

Project Title: HOME AUTOMATION SYSTEM

Microprocessor and Computer Architecture Project

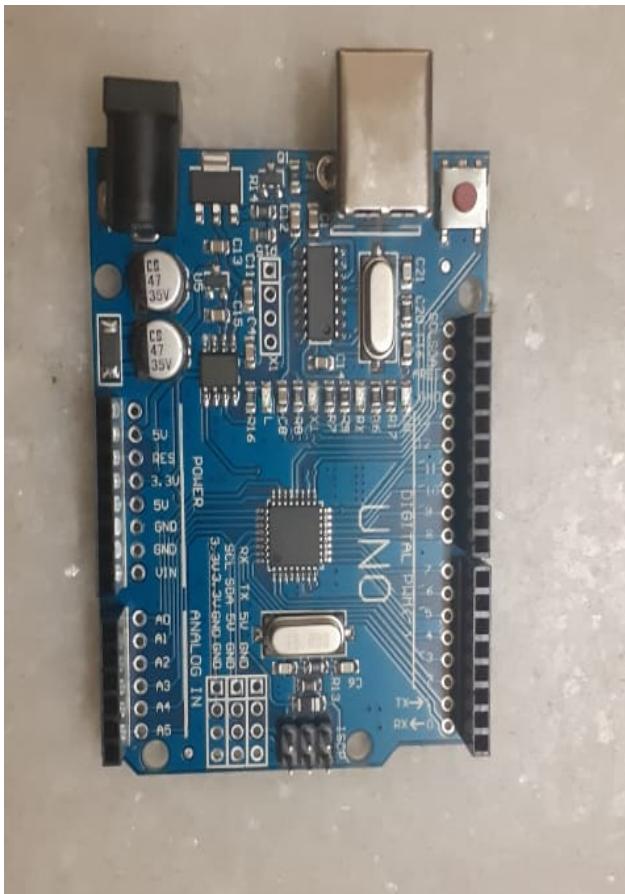
4rd Semester, Jan – May 2023

Title of Project: HOME AUTOMATION SYSTEM					
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Provide the following information

- I. Arduino Board
- II. Sensors used in Project
- III. Connections
- IV. Output

I. Arduino UNO:



The Arduino Uno is an open-source microcontroller board developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output (I/O) pins. The board has 14 digital I/O pins, 6 analog I/O pins, and is programmable

with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts.

The Uno board was the successor of the Duemilanove release and was the 9th version in a series of USB-based Arduino boards.

II. SENSORS USED IN THE PROJECT:

a. Ultrasonic



An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear).

b. PIR



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.

c. LDR



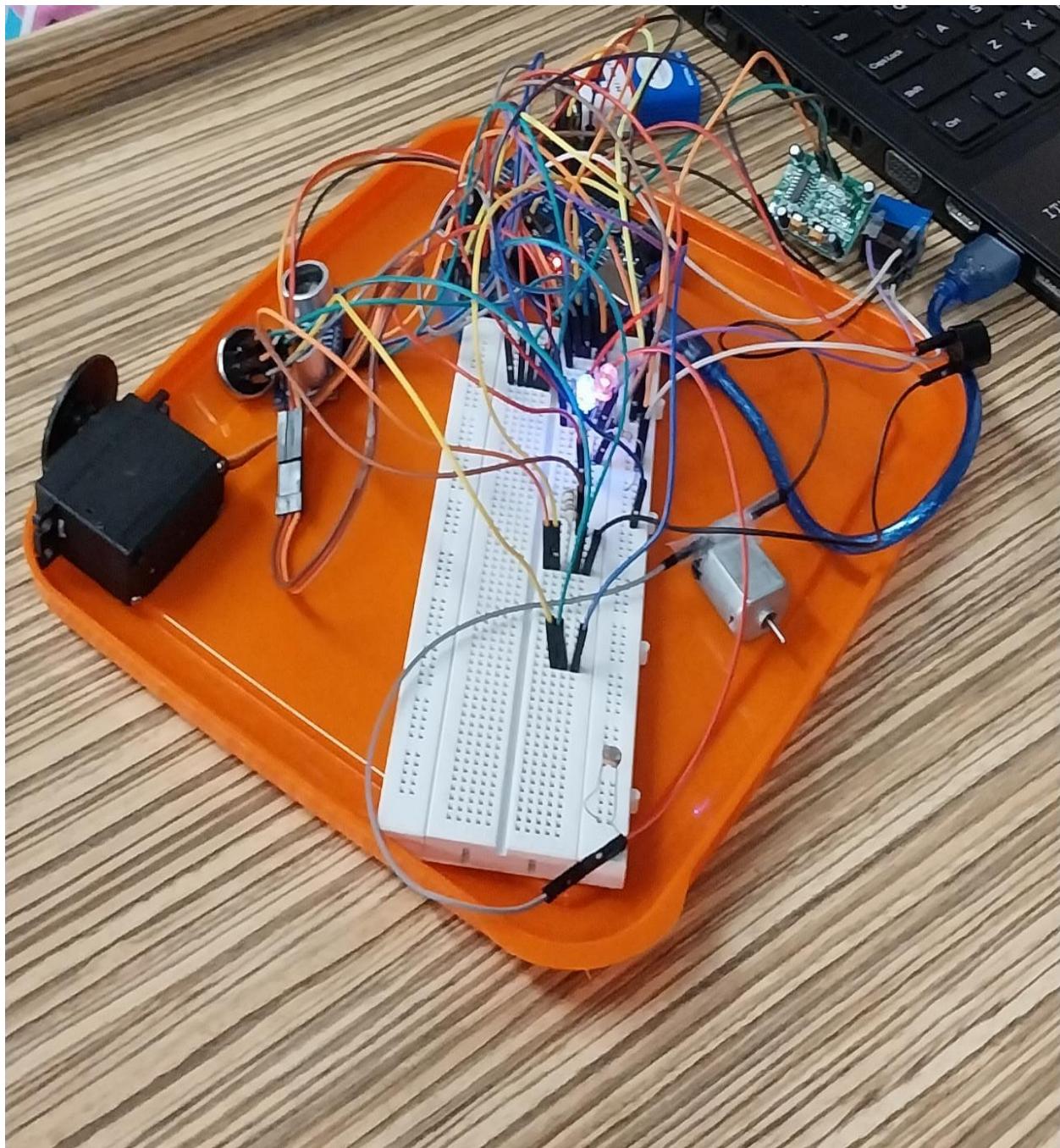
Photoresistors, also known as light dependent resistors (LDR), are light sensitive devices most often used to indicate the presence or absence of light, or to measure the light intensity. In the dark, their resistance is very high but when the LDR sensor is exposed to light, the resistance drops dramatically.

d. Gas sensor

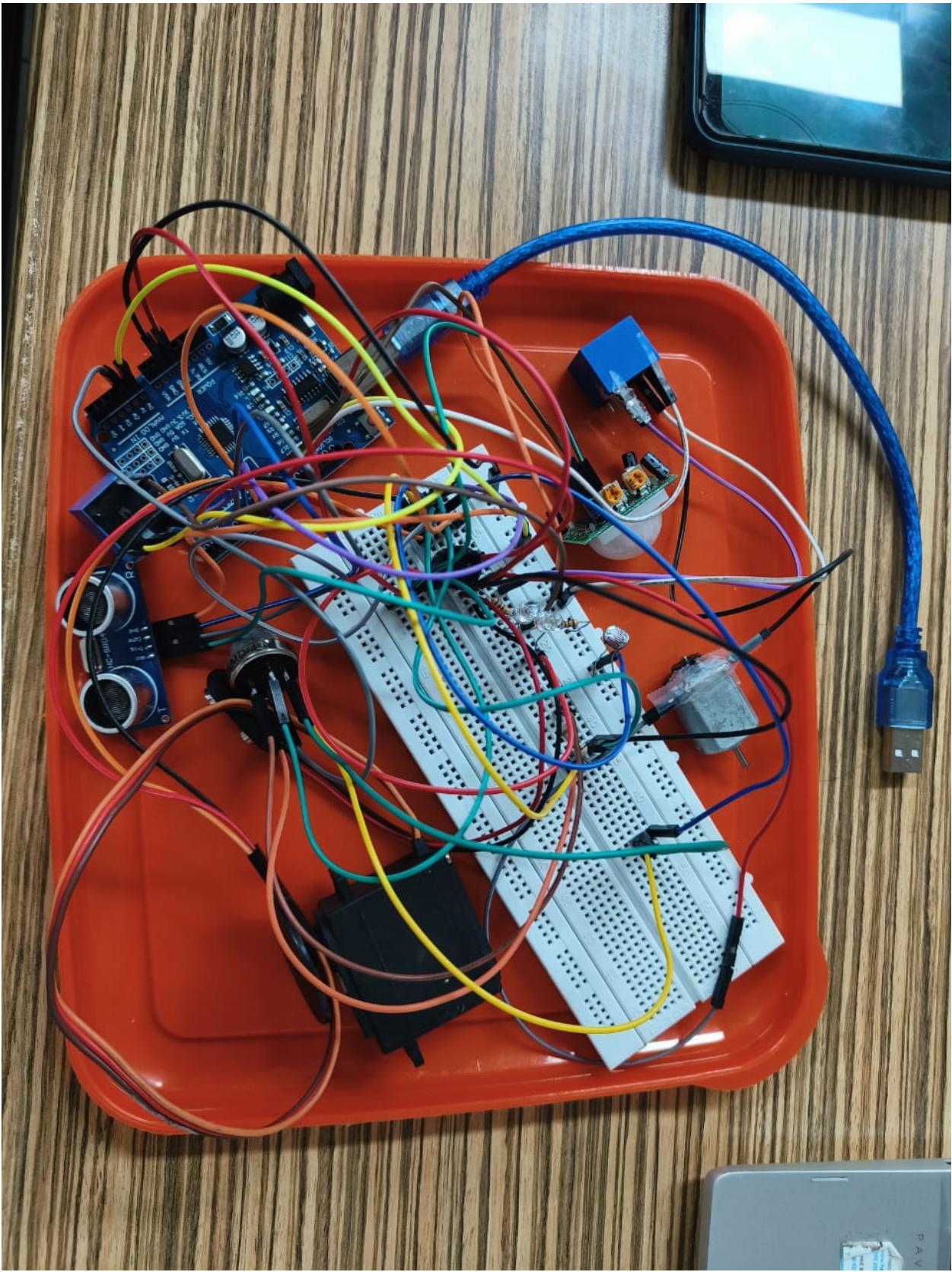


Gas sensors (also known as gas detectors) are electronic devices that detect and identify different types of gasses. They are commonly used to detect toxic or explosive gasses and measure gas concentration. Gas sensors are employed in factories and manufacturing facilities to identify gas leaks, and to detect smoke and carbon monoxide in homes.

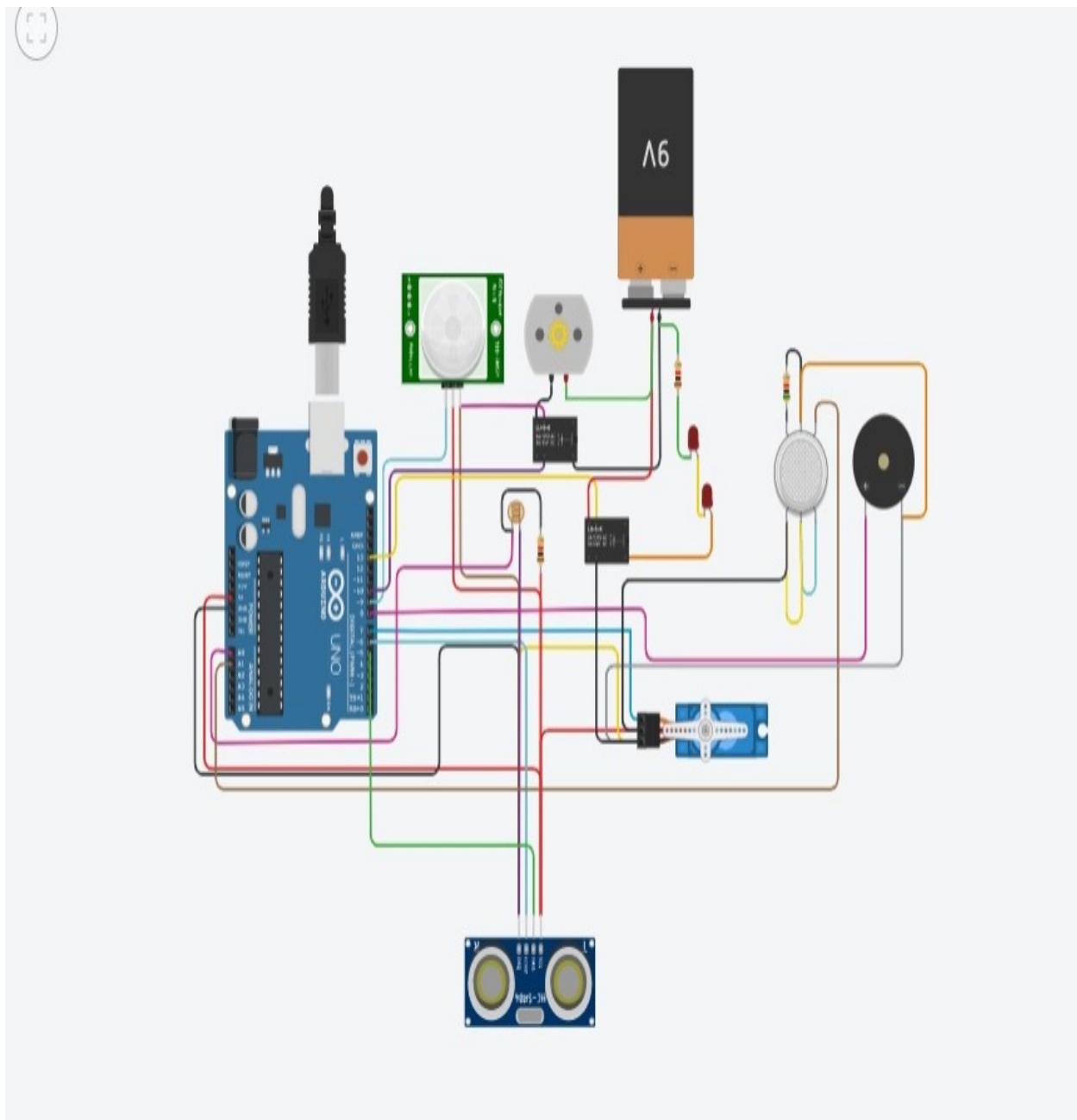
III. CONNECTIONS:



Project Title: _____ HOME AUTOMATION SYSTEM _____



Project Title: _____ HOME AUTOMATION SYSTEM _____



Project Title: HOME AUTOMATION SYSTEM

IV. OUTPUT:

The screenshot shows the Arduino IDE interface with the following details:

- File Menu:** File, Edit, Sketch, Tools, Help.
- Sketch Selection:** Arduino Uno.
- Code Area (Sweep.ino):**

```
101 //-----  
102 | | //----- servo motor -----//  
103 //-----  
104  
105 sen1Value = 0.01723 * readUltrasonicDistance(5, 6);  
106  
107 if (sen1Value < 100)  
108 {  
109     servo_7.write(90);  
110     Serial.print("    || Door Open! ; Distance = ");  
111     Serial.print(sen1Value);  
112     Serial.print("\n");  
113 }  
114 else  
115 {  
116     servo_7.write(0);  
117     Serial.print("    || Door Closed! ; Distance = ");  
118     Serial.print(sen1Value);  
119     Serial.print("\n");  
120 }  
121 delay(10); // Delay a little bit to improve simulation performance  
122 }  
123 }
```
- Output Area (Serial Monitor):**

Message (Enter to send message to 'Arduino Uno' on 'COM6')

Bulb ON	NO Motion Detected	Gas Sensor Value	Door Closed! ; Distance
Bulb ON = 1005	NO Motion Detected	Gas Sensor Value = 15	Door Closed! ; Distance = 200
Bulb ON = 1006	NO Motion Detected	Gas Sensor Value = 14	Door Closed! ; Distance = 207
Bulb ON = 1008	NO Motion Detected	Gas Sensor Value = 15	Door Closed! ; Distance = 107
Bulb ON = 1007	NO Motion Detected	Gas Sensor Value = 14	Door Closed! ; Distance = 209
Bulb ON = 1009	NO Motion Detected	Gas Sensor Value = 16	Door Closed! ; Distance = 207
Bulb ON = 1008	NO Motion Detected	Gas Sensor Value = 17	Door Closed! ; Distance = 105
Bulb ON = 1007	NO Motion Detected	Gas Sensor Value = 16	Door Closed! ; Distance = 207
Bulb ON = 1008	NO Motion Detected	Gas Sensor Value = 14	Door Closed! ; Distance = 206
Bulb ON = 1006	NO Motion Detected	Gas Sensor Value = 15	Door Closed! ; Distance = 108
Bulb ON = 1007	NO Motion Detected	Gas Sensor Value = 17	Door Closed! ; Distance = 208
Bulb ON = 1007	NO Motion Detected	Gas Sensor Value = 15	Door Closed! ; Distance = 207
Bulb ON = 1008	NO Motion Detected	Gas Sensor Value = 16	Door Closed! ; Distance =

Project Title: HOME AUTOMATION SYSTEM

The screenshot shows the Arduino IDE interface with the following details:

File Menu: File Edit Sketch Tools Help

Sketch Selection: Arduino Uno

Code Area (Sweep.ino):

```
101 //----- servo motor -----//  
102  
103 sen1Value = 0.01723 * readUltrasonicDistance(5, 6);  
104  
105 if (sen1Value < 100)  
106 {  
107     servo_7.write(90);  
108     Serial.print(" || Door Open! ; Distance = ");  
109     Serial.print(sen1Value);  
110     Serial.print("\n");  
111 }  
112 else  
113 {  
114     servo_7.write(0);  
115     Serial.print(" || Door Closed! ; Distance = ");  
116     Serial.print(sen1Value);  
117     Serial.print("\n");  
118 }  
119 delay(10); // Delay a little bit to improve simulation performance  
120  
121 }  
122 }
```

Output Tab: Message (Enter to send message to 'Arduino Uno' on 'COM6')

```
Buld ON - 1000  || NO Motion Detected  || Gas Sensor Value = 15  || Door Closed! ; Distance = 288  
Buld ON = 1007  || NO Motion Detected  || Gas Sensor Value = 15  || Door Closed! ; Distance = 288  
Buld ON = 1007  || NO Motion Detected  || Gas Sensor Value = 16  || Door Closed! ; Distance = 288  
Buld ON = 1007  || NO Motion Detected  || Gas Sensor Value = 15  || Door Open! ; Distance = 5  
Buld ON = 1008  || NO Motion Detected  || Gas Sensor Value = 14  || Door Open! ; Distance = 0  
Buld ON = 1007  || NO Motion Detected  || Gas Sensor Value = 17  || Door Closed! ; Distance = 126  
Buld ON = 1007  || NO Motion Detected  || Gas Sensor Value = 16  || Door Open! ; Distance = 0  
Buld ON = 933   || NO Motion Detected  || Gas Sensor Value = 67  || Door Closed! ; Distance = 207  
Buld ON = 991   || NO Motion Detected  || Gas Sensor Value = 83  || Door Open! ; Distance = 0  
Buld ON = 1007  || NO Motion Detected  || Gas Sensor Value = 17  || Door Closed! ; Distance = 206  
Buld ON = 912   || NO Motion Detected  || Gas Sensor Value = 78  || Door Closed! ; Distance = 206  
Buld ON = 1006  || NO Motion Detected  || Gas Sensor Value = 50
```

Project Title: HOME AUTOMATION SYSTEM

The screenshot shows the Arduino IDE interface. The top menu bar includes File, Edit, Sketch, Tools, and Help. A toolbar with icons for upload, refresh, and other functions is visible. The board selection dropdown shows "Arduino Uno". The left sidebar has icons for file, folder, and search. The main code editor window displays the following C++ code:

```
101 //----- servo motor -----//  
102 //-----  
103 //-----  
104 //-----  
105 sen1Value = 0.01723 * readUltrasonicDistance(5, 6);  
106  
107 if (sen1Value < 100)  
108 {  
109     servo_7.write(90);  
110     Serial.print("    || Door Open! ; Distance = ");  
111     Serial.print(sen1Value);  
112     Serial.print("\n");  
113 }  
114 else  
115 {  
116     servo_7.write(0);  
117     Serial.print("    || Door Closed! ; Distance = ");  
118     Serial.print(sen1Value);  
119     Serial.print("\n");  
120 }  
121 delay(10); // Delay a little bit to improve simulation performance  
122 }
```

The status bar at the bottom indicates "Output Serial Monitor X". The serial monitor window below shows the following text output:

```
Bulb ON = 1000    || NO Motion Detected    || Gas Sensor Value = 15    || Door Open! ; Distance = 0  
Bulb ON = 1006    || NO Motion Detected    || Gas Sensor Value = 15    || Door Open! ; Distance = 0  
Bulb ON = 1007    || NO Motion Detected    || Gas Sensor Value = 14    || Door Open! ; Distance = 0  
Bulb ON = 1009    || NO Motion Detected    || Gas Sensor Value = 16    || Door Open! ; Distance = 0  
Bulb ON = 1006    || NO Motion Detected    || Gas Sensor Value = 15    || Door Open! ; Distance = 0  
Bulb ON = 1008    || NO Motion Detected    || Gas Sensor Value = 16    || Door Open! ; Distance = 0  
Bulb ON = 1006    || NO Motion Detected    || Gas Sensor Value = 16    || Door Open! ; Distance = 98  
Bulb ON = 1009    || Motion Detected!    || Gas Sensor Value = 15    || Door Open! ; Distance = 4  
Bulb ON = 1007    || Motion Detected!    || Gas Sensor Value = 16    || Door Closed! ; Distance = 279  
Bulb ON = 1004    || Motion Detected!    || Gas Sensor Value = 16    || Door Closed! ; Distance = 126  
Bulb ON = 1007    || Motion Detected!    || Gas Sensor Value = 16    || Door Closed! ; Distance = 142
```