DRISHTI

A Revolutionary Concept

SARDAR VALLABHBHAI NATIONAL INSTITUTE OF TECHNOLOGY • SURAT •

FIRE ALARM SYSTEM

MAKERSPACE 5.0

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INTRODUCTION

Problem Statement :

- ➔ To design a fire alarm device that can deliver a warning SMS directly to your cell phones.

Fire alarm system detects increase in temperature, and presence of smoke to detect the presence of fire and warn by buzzers and LEDs (also by sending messages - by using GSM module). These sensors are fixed in different zones and all are wired to the Main Control Unit (MCU), such that we can pinpoint the zone which has caught fire.

COMPONENTS

ATMEGA32

AVR MICROCONTROLLER

SIM900D

GSM MODULE

TMP36

TEMPERATURE SENSOR

PROTEUS

SIMULATION SOFTWARE

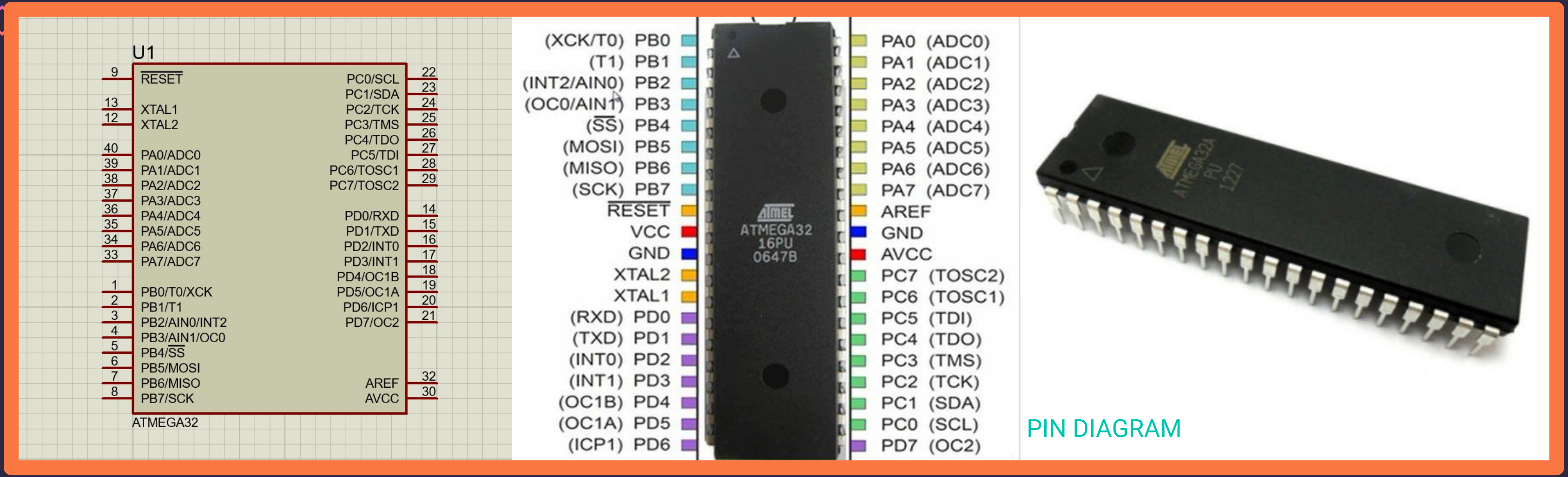
MQ2

GAS SENSOR

ATMEL STUDIO

CODE WRITING AND COMPILING

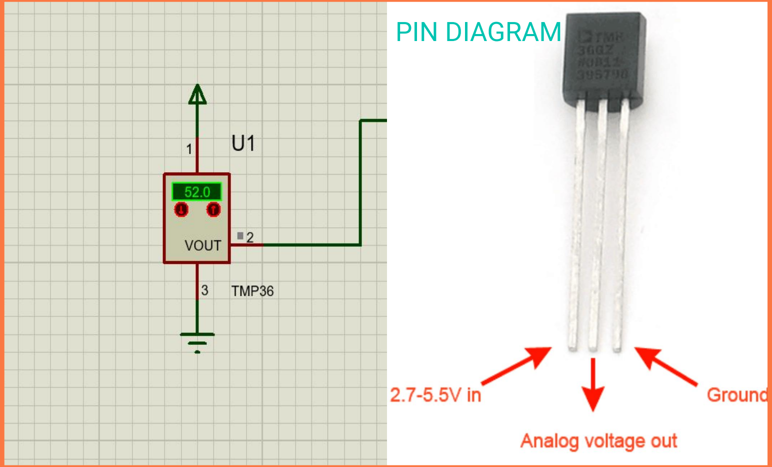
ATMEGA32



PIN DIAGRAM

An AVR 8-bit microcontroller, can attain 1 MHz of frequency.

TMP36

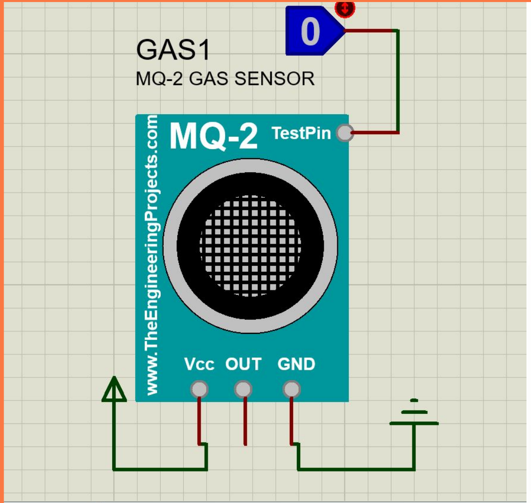


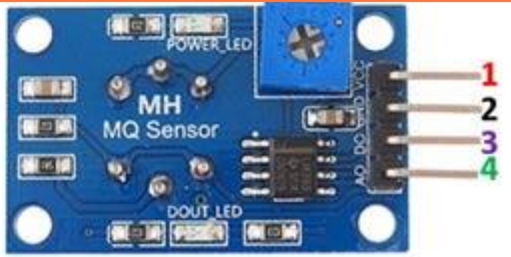
Detects temperature and gives Analog output

ADC

- ADC stands for Analog to Digital Converter. ATMEGA32 has built-in ADCs.
- The smallest change that can be detected by ADC is called Step Size.
- For an ADC the step size is V(reference)/(2^n-1). In our project it is 10-bit so, V(reference) = 5V, thus step size is 5V/1023 = 4.89mV.
- As the higher resolution provide smaller step size.
- ADC = (V_{IN} X 1024) / V_{REF}

MQ2 SENSOR



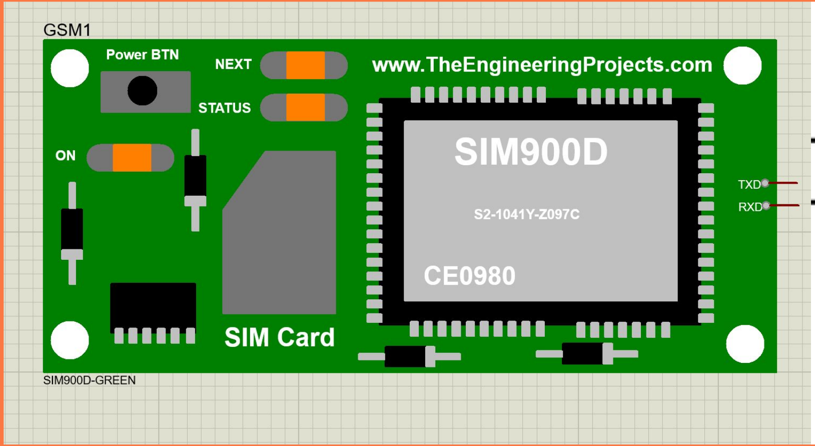


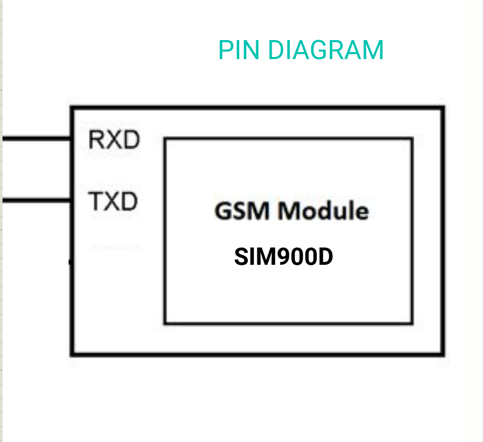
PIN DIAGRAM

Pin No.	Pin Name
1	Vcc(+5V)
2	Ground
3	Digital Out
4	Analog out

Smoke detecting sensor

SIM900D



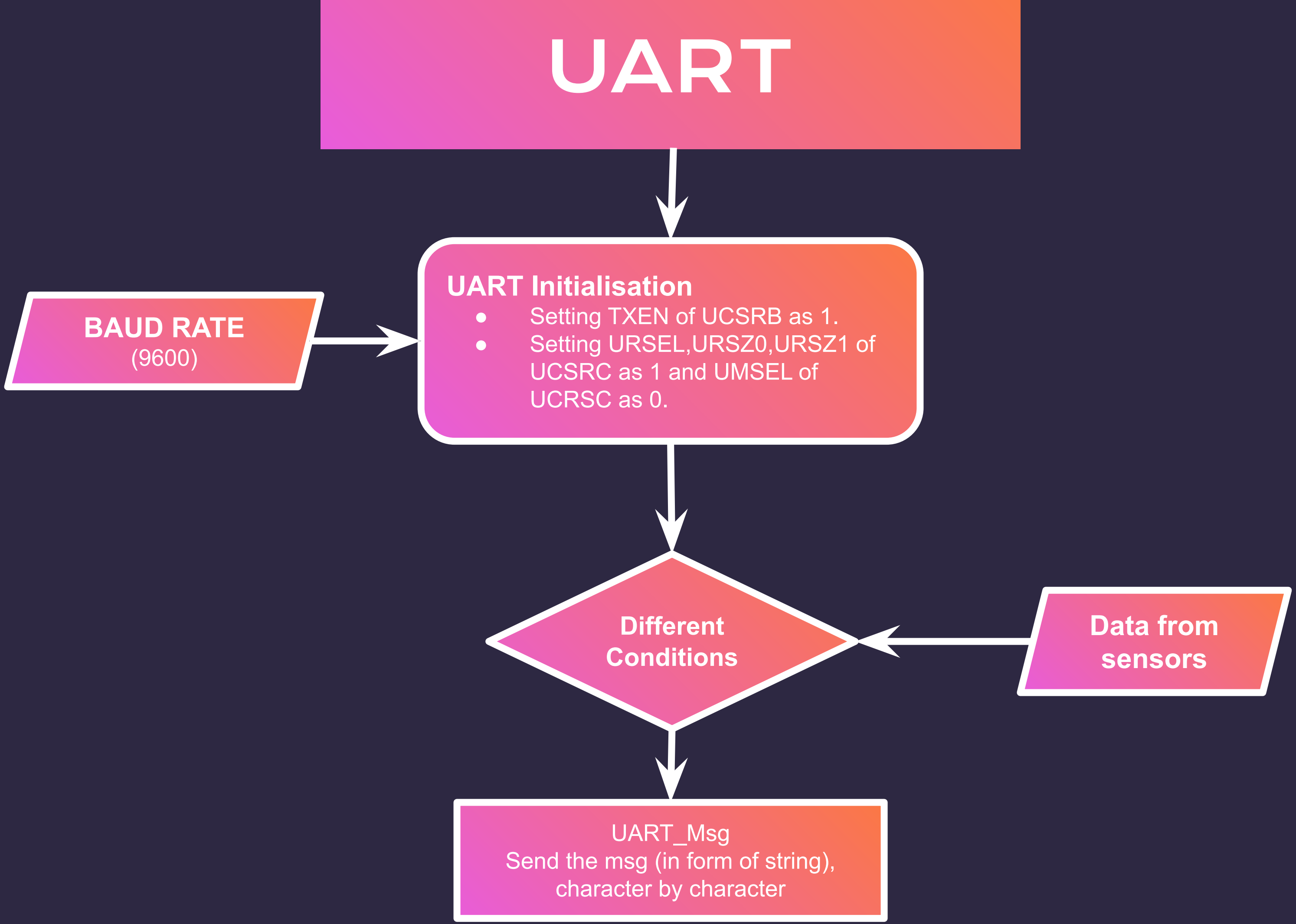


Uses AT commands

AT - Replies OK for acknowledgement

AT + CMGF = 1 - Send SMS in text mode only

AT + CMGS = “+91 xxxxxxxxxx” > “Msg” <Ctrl + Z> - Send “Msg” to the given phone no.



UART

BAUD RATE
(9600)

UART Initialisation

- Setting TXEN of UCSRB as 1.
- Setting URSEL,URSZ0,URSZ1 of UCSRC as 1 and UMSEL of UCRSC as 0.

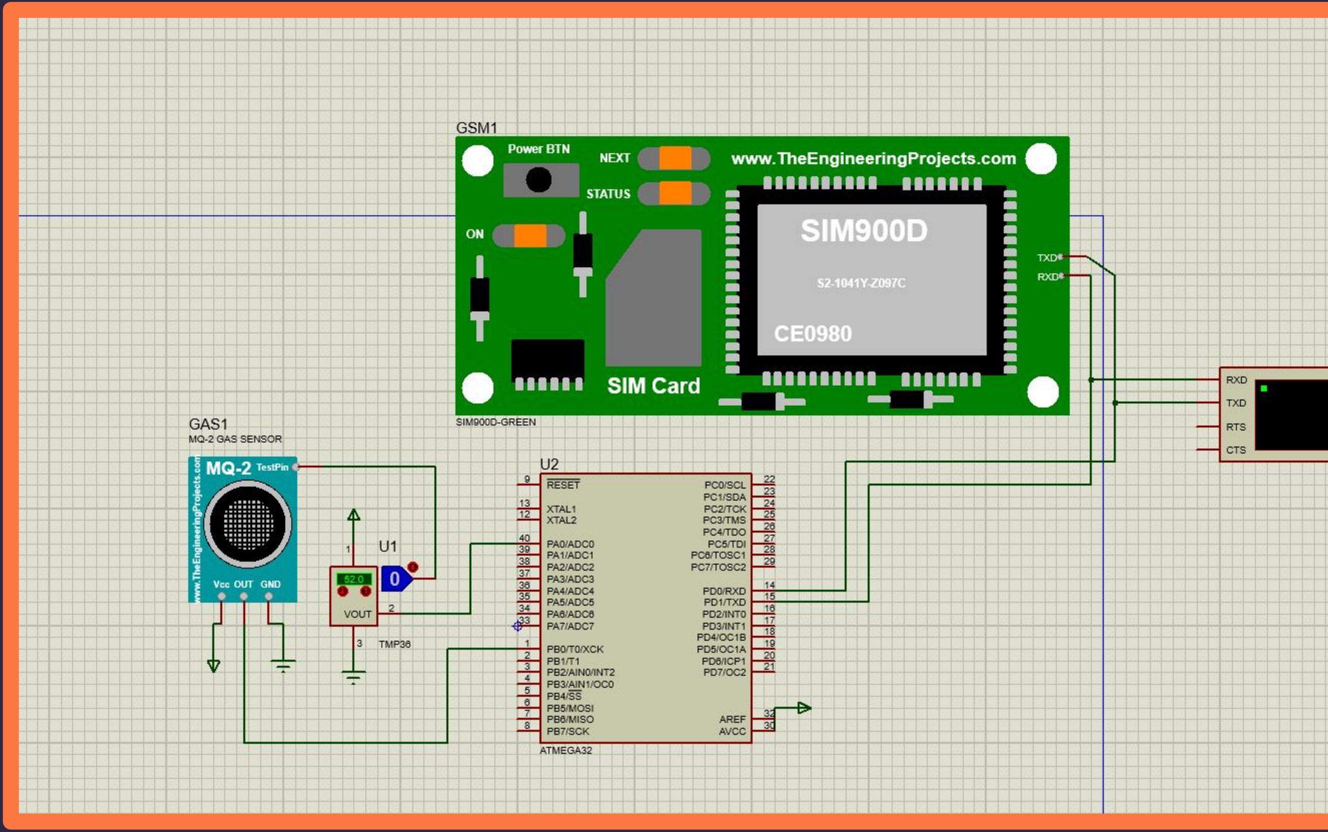
Different Conditions

Data from sensors

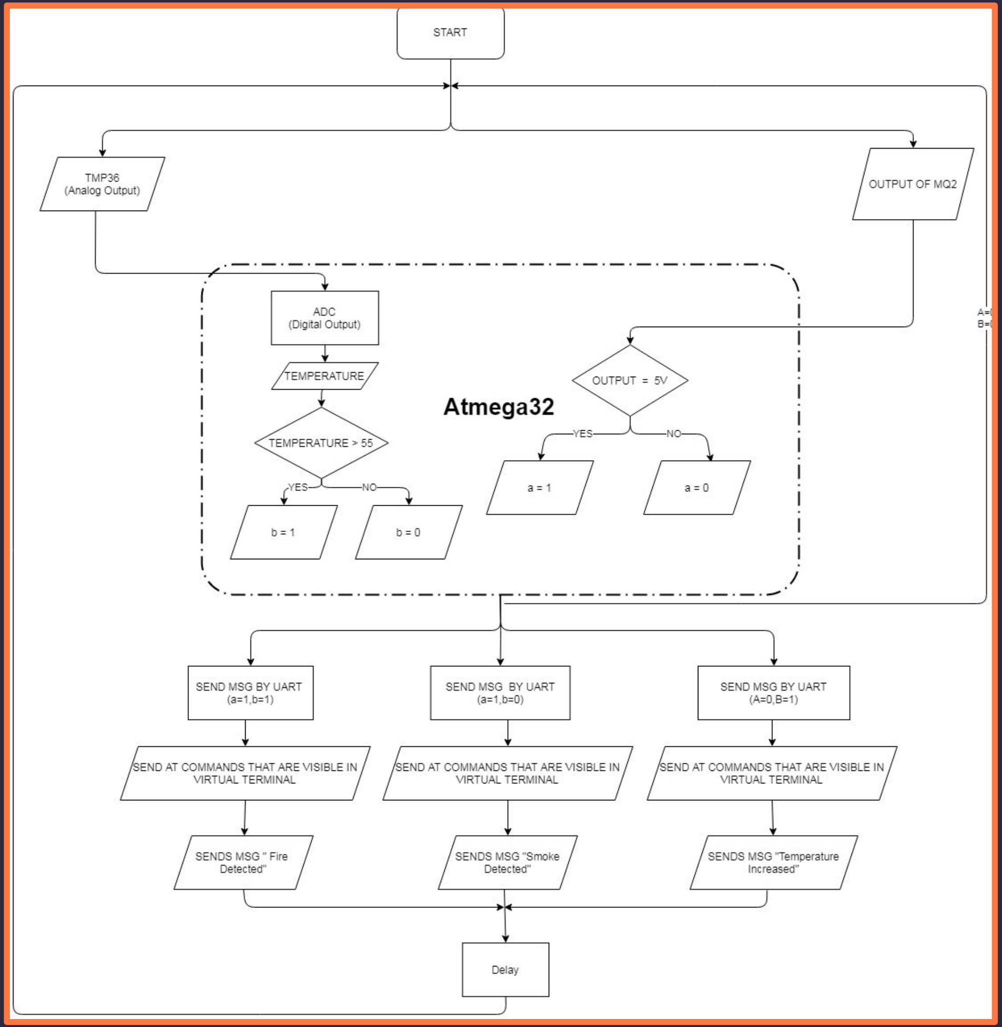
UART_Msg
Send the msg (in form of string), character by character

CIRCUIT DIAGRAM

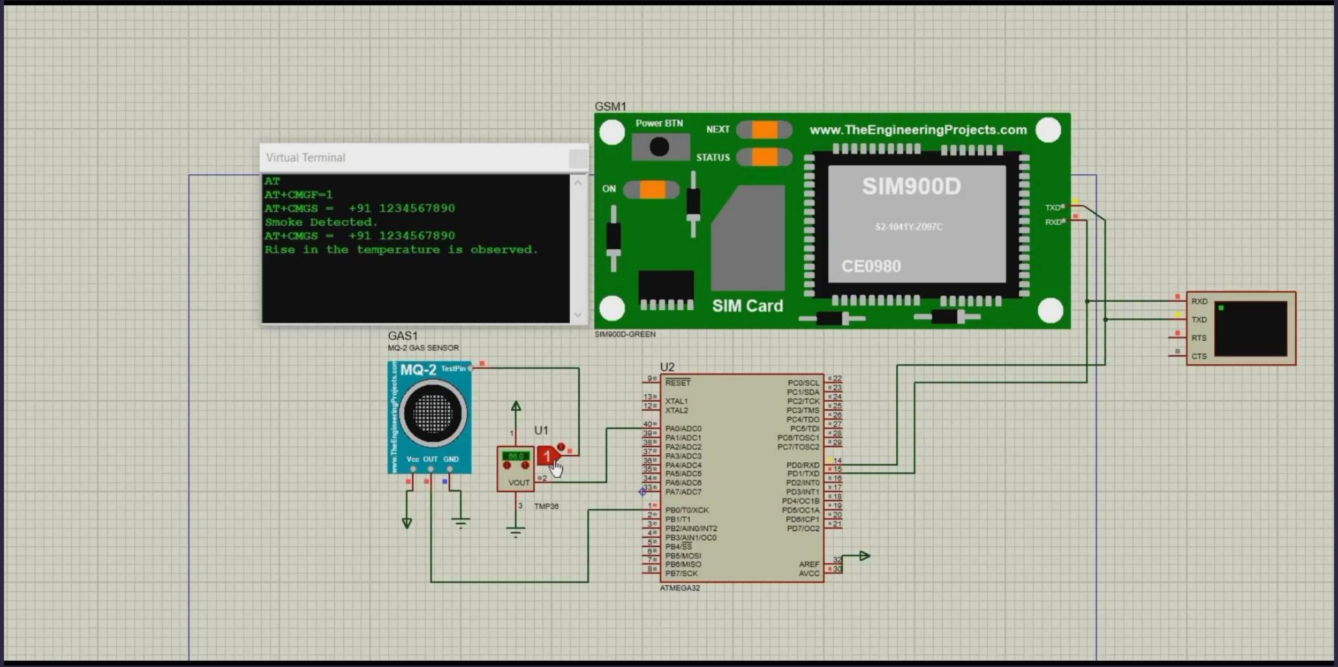
Circuit diagram including all the sensors and microcontroller



FLOWCHART


START
TMP36
(Analog Output)
OUTPUT OF MQ2
ADC
(Digital Output)
TEMPERATURE
TEMPERATURE > 55
YES
NO
b = 1
b = 0
Atmega32
OUTPUT = 5V
YES
NO
a = 1
a = 0
A=
B=
SEND MSG BY UART
(a=1,b=1)
SEND MSG BY UART
(a=1,b=0)
SEND MSG BY UART
(A=0,B=1)
SEND AT COMMANDS THAT ARE VISIBLE IN VIRTUAL TERMINAL
SEND AT COMMANDS THAT ARE VISIBLE IN VIRTUAL TERMINAL
SEND AT COMMANDS THAT ARE VISIBLE IN VIRTUAL TERMINAL
SENDS MSG " Fire Detected"
SENDS MSG "Smoke Detected"
SENDS MSG "Temperature Increased"
Delay

SIMULATION



Virtual Terminal

```
AT
AT+CMGF=1
AT+CMGS =  +91 1234567890
Smoke Detected.
AT+CMGS =  +91 1234567890
Rise in the temperature is observed.
```

All files are stored in a GitHub Repo :
https://github.com/Aniumbott/Fire-Alarm-System.git

THANK YOU