Mini Project Report Cover Sheet

SRM Institute of Science and Technology College of Engineering and Technology Department of Electronics and Communication Engineering
18ECE204J ARM based Embedded System Design **Sixth Semester, 2020-21 (Even Semester)**

Name : **ARAAVIND S**

Register No. : RA1811004010176

Title of the project : **FIRE ALARM SYSTEM**

Lab Supervisor : Ms. Padmajothi.V

Reg. No		RA1811004010176
Mark split up	Maximum Marks	Marks obtained
Novelty in the project work / Abstract	**5**	
Level of understanding of the design / Configuration	**10**	
Individual Contribution to the project	**5**	
Report writing	**5**	
Total	**25**	

REPORT VERIFICATION

Lab supervisor Signature with date :

FIRE ALARM SYSTEM

OBJECTIVE:

To trigger an alarm if temperature of the room exceeds a pre-set value of 25°C

SOFTWARE USED:

Mbed Simulator- https://simulator.mbed.com/

THEORY:

A fire alarm system warns people when smoke, fire, carbon monoxide or other fire-related emergencies are detected. These alarms may be activated automatically from smoke detectors, and heat detectors or may also be activated via manual fire alarm activation devices such as manual call points or pull stations.
The "Brain" of the system is the Fire Alarm Control Panel. It is the central hub for all of the detector signals to be wired to and provides a status indication to the users.
A heat detector can either work on a fixed temperature basis, where it will trigger an alarm if the temperature exceeds a pre-set value or they can work on the rate of change in temperature.

C12832.h - To control the 128x32 LCD enclosed in the mbed Application Shield.
This library allows you to bypass the specifics of the SPI protocol, and focus on the LCD programming with the use of the predefined functions.

Sht31.h - To add temperature and humidity sensor to the simulator.
To imitate the change of environmental condition by clicking the sensor component.

play_tone() - A function to initialise respective values for all the available datatypes.

main() - This function consists of a while loop to call out all the member functions and encloses an if-condition loop to call the function **play_tone**() if the temperature exceeds 25°C to trigger the alarm. The value of the temperature is recorded by SHT31.

CODE:

```
#include "mbed.h"
#include "C12832.h"
#include "Sht31.h"

C12832 lcd(SPI_MOSI, SPI_SCK, SPI_MISO, p8, p11);
Sht31 sht31(I2C_SDA, I2C_SCL);
DigitalOut led(LED1);
PwmOut speaker(p21);

void play_tone(float frequency, float volume, int interval, int rest) {
    speaker.period(1.0 / frequency);
    speaker = volume;
    wait(interval);
    speaker = 0.0;
    wait(rest);
}


int main() {


    while (1) {
        lcd.cls();

        float temp = sht31.readTemperature();
        float humidity = sht31.readHumidity();

        lcd.locate(3, 3);
```

```
lcd.printf("Temperature: %.2f C", temp);

lcd.locate(3, 13);

lcd.printf("Humidity: %.2f %%", humidity);


// turn on LED if the temperature is above 25 degrees

if(temp>25)

  {


play_tone(200.0, 0.5, 1, 0);

play_tone(150.0, 0.5, 1, 0);

play_tone(125.0, 0.5, 1, 2);

lcd.printf("\n Alarm");

}

  wait(0.5f);

}
```
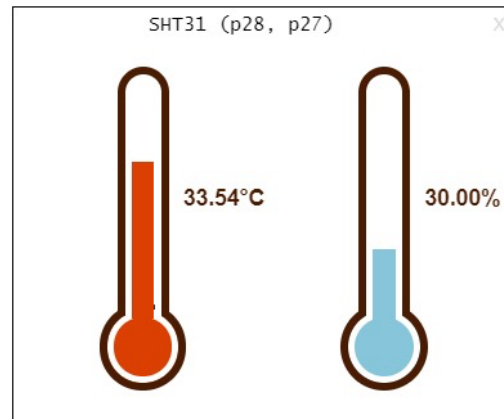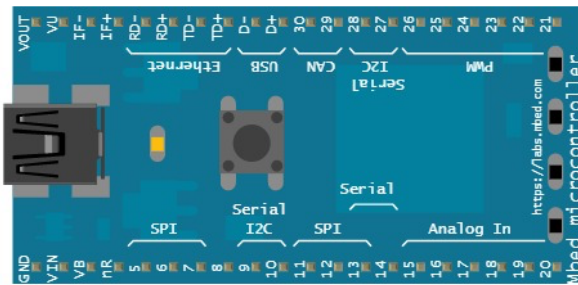
OUTPUT:

ADVANTAGES OF A FIRE ALARM SYSTEM

Fire alarms have many advantages. In the event of a fire, they provide detection and notification without you having to do anything. whether you are home or not. They can also automatically dispatch the fire department to your location. The greatest benefits also include:

Avoid Smoke Inhalation: Smoke inhalation is the leading cause of death related to fires2; more so than heat or flames. A mixture of particles, chemicals, and gases, smoke causes everything from skin and mucous membrane irritation to swelling, respiratory distress, and airway collapse. Without immediate medical help, smoke inhalation can lead to suffocation and death. A fire alarm can protect you against exposure to harmful substances such as carbon monoxide, ammonia, hydrogen cyanide, and others often found in smoke.

Early Fire Detection: An audible or visual signal enables you to seek safety soon after the fire starts. Once fire and/or smoke conditions trigger the system, you can use an available fire extinguisher to protect your home and belongings or rush your family to safety. Early detection can enable you to avoid serious damage or destruction, so it is of extreme importance. In addition to providing security in the kitchen, bathroom, bedrooms, and family rooms, a fire alarm can quickly alert firefighters so they can help minimize the damage.

Discounts on Insurance: When you install fire alarms, you can save money on home They help cut costs for insurance companies by reducing the risk of a fire destroying your home, appliances, and possessions. Installing a fire alarm system shows you are taking responsibility and are prepared for unexpected events. Instant notification of a potential fire and fast action can minimize the amount of an insurance claim; your fire protection devices can, therefore, go a long way in qualifying you for discounted homeowner's insurance policies.

Decreased Risk of Fire Damage: Property damage can require large investments and a great deal of time to repair. You can also avoid damage to nearby properties when you install a residential fire alarm. This level of prevention is possible because a fire alarm system can enable firefighters to respond and put out the fire before it gets out of control. The less damage there is, the quicker you can get each affected room back in order.

RESULT:

Hence, an alarm is triggered when temperature of the room exceeds 25°C.