

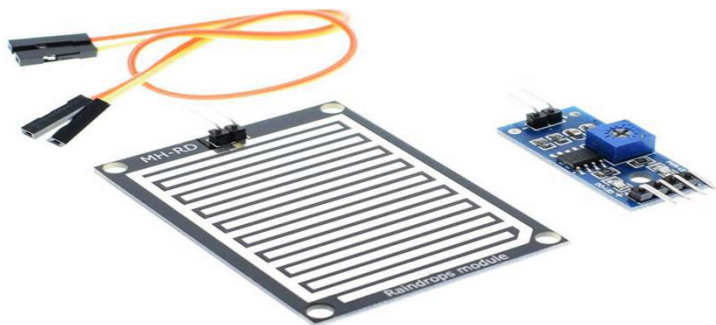
# 29.Rain\_Detection

## Introduction

The rain detection module detects rain on the board. Place the rain detection board in the open air. When it is raining, the rain detection module will sense the raindrops and send signals to the Raspberry Pi.

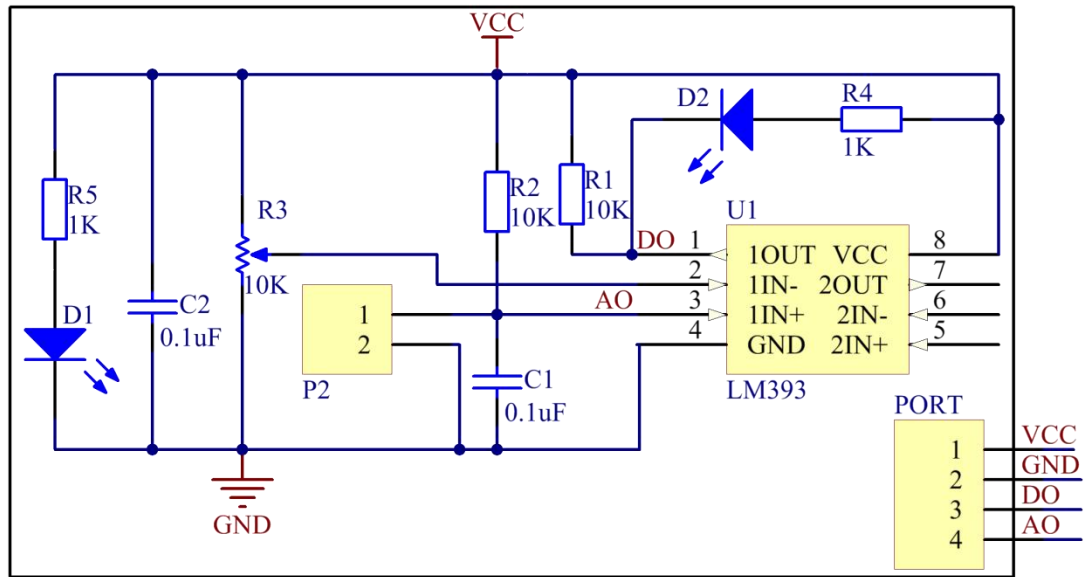
## Hardware Required

- ✓ 1 \* Raspberry Pi
- ✓ 1 \* Breadboard
- ✓ 1 \* Network cable (or USB wireless network adapter)
- ✓ 1 \* Rain Detection module
- ✓ 1 \* PCF8591
- ✓ 1 \* LM393
- ✓ 1 \* 2-Pin ribbon cable
- ✓ 1 \* 4-Pin anti-reverse cable
- ✓ Several jumper wires (M to F)
- ✓ 1 \* Glass of water (Self provided)



## Principle

There are two metal wires that are close to each other but do not cross on the rain detection board. When rain drops on the board, the two metal wires will conduct, thus there is a voltage between the two metal wires.



## Schematic Diagram

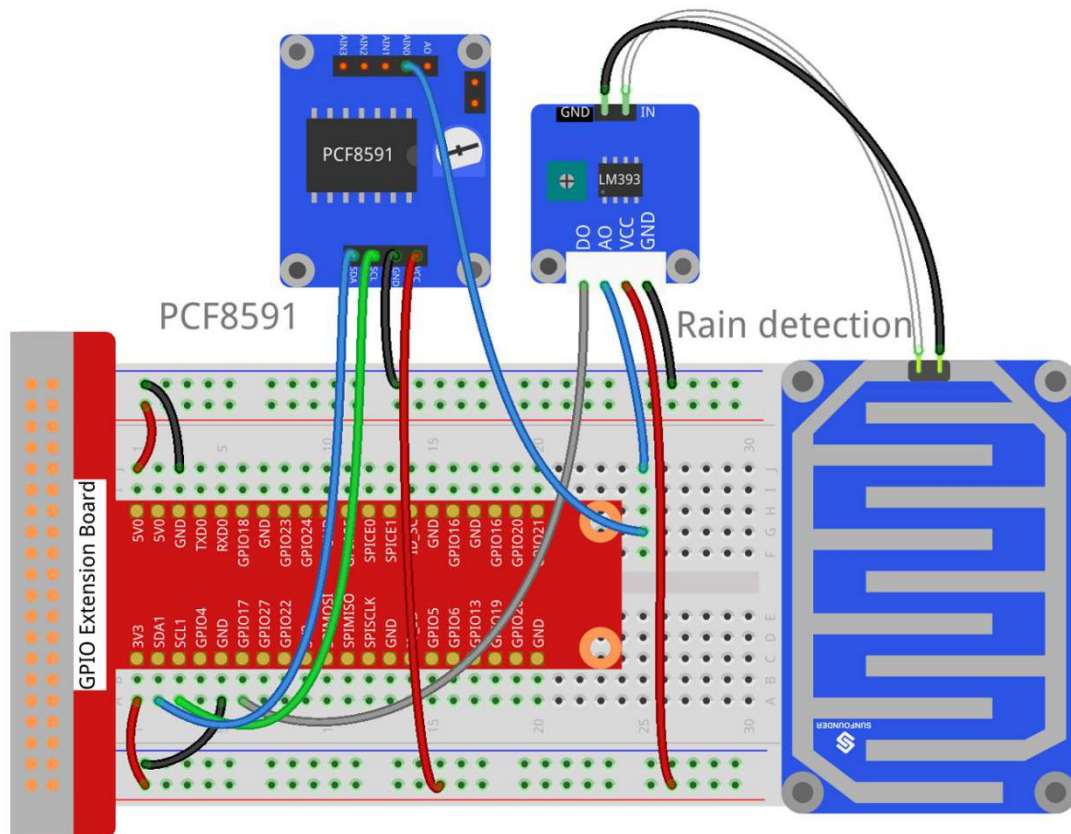
Raspberry Pi	PCF8591 Module	LM393
SDA	SDA	*
SCL	SCL	*
3V3	VCC	VCC
GND	GND	GND
GPIO0	*	DO
*	AIN0	AO

Rain Detection Board	LM393
-	IN
-	GND

## Experimental Procedures

### Step 1: Build the circuit

Note: The two pins on the rain detection board are exactly the same. You can connect them to pin IN and GND on LM393.



**For C language users:**

## Step 2: Change directory

```
cd /home/pi/REXQualis_Raspberry_Pi_Complete_Starter_Kit/C/29.Rain_Detection
```

## Step 3: Compile

```
gcc 29.Rain_Detection.c -o Rain_Detection.out -lwiringPi
```

## Step 4: Run

```
sudo ./Rain_Detection.out
```

Now dip some water onto the rain detection board until "raining" display on the screen.

You can adjust the potentiometer on LM393 to detect the threshold of rainfall.

## Code

```
#include <stdio.h>
#include <wiringPi.h>
#include <pcf8591.h>
#include <math.h>
```

```

#define PCF 120

#define DOpin 0

void Print(int x)
{
    switch(x)
    {
        case 1:
            printf("\n*****\n" );
            printf( "* Not Raining *\n" );
            printf( "*****\n\n");
            break;

        case 0:
            printf("\n*****\n" );
            printf( "* Raining!! *\n" );
            printf( "*****\n\n");
            break;

        default:
            printf("\n*****\n" );
            printf( "* Print value error. *\n" );
            printf( "*****\n\n");
            break;
    }
}

int main()
{
    int analogVal;

    int tmp, status;

    if(wiringPiSetup() == -1){
        printf("setup wiringPi failed !");
    }
}

```

```

    return 1;

} // Setup pcf8591 on base pin 120, and address 0x48

pcf8591Setup(PCF, 0x48);

pinMode(DOpin, INPUT);

status = 0;

while(1) // loop forever
{
    analogVal = analogRead(PCF + 0);

    printf("%d\n", analogVal);

    tmp = digitalRead(DOpin);

    if (tmp != status)
    {
        Print(tmp);

        status = tmp;
    }

    delay (200);
}

return 0;
}

```

## For Python users:

### Step 2: Change directory

```
cd /home/pi/REXQualis_Raspberry_Pi_Complete_Starter_Kit/Python
```

### Step 3: Run

```
sudo python3 29.Rain_Detection.py
```

### Code

```

#!/usr/bin/env python3

import PCF8591 as ADC

import RPi.GPIO as GPIO

```

```
import time

import math

DO = 17

GPIO.setmode(GPIO.BCM)

def setup():
    ADC.setup(0x48)
    GPIO.setup(DO, GPIO.IN)

def Print(x):
    if x == 1:
        print("")
        print(' *****')
        print(' * Not raining *')
        print(' *****')
        print("")
    if x == 0:
        print("")
        print(' *****')
        print(' * Raining!! *')
        print(' *****')
        print("")

def loop():
    status = 1
    while True:
        print (ADC.read(0))

        tmp = GPIO.input(DO);
        if tmp != status:
            Print(tmp)
            status = tmp
```

```
time.sleep(0.2)

if __name__ == '__main__':
    try:
        setup()
        loop()
    except KeyboardInterrupt:
        pass
```

## Phenomenon Picture

