**overview**

Automatic Room Lights System using Arduino is a very useful project as you need not worry about turning on and off the switches every time you want to turn on the lights. The main components of the Automatic Room Lights project are Arduino, PIR Sensor and the Relay Module.

Out of the three components, the PIR Sensor is the one in focus as it is the main device that helps in detecting humans and human motion.

In fact, the Automatic Room Lights project can be considered as one major application of the PIR Sensor. A similar concept is being already implemented in automatic toilet flush valves, hand dryers, etc.

If you do not have a relay module, you can make one yourself using very simple hardware. The following circuit diagram shows the project being implemented with the help of discrete components for the Relay Module.

**CAUTION**: The project involves connection with 230V AC Mains (or 110V, depending on where you live!!!). Be extremely careful when connecting the bulb and Relay to mains supply. If you are unfamiliar with the connections, I strongly recommend having an adult supervision (or an expert supervision).

**Components Required for Automatic Room Lights using Arduino**

* Arduino UNO
* PIR Sensor
* 5V Relay Module (Relay Board)
* LED
* 100Ω Resistor (1/4 Watt)
* Connecting Wires
* Breadboard
* Power Supply

If you do not have a Relay Module, use the following components:

* 5V Relay
* 2N2222 (or BC547) NPN Transistor
* 1N4007 PN Junction Diode
* 1KΩ Resistor (1/4 Watt)

### Working of the Project

The Automatic Room Lights using Arduino and PIR Sensor is a simple project, where the lights in the room will automatically turn on upon detecting a human motion and stay turned on until the person has left or there is no motion.

Working of this project is very simple and is explained here.

Initially, when there is no human movement, the PIR Sensor doesn’t detect any person and its OUT pin stays LOW. As the person enters the room, the change in infrared radiation in the room is detected by the PIR Sensor.

As a result, the output of the PIR Sensor becomes HIGH. Since the Data OUT of the PIR Sensor is connected to Digital Pin 8 of Arduino, whenever it becomes HIGH, Arduino will activate the relay by making the relay pin LOW (as the relay module is an active LOW module).

This will turn the Light ON. The light stays turned ON as long as there is movement in front of the sensor.

If the person takes a nap or leaves the room, the IR Radiation will become stable (there will be no change) and hence, the Data OUT of the PIR Sensor will become LOW. This in turn will make the Arduino to turn OFF the relay (make the relay pin HIGH) and the room light will be turned OFF.

**Applications**

I’ve already mentioned a few applications of the Automatic Room Lights concept. Some of them are:

* Garage Lights
* Bathroom Lights
* Hand Dryers
* Toilet Flushers
* Security Lights
* Precaution
* Don't EVER hook a motor (or other inductive loads like a relay) up to it directly.
* Don't plug in an LED without a current limiting resistor.
* Don't supply it with more then 9V unless you know what Thermal Resistance and Power Dissipation mean.
* Get some inline fuses if you're plugging it into unknown circuits.