FPGA Project

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Outline:

1) The Idea
2) The Sensors and Parts
3) The implementation
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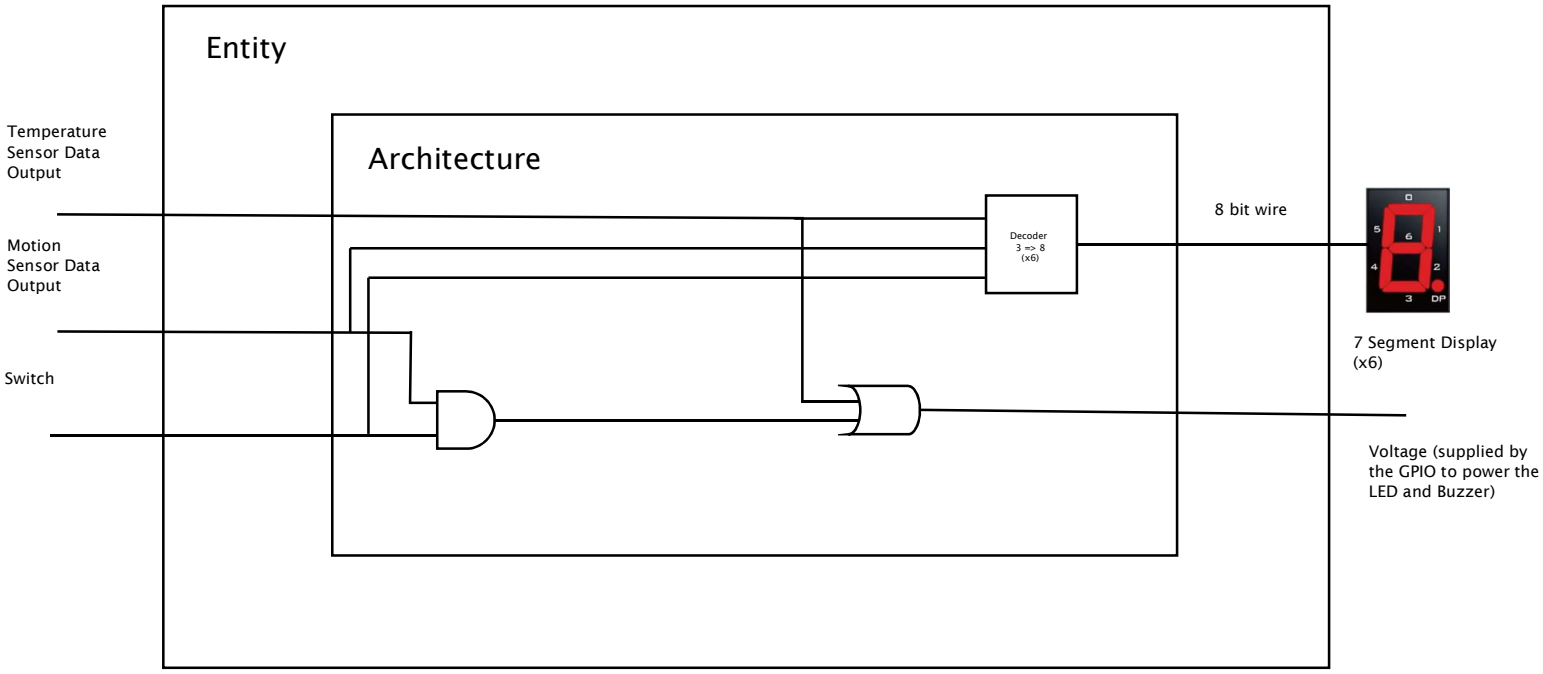
The Idea:

The idea of this project is to implement a 2 in 1 Fire / Motion Sensor for use in security and home management modules for homes and places of business.



The Components:

1) Temperature Sensor Module

2) PIR Motion Sensor Module

3) LED

4) 5V Buzzer

5) A Breadboard

6) Male to Female Jumper Wires

The Implementation:

The Entity:

```
library ieee;
use ieee.std_logic_1164.all;
entity buzz is
port( A,B,C: in std_logic; V: out std_logic; LED1,LED2,LED3,LED4,LED5,LED6: out std_logic_vector(7 downto 0));
end buzz;
```

The Architecture:

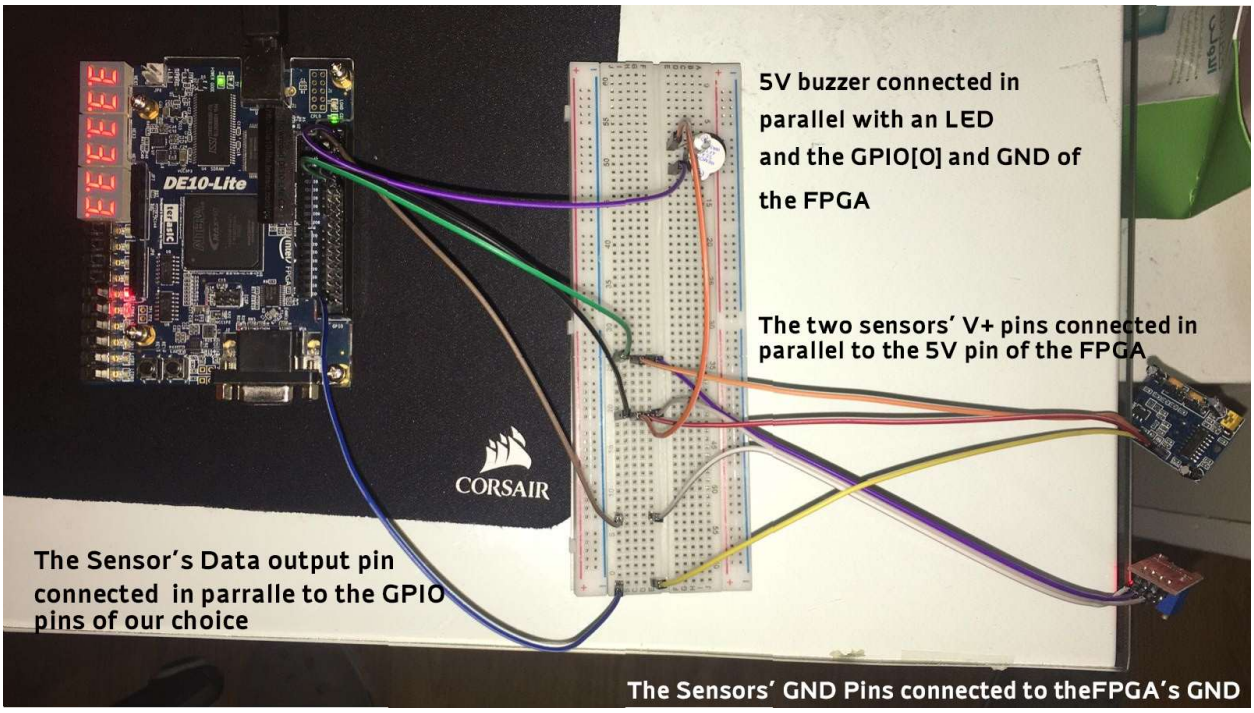
```
architecture arch of buzz is
Signal X:  std_logic_vector(2 downto 0);
begin
X <= A & B & C;
V <=  A OR (B AND C);

With X select
   LED6 <=  "10001110" when "100",
            "10000110" when "011",
            "11111111" when others;

With X select
   LED5 <=  "11001111" when "100",
            "10100011" when "011",
            "11111111" when others;
With X select
   LED4 <=  "11001110" when "100",
            "10001111" when "011",
            "11111111" when others;

With X select
   LED3 <=  "10000110" when "100",
            "10111111" when "011",
            "11111111" when others;


With X select
   LED2 <=  "01111001" when "100",
            "10100011" when "011",
            "11111111" when others;

With X select
   LED1 <=  "01111001" when "100",
            "10100111" when "011",
            "11111111" when others;

end arch;
```

The Pin Assignment:

Node Name	Direction	Location
V	Output	PIN_W10
LED6[7]	Output	PIN_L19
LED6[6]	Output	PIN_N20
LED6[5]	Output	PIN_N19
LED6[4]	Output	PIN_M20
LED6[3]	Output	PIN_N18
LED6[2]	Output	PIN_L18
LED6[1]	Output	PIN_K20
LED6[0]	Output	PIN_J20
LED5[7]	Output	PIN_F17
LED5[6]	Output	PIN_F20
LED5[5]	Output	PIN_F19
LED5[4]	Output	PIN_H19
LED5[3]	Output	PIN_J18
LED5[2]	Output	PIN_E19
LED5[1]	Output	PIN_E20
LED5[0]	Output	PIN_F18
LED4[7]	Output	PIN_D22
LED4[6]	Output	PIN_E17
LED4[5]	Output	PIN_D19
LED4[4]	Output	PIN_C20
LED4[3]	Output	PIN_C19
LED4[2]	Output	PIN_E21
LED4[1]	Output	PIN_E22
LED4[0]	Output	PIN_F21
LED3[7]	Output	PIN_A19
LED3[6]	Output	PIN_B22
LED3[5]	Output	PIN_C22
LED3[4]	Output	PIN_B21
LED3[3]	Output	PIN_A21
LED3[2]	Output	PIN_B19
LED3[1]	Output	PIN_A20
LED3[0]	Output	PIN_B20
LED2[7]	Output	PIN_A16
LED2[6]	Output	PIN_B17
LED2[5]	Output	PIN_A18
LED2[4]	Output	PIN_A17
LED2[3]	Output	PIN_B16
LED2[2]	Output	PIN_E18
LED2[1]	Output	PIN_D18
LED2[0]	Output	PIN_C18

LED1[7]	Output	PIN_D15
LED1[6]	Output	PIN_C17
LED1[5]	Output	PIN_D17
LED1[4]	Output	PIN_E16
LED1[3]	Output	PIN_C16
LED1[2]	Output	PIN_C15
LED1[1]	Output	PIN_E15
LED1[0]	Output	PIN_C14
C	Input	PIN_C10
B	Input	PIN_AB2
A	Input	PIN_V10

Circuit implementation:



The Results:

The result is a component that beeps, lights up, and displays the word “Motion” on the 7 segment display when the switch is up and the motion sensor is feeding a one and beeps, lights up, and displays the word “FIRE!!” on the 7 segment display when the switch is down and the temperature sensor is feeding a 1.