Project 2: Fire Alarm System Project by Interfacing Arduino with Temperature & Gas Sensor

The components used in the **Fire Alarm System Project** are:

1. **Arduino Uno** – The microcontroller that processes sensor data and controls the outputs.
2. **Breadboard** – Used for easy circuit connections.
3. **LM35 Temperature Sensor** – Measures temperature; outputs voltage proportional to temperature changes.
4. **Gas Sensor (MQ-2 or MQ-135)** – Detects the presence and concentration of gases or smoke.
5. **Piezo Buzzer** – Emits sound when smoke or high temperature is detected.
6. **LED** – Indicates fire detection by glowing when the threshold is crossed.
7. **Resistors** – Used to limit current to prevent damage to components.
8. **Connecting Wires** – Establish electrical connections between components.

The **LM35** sensor works by varying voltage based on temperature, while the **gas sensor** changes its resistance based on gas concentration. The **Arduino Uno** reads these values and activates the buzzer and LED when temperature or gas concentration crosses a threshold.

Description :

To set up the circuit, we first establish power and ground connections on the breadboard. The **5V pin** of the **Arduino Uno** is connected to one side of the breadboard to act as the power supply, while the **GND pin** is connected to the other side to serve as the ground. These lines will distribute power to the other components.

Temperature Sensor Connections

The **temperature sensor** has three pins: **Vs (Supply), Vout, and Ground**.

- The **Vs pin** (operating range: **4-20V**) is linked to the power rail of the breadboard.
- The **Ground pin** is connected to the ground rail.
- The **Vout pin**, which provides the temperature readings, is wired to **Analog Pin A1** of the Arduino.

Gas Sensor Connections

The **gas sensor** consists of six pins.

- Three of them are directly connected to the power rail.
- One of the remaining three pins is linked to **Analog Pin A0** on the Arduino.
- The middle pin is connected to the ground rail.
- The last pin is connected to a **resistor**, which is then grounded to prevent excessive current flow.

Piezo Buzzer Connections

The **piezo buzzer** is wired externally.

- Its **ground pin** is connected to the ground rail.
- The other pin is connected to **Digital Pin 7** on the Arduino, which controls its activation.

LED Connections

The **LED** is directly connected to the Arduino.

- The **cathode** (negative leg) is linked to **GND** on the Arduino.
- The **anode** (positive leg) is connected through a **resistor** to **Digital Pin 13**, ensuring controlled current flow.

This setup allows the Arduino to receive input from the **temperature and gas sensors**, process the data, and trigger the **LED** and **buzzer** when necessary.