**Project Overview**

This project involves designing a heartbeat monitor using an Arduino and a pulse sensor to detect the heartbeat and display the heart rate on an LCD screen. Logical gates (implemented through software) will help analyze the pulse data to provide accurate heart rate readings.

**Components Required**

1. **Arduino Uno** (or any compatible Arduino board)
2. **Pulse Sensor** (e.g., Pulse Sensor Amped)
3. **16x2 LCD Display** (with I2C module for easy connection)
4. **Breadboard**
5. **Jumper Wires**
6. **Resistors** (if needed for pull-up/pull-down configurations)
7. **Two resisters of 10k and three of 330**
8. **USB Cable** (to connect Arduino to a computer for programming)
9. **Power Supply** (battery or adapter if not using USB power)

**Logical Gates Analysis:**

Logical gates are not physically used in this project, but their equivalent functions are implemented in the software to analyze the heartbeat data. The threshold setting and beat detection algorithm can be seen as implementing the function of logical gates to process the analog signal from the pulse sensor and determine if it crosses a certain threshold (indicating a heartbeat).

**Assembly and Testing:**

1. **Assemble the Circuit**: Connect the components as per the circuit diagram.
2. **Upload the Code**: Upload the provided code to the Arduino using the Arduino IDE.
3. **Test the System**: Place the pulse sensor on your finger or earlobe and observe the BPM reading on the LCD display.

**Troubleshooting Tips:**

* Ensure all connections are secure and correct.
* Verify the pulse sensor is properly placed on a finger or earlobe.
* Adjust the threshold value in the code if the heartbeat is not being detected reliably.

This project provides a hands-on way to understand pulse monitoring, signal processing, and real-time data display using Arduino.