DIY PROJECT

FINAL PRESENTATION

TOPIC - Automatic room lights using Arduino and PIR sensor.

TEAM - 2

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INTRODUCTION

In this project, we will see the Automatic Room Lights using Arduino and PIR Sensor, where the lights in the room will automatically turn ON and OFF by detecting the presence of a human.

Such Automatic Room Lights can be implemented in your garages, staircases, bathrooms, etc. where we do not need continuous light but only when we are present.

Also, with the help of an automatic room light control system, we need not worry about electricity as the lights get automatically off when there is no person.

So, in this DIY project, we have implemented Automatic Room Lights using Arduino and PIR Sensor.

WORK PROGRESS IN WEEKS

- WEEK 1 – Project discussion.
  Order of required items.
- WEEK 2 – Assembling all required items.
  Work distribution.
- WEEK 3 – Circuit connection.
  Code writing in Arduino.
- WEEK 4 – Compilation and finalization of project.

COMPONENTS REQUIRED

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

ARDUINO UNO

Arduino uno is a microcontroller board based on the microchip AT mega 328P. It helps in doing specific function in a system. It consist of sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.

PIR SENSOR

A **passive infrared sensor** (**PIR sensor**) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. It detects general movement, but do not give information on who or what moved. PIR devices do not radiate energy for detection purposes. They work entirely by detecting infrared radiation (radiant heat) emitted by or reflected from objects.

RELAY MODULE

A Relay Module is a very useful component as it allows Arduino, Raspberry Pi or other Microcontrollers to control big electrical loads. We have used a 2-channel Relay Module in this project but used only one relay in it. In order to control a single relay on the board, we need to use three pins of the relay module: VCC, GND and IN1.

LED(LIGHT EMITTING DIODE)

It is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

RESISTOR

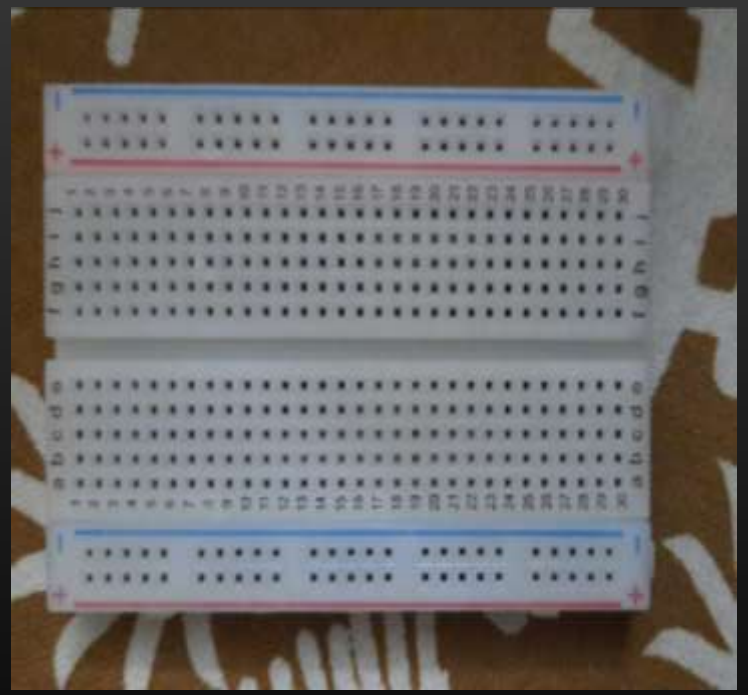
This are 100 ohm (1/4 watt) Carbon Composition resistor. The value of this resistor is found by the colour code on its structure. Carbon composition resistors (CCR) consist of a solid cylindrical resistive element with embedded wire leads or metal end caps to which the lead wires are attached. The body of the resistor is protected with paint or plastic. The resistive element is made from a mixture of finely powdered carbon and an insulating material, usually ceramic. A resin holds the mixture together. The resistance is determined by the ratio of the fill material (the powdered ceramic) to the carbon. Higher concentrations of carbon, which is a good conductor, result in lower resistance.

CONNECTING WIRE

These are the wires that helps us to connect the various circuit parts. Here we are using the jumper wires. It is of two type Male jumper wire and Female jumper wire. It is used in connection from breadboard to breadboard.

BREADBOARD

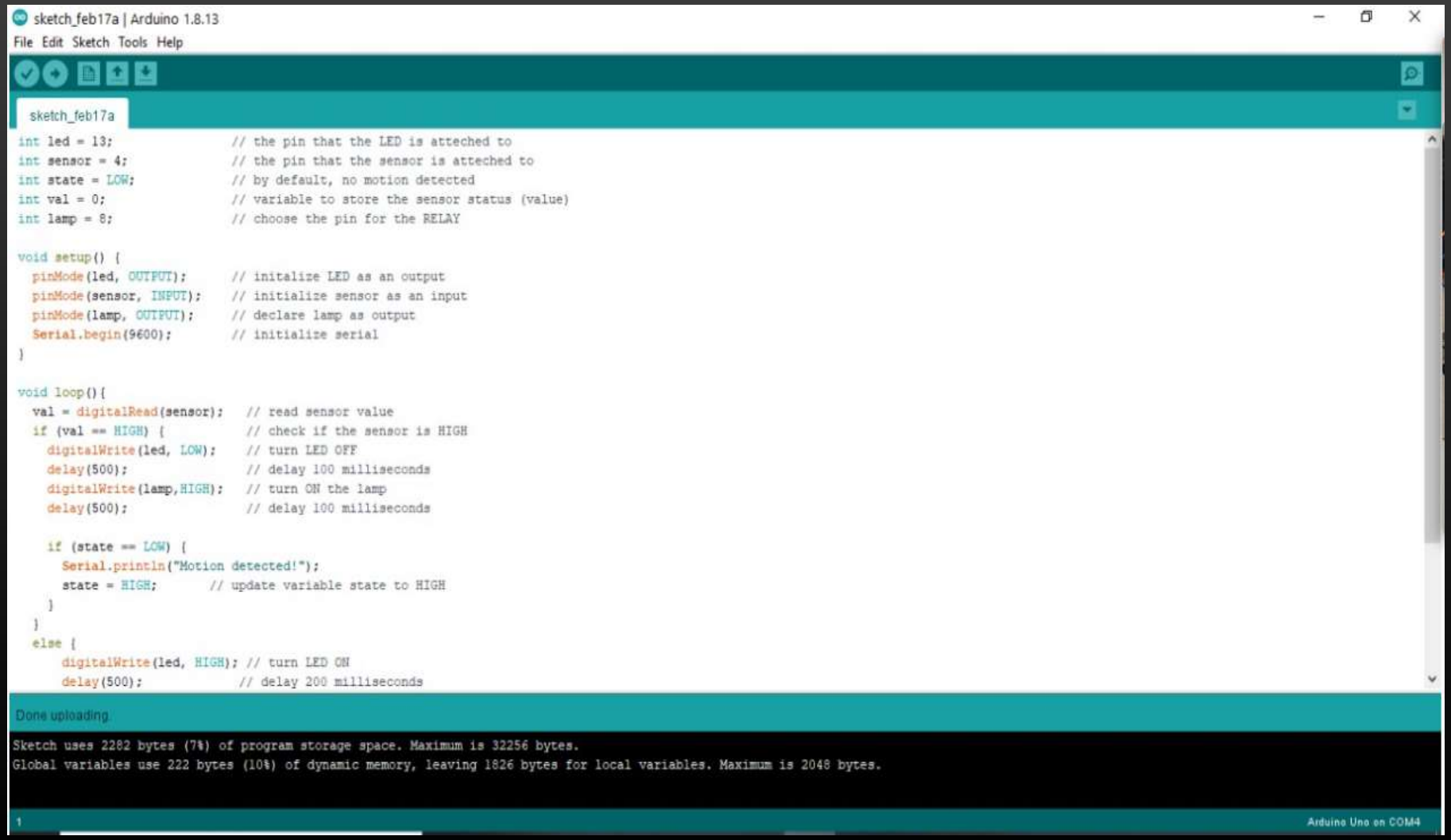
Breadboard is required in the project to join the various circuit component. It commonly used in the prototyping of the electronic circuit.

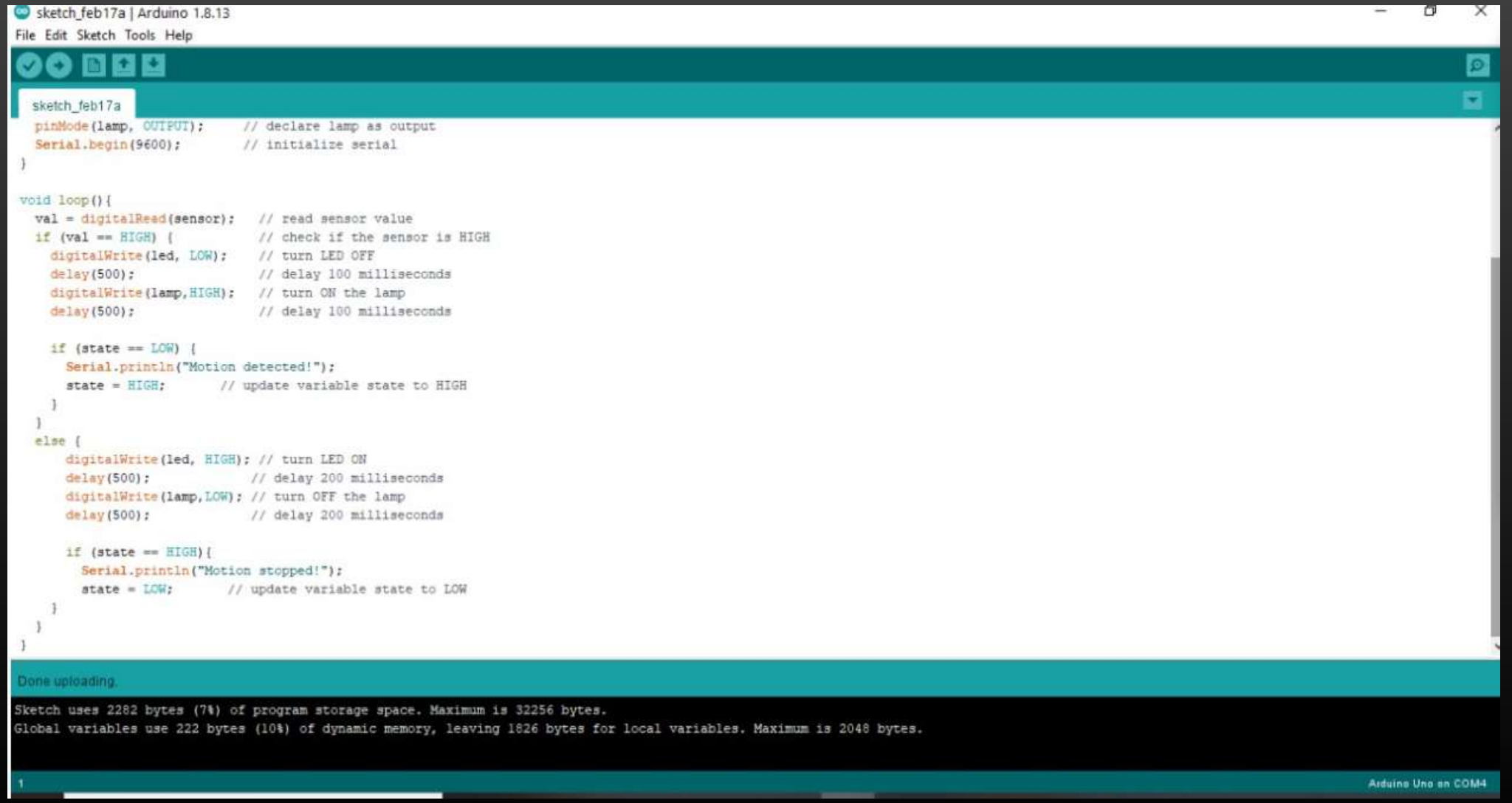


COMPUTER FOR SOFTWARE

To write the code in Arduino IDE and execution we need a computer. We need to connect it with USB cable to the ARDUINO UNO board. And when we want to run the system we need to run it from the computer

CODE IN ARDUINO IDE




sketch_feb17a | Arduino 1.8.13
File Edit Sketch Tools Help
sketch_feb17a
pinMode(lamp, OUTPUT); // declare lamp as output
Serial.begin(9600); // initialize serial
}
void loop(){
val = digitalRead(sensor); // read sensor value
if (val == HIGH) { // check if the sensor is HIGH
digitalWrite(led, LOW); // turn LED OFF
delay(500); // delay 100 milliseconds
digitalWrite(lamp,HIGH); // turn ON the lamp
delay(500); // delay 100 milliseconds
if (state == LOW) {
Serial.println("Motion detected!");
state = HIGH; // update variable state to HIGH
}
}
else {
digitalWrite(led, HIGH); // turn LED ON
delay(500); // delay 200 milliseconds
digitalWrite(lamp,LOW); // turn OFF the lamp
delay(500); // delay 200 milliseconds
if (state == HIGH){
Serial.println("Motion stopped!");
state = LOW; // update variable state to LOW
}
}
}
Done uploading.
Sketch uses 2282 bytes (7%) of program storage space. Maximum is 32256 bytes.
Global variables use 222 bytes (10%) of dynamic memory, leaving 1826 bytes for local variables. Maximum is 2048 bytes.
1
Arduino Uno on COM4

VIDEO LINKS

1. https://youtu.be/XaQAFDfq350 (Working in real life situation)

2. https://youtu.be/mvZZpEDTzbE (Testing of PIR sensor)

3. https://youtu.be/zGxaDpcC33k (Circuit assembly)

4. https://youtu.be/Gm1s6FwHV3Y (Working principle)

ADVANTAGES OF THE PROJECT

This automatic room light project is itself a revolutionary in the modern era. As we are driven towards the more energy consuming society, it will help us in reducing unnecessary energy consumption. It will spent only required amount of energy. And so on this system will reduce the pollution, as much of the electricities are produced from coal which causes a lot of pollution. It helps in sustainable development and achieving future goals of the nation. It is very much useful in the smart city project of the Govt. of India.

CHALLENGES DURING PROJECT MAKING

During making of this projects we have confronted with many difficulties.

We were unable to deal with the software part of the project. We faced a lot of problem in writing code for the Arduino IDE.

We were unable to get some of the circuit components for the project.

Connection problem of circuit.

Problems in coordination with each team member. As we all live in different places.

WHAT DO WE LEARN FROM THE PROJECT?

From the project we have learned a lot of things

We learnt about the Arduino uno board, breadboard, relay module, PIR sensor etc. This things were completely new for us but we learned a lot of these things in this project.

We learnt about the Arduino IDE writing code

We learnt about the various sources and project development in this field. Various better technologies to be implemented to reduce the use of such smart equipments.

We have studied the various sustainable development project initially to come up with such an idea to make our project a small contribution to better environment.

PROJECT DISTRIBUTION

PARTH PATHADIA – Hardware Compilation.

TANISHQ –Code Writing.

ARNAB KR. BORAH – Hardware Assembly , Project Report and Presentation.

GEREMSA MUCHAHARY -Code Writing , Presentation and Project Report.

BIBLIOGRAPHY

- Wikipedia
- Youtube
- howtomechatronics.com
- electronicshub.org

THANK YOU