PRIME UNIVERSITY

114/116, Mazar Road, Dhaka

Project Name: Fire Alarm System

Submitted By

Somaiya Afrin Eva Khondokar

Department of CSE

Prime University

Fire Alarm System

Problem Statement:

This system checks for abnormal smoke content in a room every 2 seconds. Under abnormal conditions, it throws open 2 doors and 2 windows and opens a valve that releases the gas to put out fire and also sounded until smoke level in room drops to an acceptable level.

Procedure:

Though it is a virtual project, but the whole planning is assumed for a real fire alarm which can use at home protection.

1. We have used a logic gate (OR) which indicates '0' as **System normal** & '1' as **Fire detected!**
2. There have 2 parts : 'Heat Sensor' & 'Smoke Sensor'. It only accepts binary input, but when any digit inputs without binary, it will show **Invalid Input!**
3. When the virtual fire alarm machine shows the "Fire Detected" message, it will alert by a beep sound (3 times).
4. In real, if both sensors detect abnormalities, the red indicator light will turn on to signal a potential fire.

OR Gate:

A	**B**	**A+B**
0	0	0
0	1	1
1	0	1
1	1	1

Code:

```
.MODEL SMALL
.STACK 100H
.DATA
    prompt_heat     DB 'Enter heat sensor value: $'
    newline db 0Dh, 0Ah, '$'
    prompt_smoke    DB 'Enter smoke sensor value: $'
    msg_normal      DB 'System Normal!', 0AH, 0DH, '$'
    msg_fire        DB 'Fire Detected!!!', 0AH, 0DH, '$'
    msg_wrong       DB 'Invalid input!', 0AH, 0DH, '$'
.CODE
MAIN PROC
   MOV AX, @DATA       ; Initialize DS
    MOV DS, AX
; Prompt for heat sensor input
    MOV AH, 09H
   LEA DX, prompt_heat
    INT 21H
; Read heat sensor input
    MOV AH, 01H
   INT 21H
   SUB AL, '0'         ; Convert ASCII to binary
    MOV BL, AL          ; Store heat sensor value in BL
    ; New line
    lea dx, newline
    mov ah, 09h
    int 21h
  ; Validate heat sensor input (must be binary)
    CMP BL, 0
    JE check_smoke
    CMP BL, 1
    JE check_smoke
```

```
    MOV AH, 09H         ; Display "Wrong Inputs" message
    LEA DX, msg_wrong
    INT 21H
    JMP END_PROGRAM
check_smoke:
    ; Prompt for smoke sensor input
    MOV AH, 09H
    LEA DX, prompt_smoke
    INT 21H
; Read smoke sensor input
    MOV AH, 01H
    INT 21H
    SUB AL, '0'         ; Convert ASCII to binary
    MOV BH, AL          ; Store smoke sensor value in BH
  ; New line
    lea dx, newline
    mov ah, 09h
    int 21h
  ; Validate smoke sensor input (must be binary)
    CMP BH, 0
    JE perform_or
    CMP BH, 1
    JE perform_or
    MOV AH, 09H         ; Display "Wrong Inputs" message
    LEA DX, msg_wrong
    INT 21H
    JMP END_PROGRAM
perform_or:
; Perform logical OR operation (BL = heat sensor, BH = smoke sensor)
    OR BL, BH
   CMP BL, 0
JNE fire_detected   ; If result is 1, jump to fire_detected message
```

```
; Display "System Normal" message
   MOV AH, 09H
    LEA DX, msg_normal
    INT 21H
    JMP END_PROGRAM
fire_detected:
    ; Display "Fire Detected" message
    MOV AH, 09H
    LEA DX, msg_fire
    INT 21H
; Sound alarm (simulated via simple tone)
    mov ah, 2
    mov dl, 07 ;beep ascii code
    int 21h

    mov ah, 2
    mov dl, 07 ;beep ascii code
    int 21h


    mov ah, 2
    mov dl, 07 ;beep ascii code
    int 21h
    exit:
    mov ah, 4ch
    int 21h
END_PROGRAM:
    MOV AH, 4CH         ; Exit program
    INT 21H
MAIN ENDP
END MAIN
```