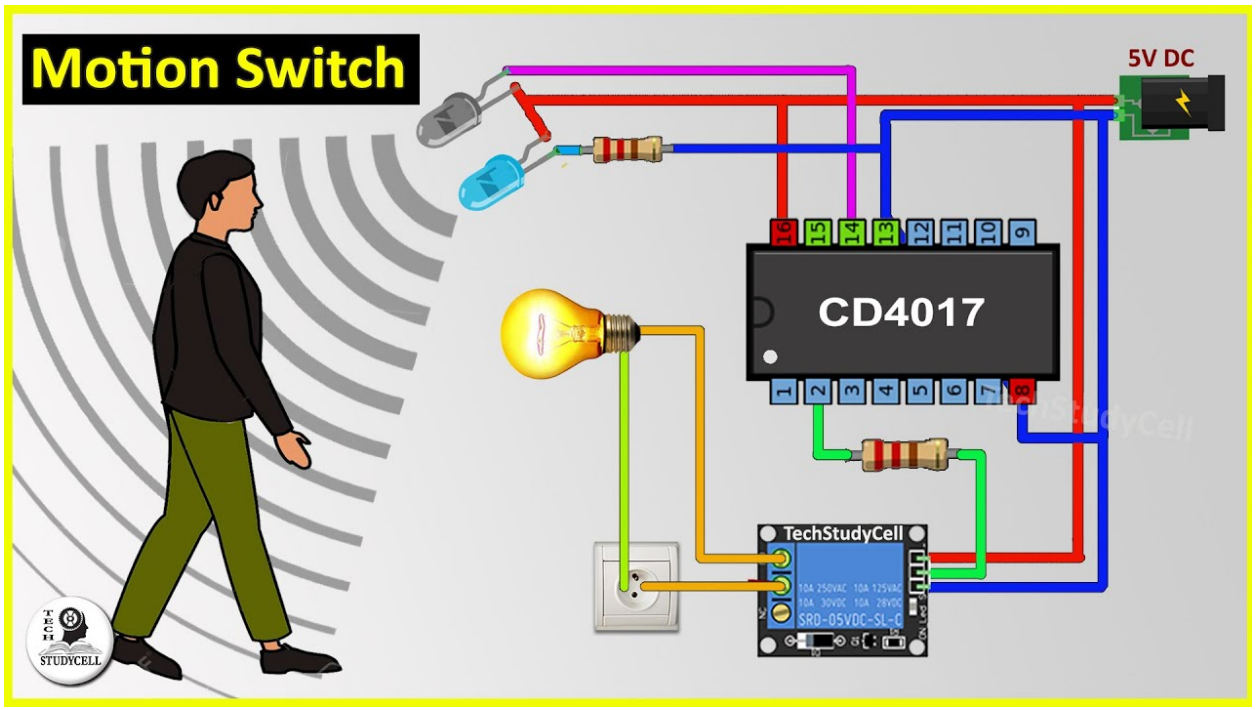
NETWORK THEORY PROJECT



TOPIC: MOTION SENSOR LIGHT SWITCH

Group

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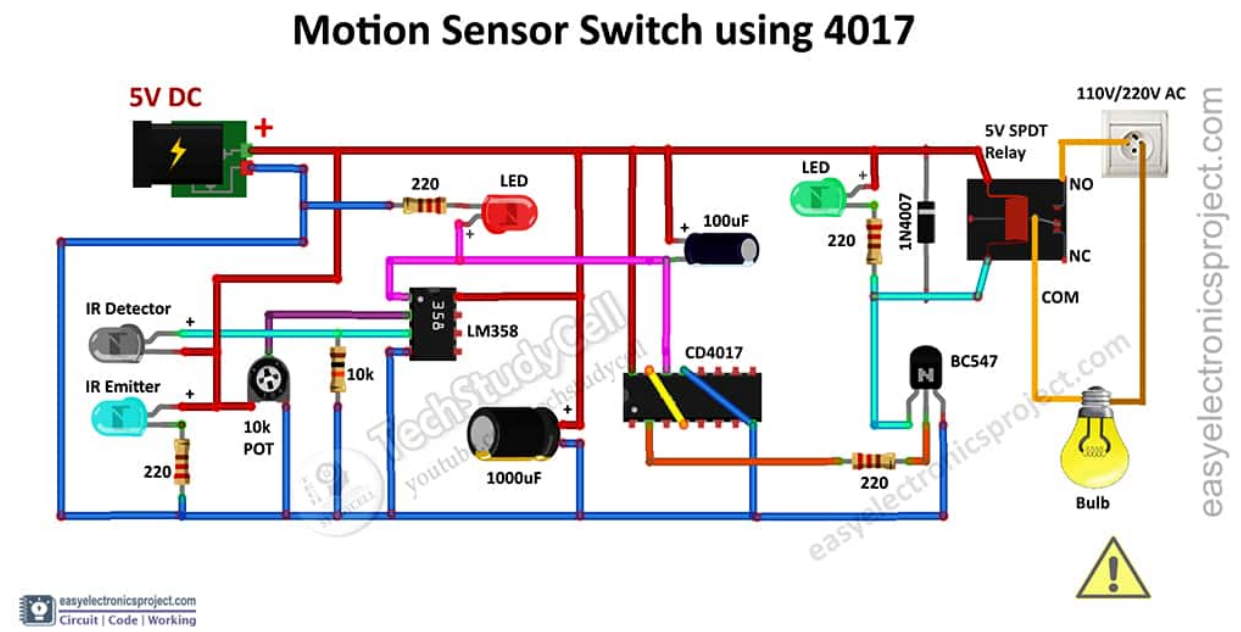
AIM

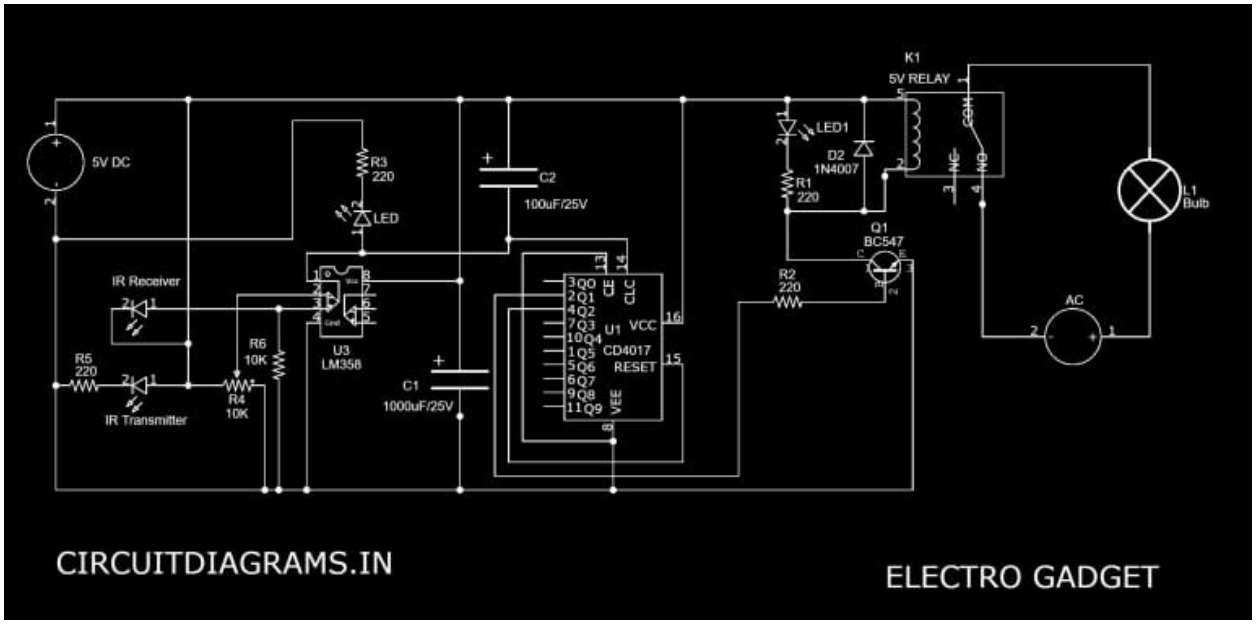
To design a motion sensor light switch using *IR EMITTER RECEIVER* pair as main sensor

APPARATUS

S.NO	EQUIPMENT	SPECIFICATION	QUANTITY
1	IR LED pair (Detector & Emitter)	-	1
2	1N4007 Diode	-	1
3	SPDT Relay	5V	1
4	CD4017 IC	-	1
5	LM358 IC	-	1
6	BC547 Transistor	-	1
7	Capacitor	100uF 25V	1
8	Capacitor	1000uF 25V	1
9	Resistors	220-ohm 0.25watt	4
10	Resistor	10k 0.25watt	1
11	Trimmer	10K	1
12	LED	5MM	2
13	Connectors	-	-
14	Breadboard		
15	Battery	9v	1
16	Connecting wires	-	-

CIRCUIT DIAGRAM





WORKING PRINCIPLE

The working of an IR LED is to emit IR rays continuously. So when an object comes to these rays, some of these will reflect by this object and go back to the IR receiver.

IR Sensor is an electronic device that emits or detects IR radiation to sense the aspects of its background. This consists of an IR LED source that emits the light with the specific IR wavelengths. This particular frequency of the IR beam is received by the detector circuit which also consists of an optical component to focus the infrared radiation and also to limit the spectral response.

The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode . Photodiode is sensitive to IR light of the same wavelength which is emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received

Then LM358 op-amp compares the voltage between the IR receiver and predefined value. If any voltage fluctuation is detected happened by the IR receiver, then the output of LM358 becomes high. The clock pin (pin 14) of 4017 ic is connected with the output pin (pin 1) of LM358 ic.

So the output of the op-amp is then received as an input to the 4017 ic and it changes the current state of the output pin (pin 2).Each time when IR sensor detects an object, it sends the clock pulse to the 4017 decade counter. By that principle, 4017 ic is set to ON state and after receiving another clock pulse it goes back to the previous state (OFF state).

The output of the 4017 decade counter is connected with the base of the BC547 NPN Transistor. The transistor acts as a switch, so the transistor then becomes high.

After that, the current can flow through the 5V relay and that’s how the circuit will turn on the connected load.

At the same process, when the IR receiver detects the second clock pulse, it becomes low. Thereafter the load connected with the 5V relay will turn off.

APPLICATIONS OF MOTION SENSOR LIGHT SWITCH

1.Mostly uses in washroom lights to switch on and off.

2.It is also can use in home appliances like AC, fan etc to reduce electricity bill.

Milestones

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