

# EXPERIMENT NO. - 1.2

**NAME-**

**UID-**

**CLASS & GROUP-**

**SEMESTER-2nd**

## **AIM OF THE EXPERIMENT -**

1. Design a Burglar alarm using an AND gate such that the alarm should turn on whenever the light falling on the LDR is disrupted.
2. Design a voting system to consider a valid vote when a person sitting at a desk presses both the buttons. IN case only one button is pressed during the casting of the vote will be considered invalid. Also, a valid casted vote will be represented by greenlight invalid casted vote will be represented by a red light.
3. Design an automatic heater controller using NOT gate such that at a temperature below  $10^{\circ}$  C the heater should turn ON (the heater can be represented by using an LED).

**Task to be done** - To design circuits for a burglar alarm, voting system, and automatic heat controller.

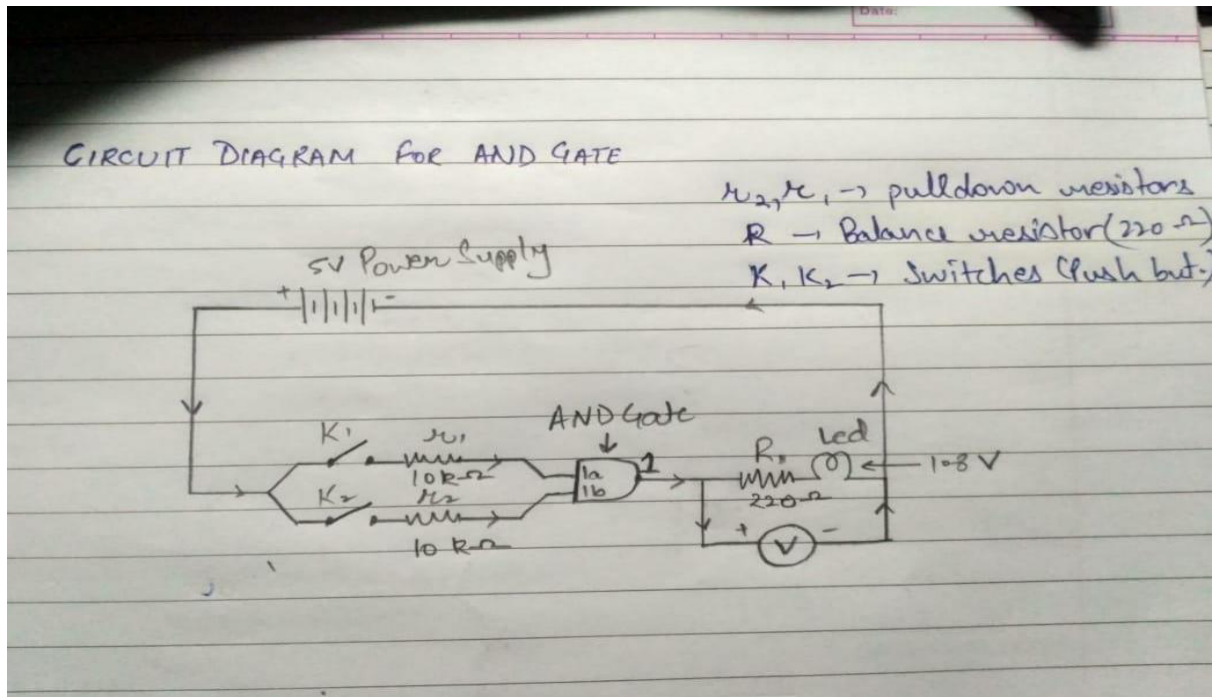
## Requirements

**Hardware:** Breadboard, IC for NAND, NOR, NOT, AND, and XOR Gate, balance resistor, pulldown resistors, connecting wires, power supply, multimeter, switches, LED.

**Software:- Tinkercad.**

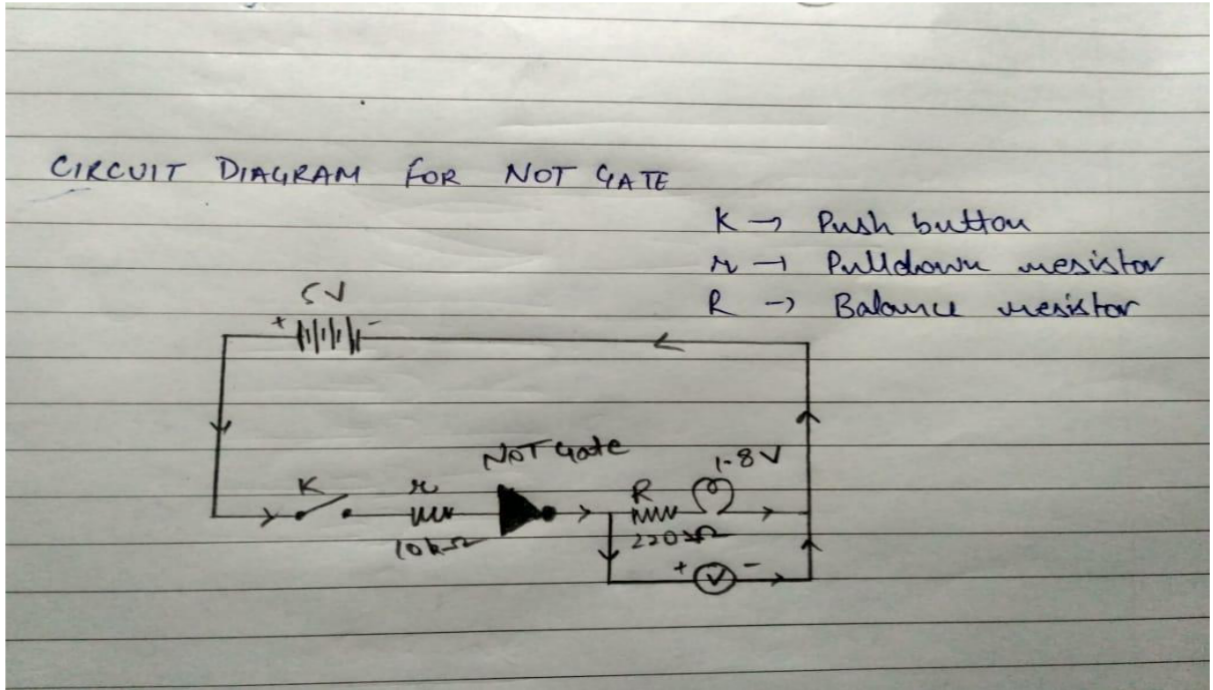
## Circuit diagram/ Block diagram

(The following diagram could be used for **NAND, NOR, AND, and XOR** Gates by simply changing the gate without changing any other component)



(This circuit diagram is for **NOT**

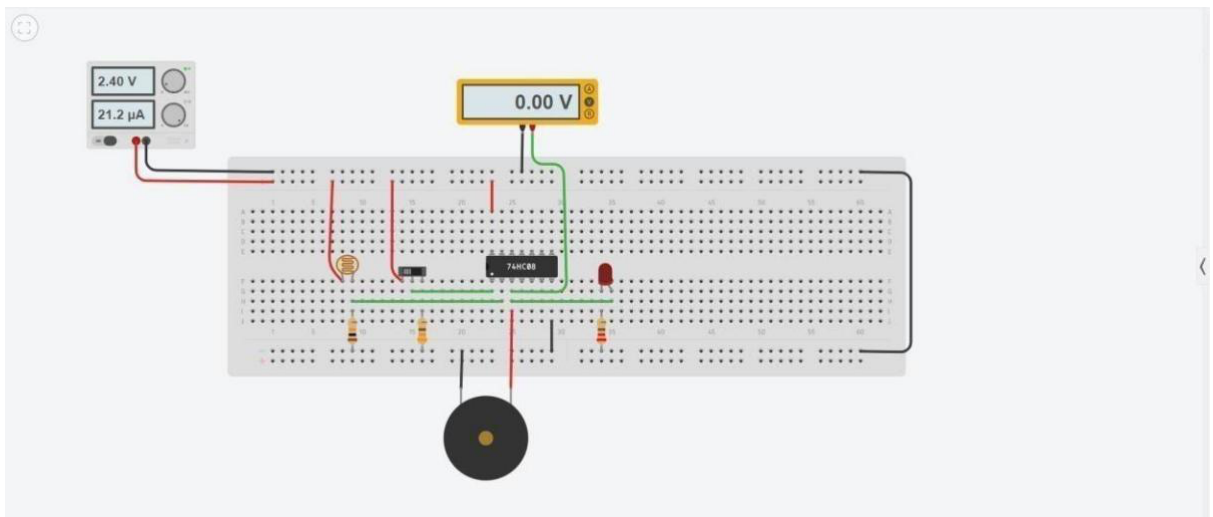
Gate only)



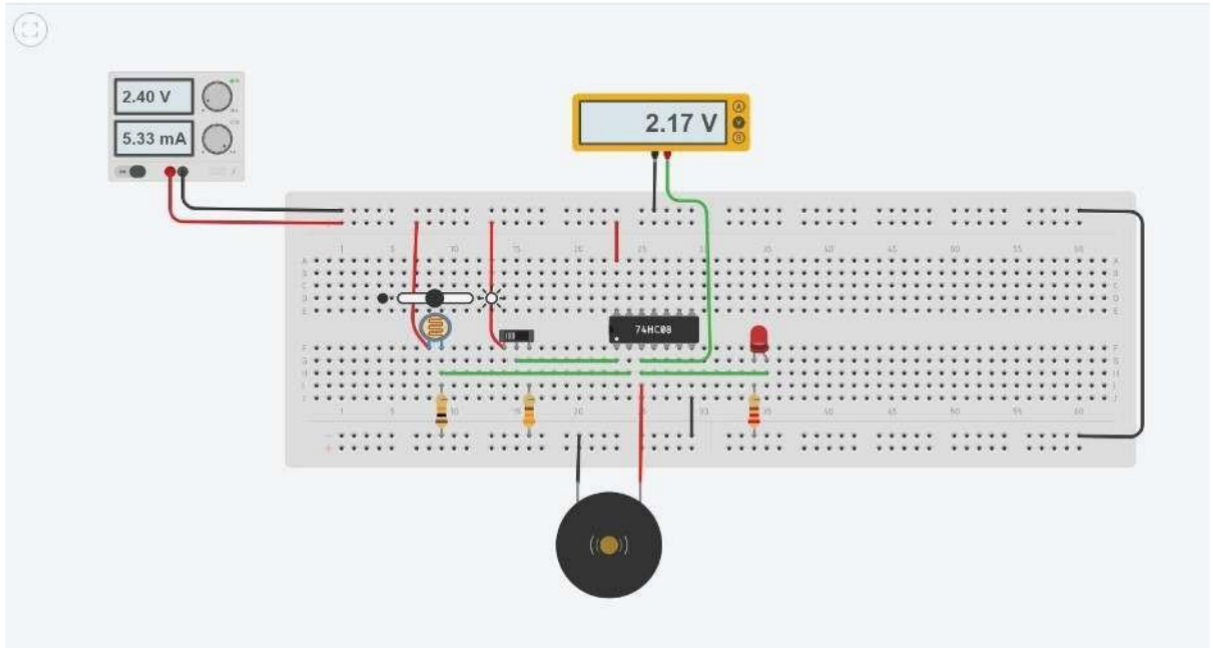
### Simulation Results:

#### Burglar Alarm:

*(When no light is detected by the photoresistor.)*

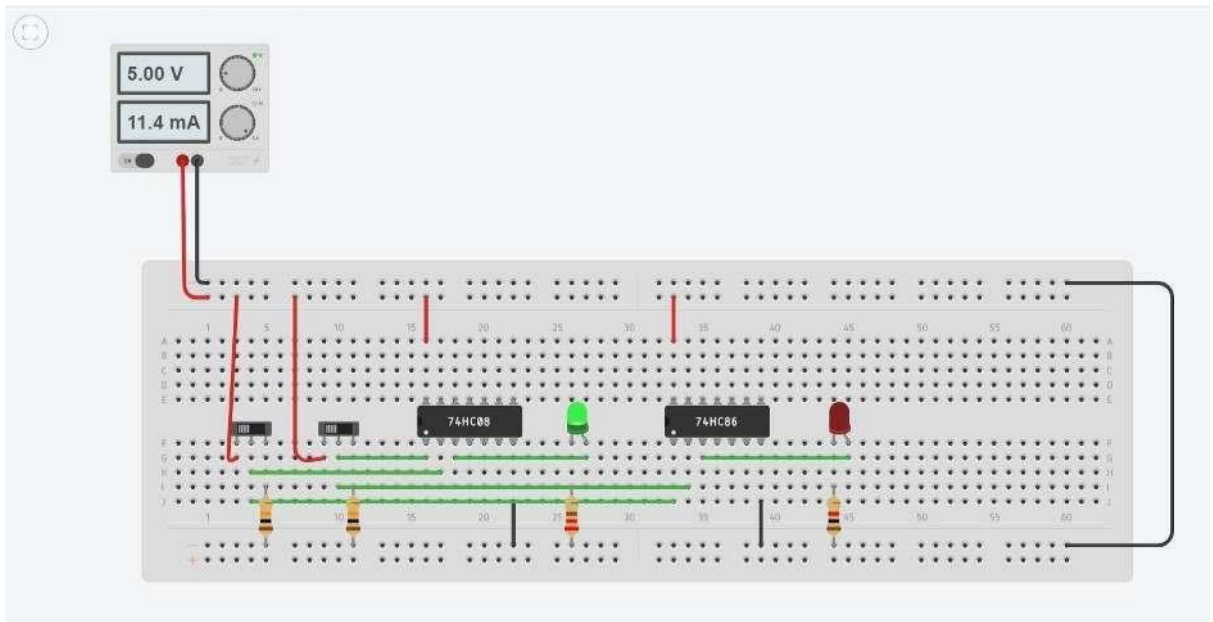


*(When light falls on the photoresistor.)*

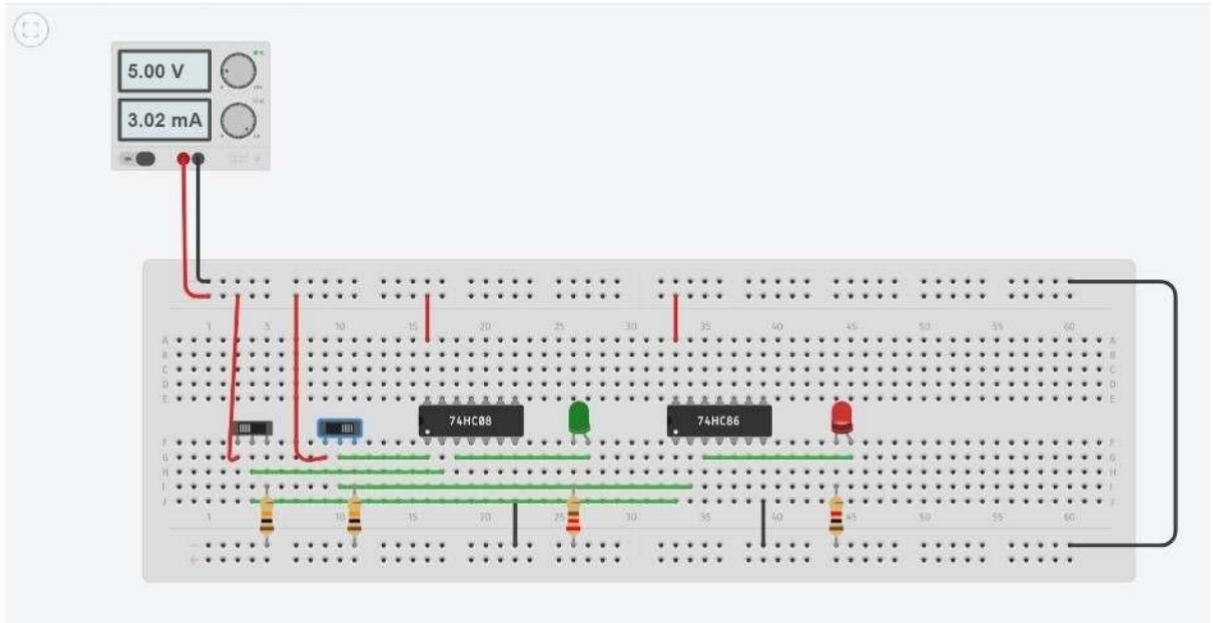


## Voting System:

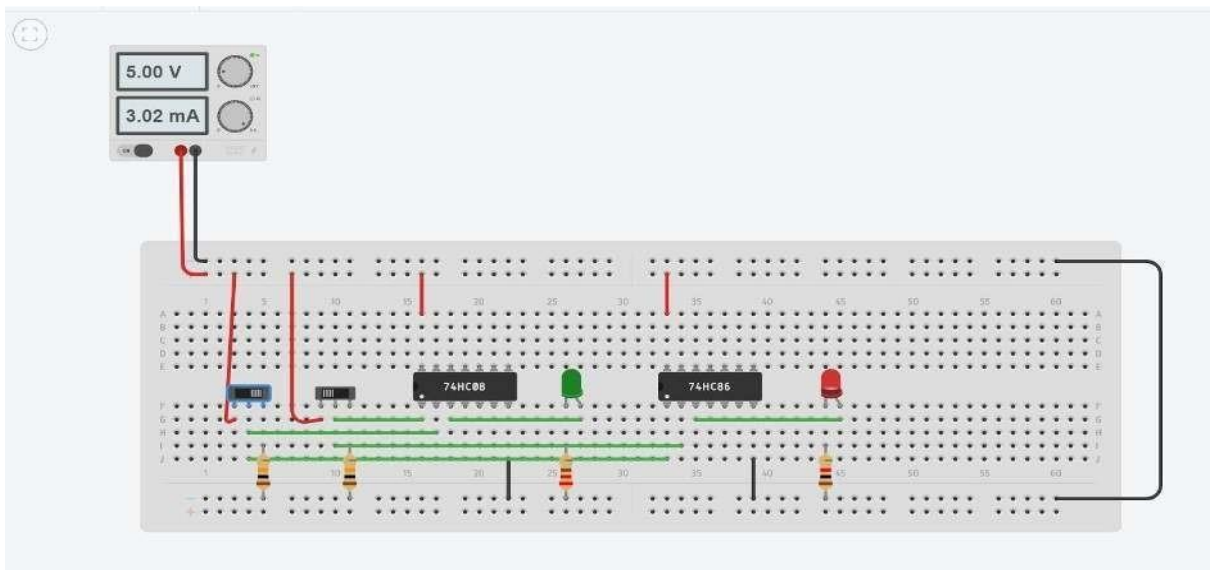
*(When both the buttons are pressed.)*



*(When only the first button is pressed.)*



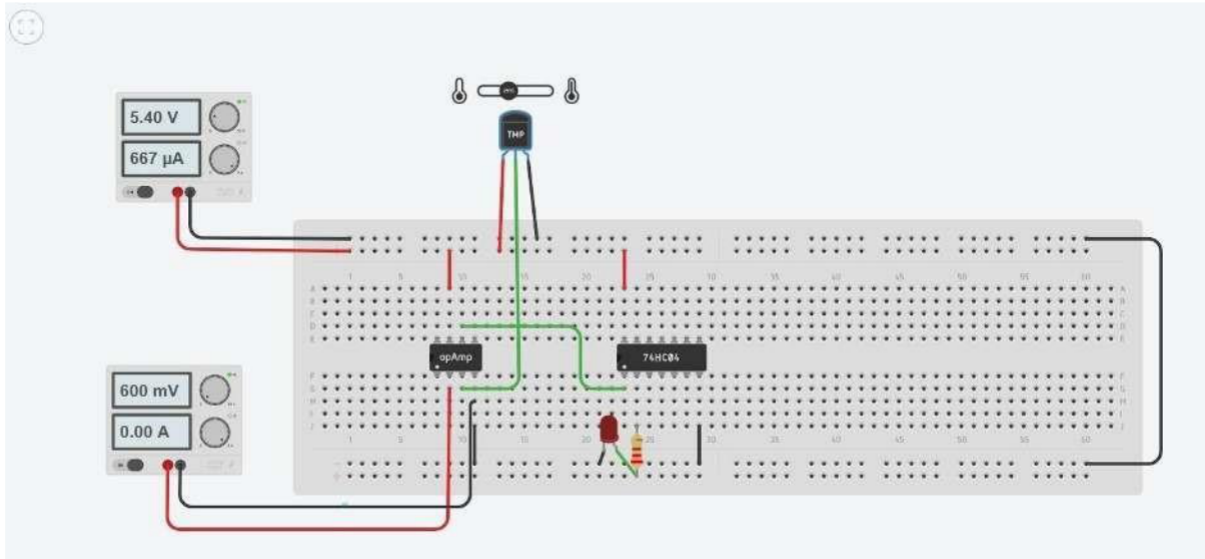
*( When only the second button is pressed.)*



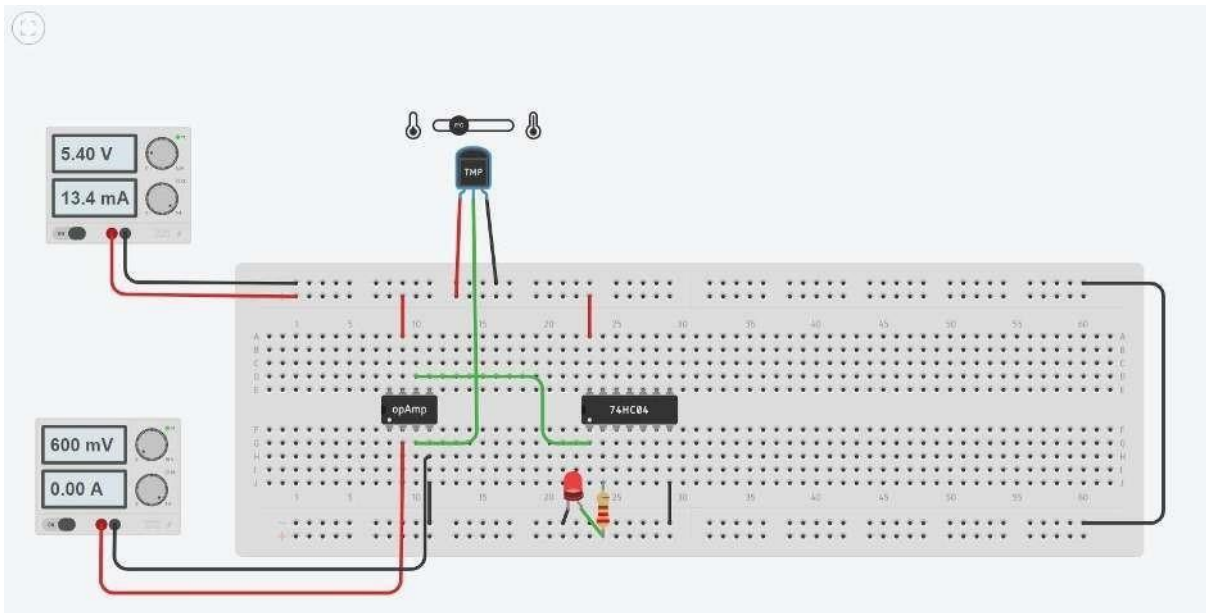
## **Automatic Heat Controller:**

*( When the temperature is above 10°C)*





( When the temperature is above 10 °C )



## **The concept used**

### **For Burglar Alarm:**

AND gate is used in the construction of a burglar alarm as it gives an output when both the inputs are positive. So, we keep a switch in the house which is always on and another input is of LDR sensor as when a burglar's flashlight falls on it will detect it and give the output as positive resulting in the sound of the buzzer.

### **For Voting System:**

Here we use two ICs AND gate and XOR gate as when both the buttons are pressed AND gate gives positive output and the vote is considered but if any one output is negative or 0 the XOR gate gives positive output and vote is considered invalid

### **For Automatic Heat Controller:**

Temperature sensor detects temperature and for any temperature below 10 °C the heater switches ON. An operational Amplifier is also used which compares one analog voltage level with another analog voltage level and produces an output signal based on this voltage comparison.

**Learning/ observation:** We observed the working of a temperature sensor, LDR sensor, operational amplifier, using two ICs in one breadboard for the voting system, and the use of a buzzer.

### **Troubleshooting**

1. Operational Amplifiers can be used as both inverting and noninverting amplifiers. For an automatic heat controller, we have to use it as an inverting amplifier to get the desired output.
2. LM 35 sensor was not available but T MP36 can be used as its substitute.