PHOTOCELL PROJECT

IDEA

I was looking for an idea that would make a person more aware of the amount of electricity they could be saving. When a house is empty, usually there is a light on somewhere that the owner doesn’t know it is on. My project would make a person aware of which lights are on around the house so they could be turned off before leaving.

DESIGN

When I first started to design my circuitry, a tried to use an op amp as a comparator to read my photocell resistance in one input. I would compare this to a voltage source connected to a set of precise resistances. If the light hits the photocell resistor it would make the resistance smaller causing a greater voltage value into the positive input of the op amp. I found this to be difficult because the light that hit the sensor during the daytime would be different depending on where the sensor was located. So I did not use this method.

The design I ended up going with is a single input where the voltage source runs through the photocell and another resistor to a ground. To cut out the problem of the room lighting, I simply covered the sensor with a black tube to block out surrounding light. The light would have to shine directly into the tube for the photocell to work properly. I then connected the input wire between the resistors and ran it to an analog input pin (#2) on the arduino board. (Diagram below)
Once I completed the input portion of my design, I then had to design the LED breadboard. This consists of 4 LED that are use to show whether the photocell was working properly. This didn’t take much. All I needed was voltage coming from the output pin of the Arduino Board running through a resistor to my LED and then being grounded out. (Picture below)

**PROGRAMMING**

The programming basically works like this. I have to write the code so that when my Analog Input Pin #2 is reading Voltage, then it will turn Digital Output Pin #10 on. If I want to run multiple sensors and output LED’s, I hook each sensor to a different Analog Input Pins (#3,4,5) and each LED to different Digital Output Pins (#11,12,13). Using code, I link Analog Input Pin #3 to Digital Output Pin #11, #4 to #12, and #5 to #13. If one of the Photocells senses light, the corresponding LED will turn on. (For Arduino Code used please see appendix)

**PROJECT PHOTOS**
APPENDIX

ARDUINO PROGRAM CODE
int photo1Pin = 2; // select the input pin for the photocell
int led1Pin = 10; // select the pin for the LED
int led2Pin = 11; // select the pin for the LED
int led3Pin = 12; // select the pin for the LED
int led4Pin = 13; // select the pin for the LED
int val = 0; // variable to store the value coming from the sensor

void setup()
{
  pinMode(led1Pin, OUTPUT); // declare the led1Pin as an OUTPUT
  pinMode(led2Pin, OUTPUT); // declare the led2Pin as an OUTPUT
  pinMode(led3Pin, OUTPUT); // declare the led3Pin as an OUTPUT
  pinMode(led4Pin, OUTPUT); // declare the led4Pin as an OUTPUT
}

void loop()
{
  val = analogRead(photo1Pin); // read the value from the sensor

  if (val > 60)
  {
    digitalWrite(led1Pin, HIGH);
  }
  else
  {
    digitalWrite(led1Pin, LOW);
  }

  if (val > 60)
  {
    digitalWrite(led2Pin, HIGH);
  }
  else
  {
    digitalWrite(led2Pin, LOW);
  }

  if (val > 60)
  {
    digitalWrite(led3Pin, HIGH);
  }
  else
{  
digitalWrite(led3Pin, LOW); 
}

if (val > 60)
{
  digitalWrite(led4Pin, HIGH);
}
else
{
  digitalWrite(led4Pin, LOW);
}