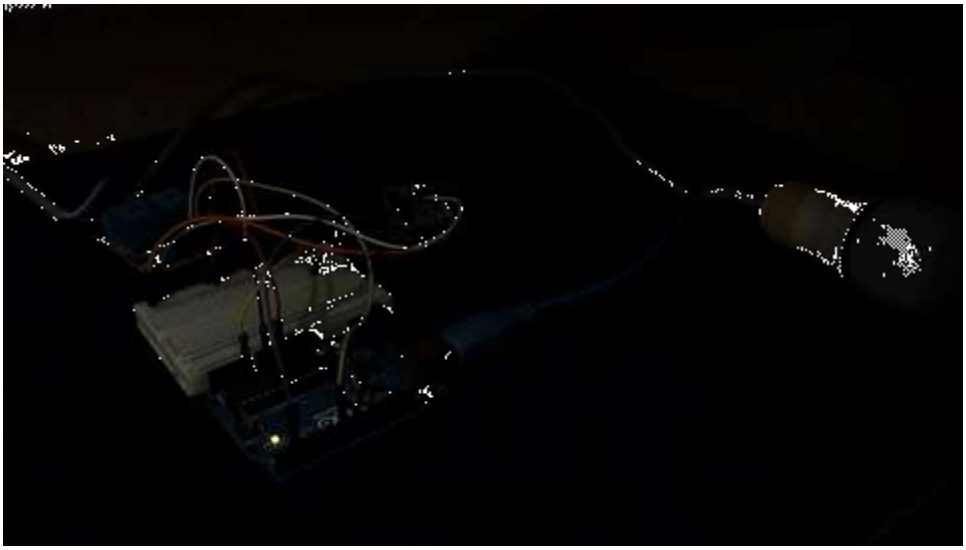
Build a Night Security Light with Arduino

In this project you're going to build a night security light with a relay module, a photoresistor and an Arduino.



A night security light only turns on when it's dark and when movement is detected.

Here's the main features of this project:

- the lamp turns on when it's dark AND movement is detected;
- when movement is detected the lamp stays on for 10 seconds;
- when the lamp is ON and detects movement, it starts counting 10 seconds again;
- when there's light, the lamp is turned off, even when motion is detected.

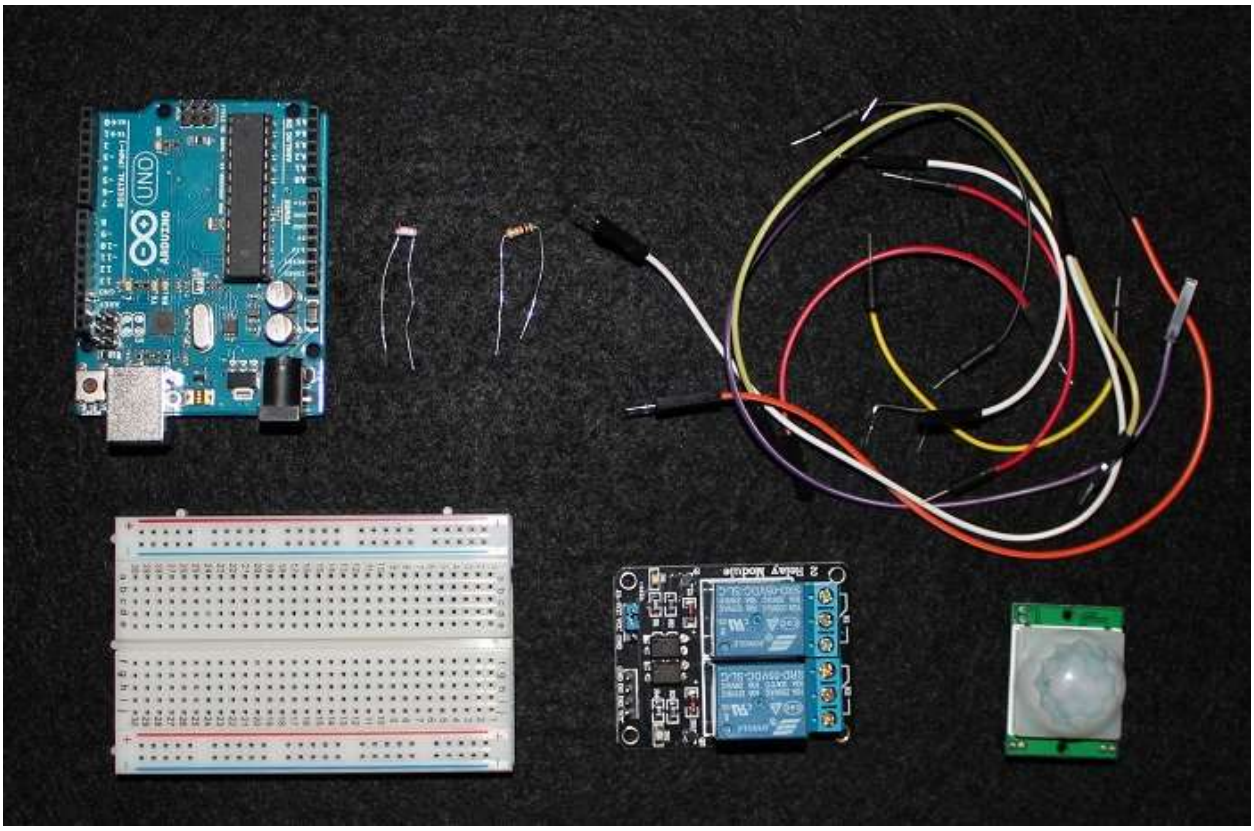
Recommended resources

The following resources include guides on how to use the relay module and the PIR motion sensor with the Arduino, which might be useful for this project.

- Guide for Relay Module with Arduino
- Arduino with PIR Motion Sensor

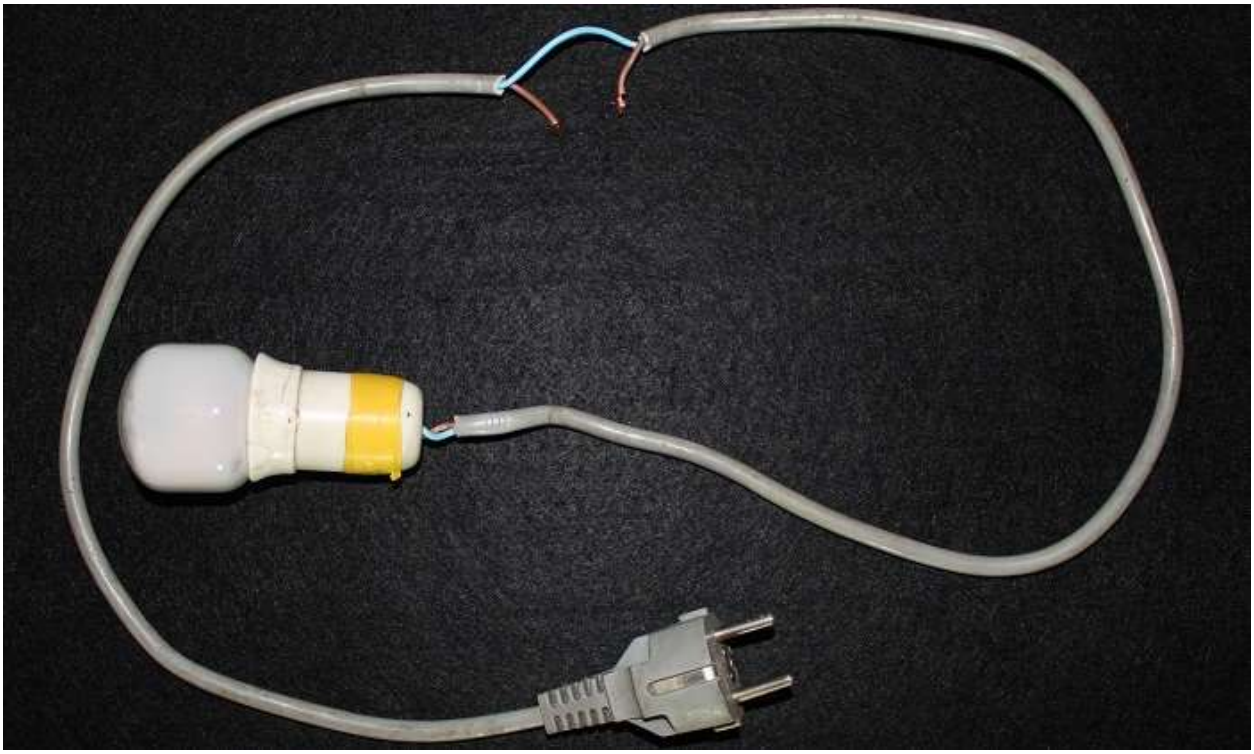
Parts required

Here's a complete list of the parts required for this project:



- Arduino UNO – read Best Arduino Starter Kits
- PIR Motion Sensor
- Photoresistor
- 10kOhm resistor
- Relay module
- Lamp cord set (view on eBay)
- Breadboard
- Jumper wires

Besides these electronics components, you also need an AC male socket, an AC wire and a lamp bulb holder (a lamp cord set). My lamp cord set is the one in the figure below.



You can use the preceding links or go directly to MakerAdvisor.com/tools to find all the parts for your projects at the best price!

Code

Download or copy the following code to your Arduino IDE, and upload it to your Arduino board.

Warning: do not upload a new code to your Arduino board while your lamp is connected to the mains voltage. You should unplug the lamp from mains voltage, before upload a new sketch to your Arduino.

```
/*

 * Rui Santos

 * Complete Project Details https://randomnerdtutorials.com

 */
```

```
// Relay pin is controlled with D8. The active wire is connected to Normally Closed and common

int relay = 8;

volatile byte relayState = LOW;



// PIR Motion Sensor is connected to D2.

int PIRInterrupt = 2;



// LDR pin is connected to Analog 0

int LDRPin = A0;

// LDR value is stored on LDR reading

int LDRReading;

// LDR Threshold value

int LDRThreshold = 300;



// Timer Variables

long lastDebounceTime = 0;

long debounceDelay = 10000;



void setup() {

  // Pin for relay module set as output

  pinMode(relay, OUTPUT);

  digitalWrite(relay, HIGH);

  // PIR motion sensor set as an input

  pinMode(PIRInterrupt, INPUT);
```

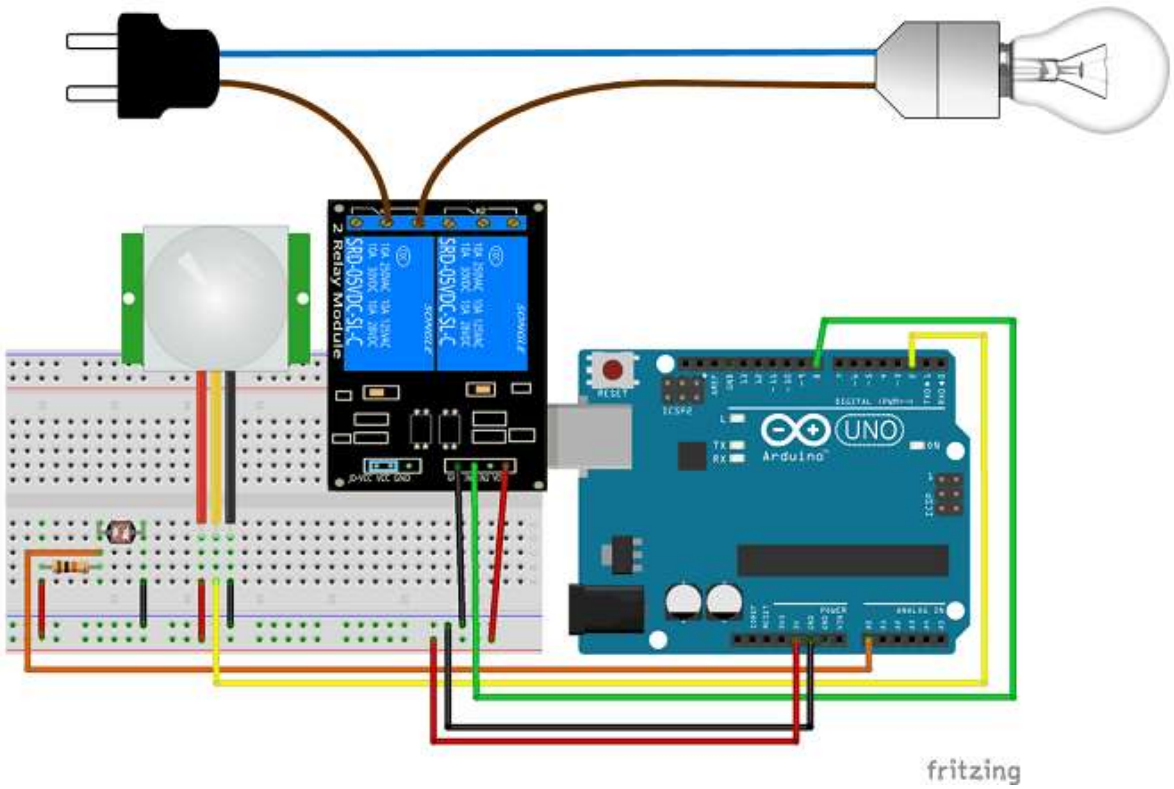
```
  // Triggers detectMotion function on rising mode to turn the relay on, if
the condition is met

  attachInterrupt(digitalPinToInterrupt(PIRInterrupt), detectMotion, RISING);

  // Serial communication for debugging purposes

  Serial.begin(9600);

}



void loop() {

  // If 10 seconds have passed, the relay is turned off

  if((millis() - lastDebounceTime) > debounceDelay && relayState == HIGH){

    digitalWrite(relay, HIGH);

    relayState = LOW;

    Serial.println("OFF");

  }

  delay(50);

}



void detectMotion() {

  Serial.println("Motion");

  LDRReading = analogRead(LDRPin);

  // LDR Reading value is printed on serial monitor, useful to get your
LDRThreshold

  //Serial.println(LDRReading);

  // Only turns the Relay on if the LDR reading is higher than the
LDRThreshold

  if(LDRReading > LDRThreshold){
```

```
    if(relayState == LOW){

      digitalWrite(relay, LOW);

    }

    relayState = HIGH;

    Serial.println("ON");

    lastDebounceTime = millis();

  }

}
```

View raw code

Schematics

Here's the schematics for this project.



Note: if you have an earth (GND) connection in the mains voltage cable – a yellow and green cable – it should go outside the relay module, like the blue wire (neutral).

Demonstration

Here's your circuit in action:

Wrapping up

In this project you've built a night security light with a photoresistor and a PIR motion sensor.

This is a great project to practice with relays and with the PIR motion sensor.

If you like Arduino projects, make sure you check our latest Arduino course: **Arduino Step-by-step Projects – Build 25 Projects**

Thanks for reading,

Sara Santos