

ASSIGNMENT

COURSE TITLE: INDUSTRIAL ELECTRONICS

COURSE CODE: EL-301

YEAR: TE

SECTION: C & D



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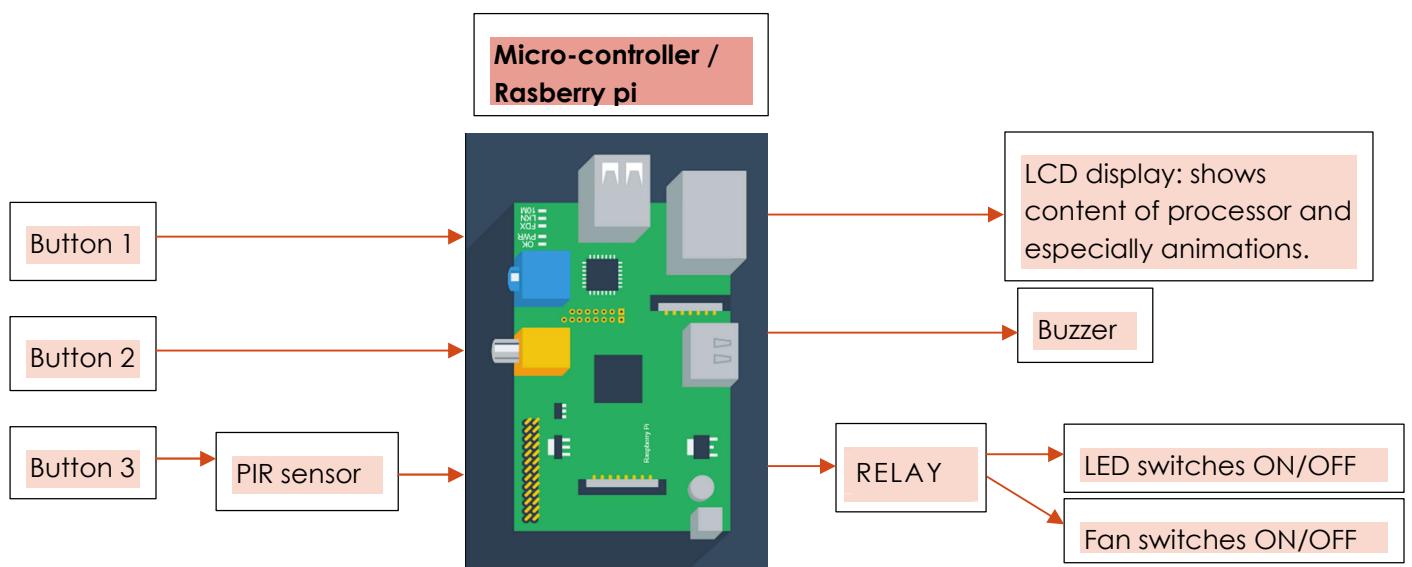
OBJECT

SMARTROOM USING RASPBERRYPI AND PI SENSOR

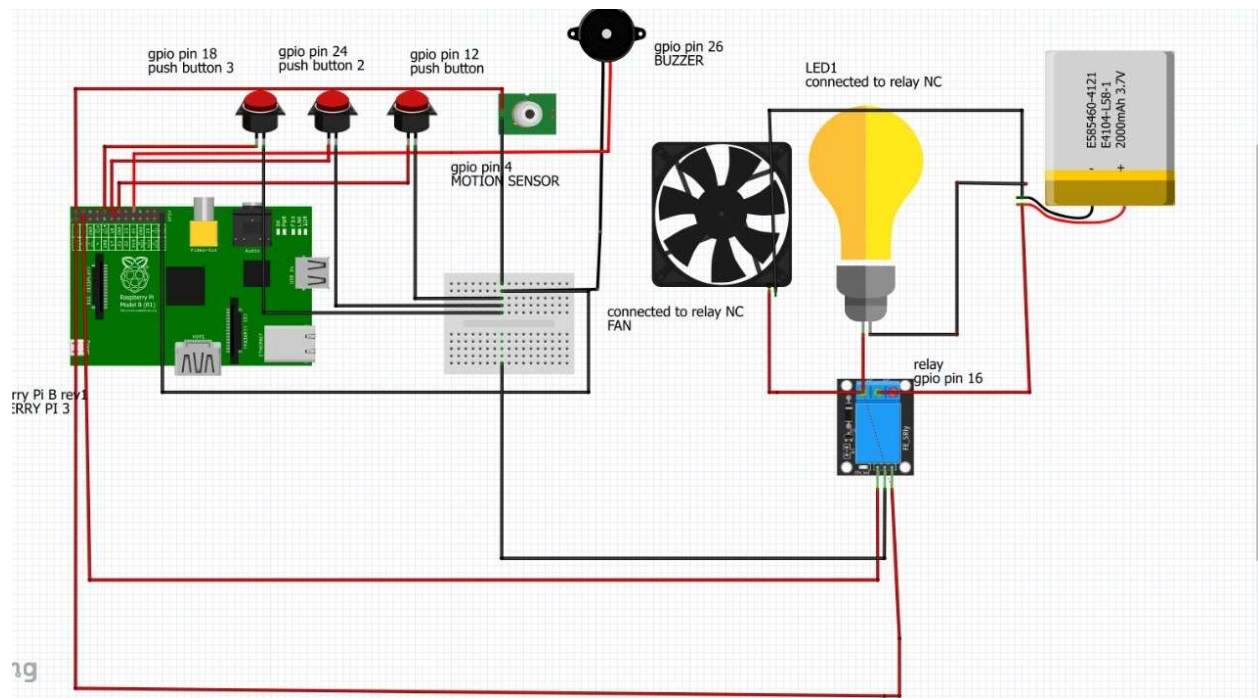
COMPONENT USED

- Raspberry pi
- LCD
- PIR Sensor
- Push Buttons
- Relay
- Buzzer
- DC fan
- Connecting Wires

BLOCK DIAGRAM



SCHEMATIC



PROJECT

SENSOR

The basic objective of this project was achieved using PIR (motion) sensor. PIR sensor detects a human being moving around within approximately 10m from the sensor. This is an average value, as the actual detection range is between 5m and 12m. A **PIR sensor** detects the infrared light radiated by a warm object. It consists of pyro electric **sensors** which introduce changes in their temperature (due to incident infrared radiation) into electric signal. When infrared light strikes a crystal, it generates an electrical charge.

ACTUATOR

The actuators used in this project is 5V Dc Fan, buzzer and bulb. They are connected through relay. **Relays** are **used** to provide time delay functions. They are **used** to time the delay open and delay close of contacts. **Relays** are **used** to control high voltage circuits with the help of low voltage signals. Similarly, they are **used** to control high current circuits with the help of low current signals.

SOFTWARE

The software used is Scratch 1.4 where, animations are produced on different costumes. This software is manually installed in Raspberry pi.

CONTROLLER

Raspberry pi B3 is used as controller which works on the gpio server having all its gpio pins gives an output of 3.3volts.

Raspberry pi is basically a micro processor which uses Linux to operate. Scratch 1.4 software is used to display different animations and perform operation in this project.

LCD

The 7 Inch Touch Screen HDMI Interface LCD is a good solution for those who are seeking for a bigger resolution display. As Raspberry pi needs an LCD to display its contents, so LCD is used in this project especially for animation purpose.

BUTTONS

3 switch/push buttons work as sensor in this project to perform different animations when pressed.

WORKING

The system works in such a way when a motion is produced and simultaneously sensed by the motion sensor, it causes buzzer to sound and switch on the relay to operate DC fan and bulb.

On the other hand, the sensor also stimulates the animation, where it greets the person.

The three push buttons on the board performs different animations when pressed.

SCRATCH CODE

```
from scratch import event
```

```
import time
```

```
@event.greenflag
```

```
def on_greenflag4():
```

```
    sprite.broadcast(str('gpioserveron'))  //to operate all gpio server
```

```
    //initialize all gpio pins as input or output
```

```
    sprite.broadcast(str('config4in'))
```


```
    sprite.broadcast(str('config26out'))
```

```
    sprite.broadcast(str('config18in'))
```

```
    sprite.broadcast(str('config24in'))
```

```
    sprite.broadcast(str('config12in'))
```


```
    sprite.broadcast(str('config16out'))
```




```
while True:
    sprite.set_costume('smiling_face') //for continuous animation when run
    time.sleep(2)
    sprite.set_costume('smiling_face')
    time.sleep(2)
    sprite.set_costume('smiling_face')
    time.sleep(2)
```

```
@event.greenflag
def on_greenflag():
    while True:
        if gpio12.sensorvalue == 1:                //when button 1 pressed
            sprite.set_costume('right_eye')
            sprite.say('welcome to', 2)
            sprite.show()
            time.sleep(1)
            sprite.set_costume('left_eye')
            sprite.show()
            sprite.say('Raspberry Pi', 2)
            time.sleep(1)
```

```
@event.greenflag
def on_greenflag1():
    while True:
        if gpio24.sensorvalue == 1:                //when button 2 pressed
            sprite.set_costume('smiling_face')
            sprite.show()
            sprite.say('Smartroom Project', 2)
            time.sleep(1)
            sprite.set_costume('smiling_face')
            sprite.say('Made by:', 2)
            time.sleep(1)
            sprite.show()
            sprite.set_costume('eyes_open')
```





```
sprite.say('wardah, Unais, Areej, Bushra', 2)
time.sleep(1)
sprite.show()
```

```
@event.greenflag
```

```
def on_greenflag1():
```

```
    while True:
```

```
        if gpio18.sensorvalue == 1:
```

```
            sprite.broadcast(str('gpio26off'))    //buzzer off
```

```
            sprite.broadcast(str('gpio16off'))    //fan off  and bulb off
```

```
@event.greenflag
```

```
def on_greenflag3():
```

```
    while True:
```

```
        if gpio18.sensorvalue == 0:    //button 3 act as a switch for PIR sensor
```

```
            if gpio4.sensorvalue == 1:    //when PIR senses any motion
```

```
                sprite.say('Somebody here!', 2)
```

```
                sprite.broadcast(str('gpio26on'))    //buzzer on
```

```
                sprite.broadcast(str('gpio16on'))    //relay on(fan and bulb on)
```

```
                sprite.set_costume('eyes_open')
```

```
                sprite.say('Hello!', 2)
```

```
                sprite.set_costume('download')    //fan animation
```

```
                sprite.set_costume('download1')
```

```
                sprite.set_costume('download2')
```

```
                time.sleep(2)
```

```
                sprite.set_costume('download3')
```

```
                sprite.set_costume('download4')
```

```
                sprite.set_costume('download5')
```

```
                time.sleep(2)
```

```
                sprite.set_costume('download6')
```


```
                sprite.set_costume('download7')
```

```
                sprite.set_costume('download8')
```

```
                time.sleep(2)
```

```
                prite.set_costume('download9')
```





```
sprite.set_costume('download10')  
sprite.set_costume('download11')  
time.sleep(2)
```

```
if gpio4.sensorvalue == 1:          //when PIR doesnt sense any motion  
    sprite.broadcast(str('gpio26off'))    //buzzer off  
    sprite.broadcast(str('gpio16off'))    //fan off and bulb off  
    sprite.set_costume('eyes_close')  
    time.sleep(4)
```

APPLICATION

- Home automation
- Home security system