serial.begin(9600);
  pinMode(13, OUTPUT);
}

void loop()
{
  a=analogRead(A0);
  b=map(a,0,1023,0,255);
  Serial.println(b);
  if(b>100)
  {
    Serial.println("Motion detected");
    delay(100);
  }

}
```



PIR Sensor

Name 1

```
int a = 0;
int b = 0;

void setup()
{
  Serial.begin(9600);
  pinMode(13, OUTPUT);
}

void loop()
{
  a=analogRead(A0);
  b=map(a,0,1023,0,255);
  Serial.println(b);
  if(b>100)
  {
    Serial.println("Motion detected");
    delay(100);
  }

}
```

```
253
Motion detected
253
Motion detected
253
Motion detected
253
Motion detected
```