AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH

Faculty of Engineering

OEL Report

Title: Distance Measuring using Ultrasonic Sensor with OLED.

Course Title:	MICROPROCESSOR AND EMBEDDED SYSTEMS LAB		
Course Code:	COE3104	**Section:**	A
Semester:	Spring 2022-23	**Degree Program:**	BSc in CSE/BSc in EEE
Course Teacher:	**Md. Ali Noor**		

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FACULTY COMMENTS	**Marks Obtained**	
	Total Marks	

Title: Distance Measuring using Ultrasonic Sensor with OLED.

Objective: To measure the distance of an obstacle and display it on the OLED display.

Theory and Methodology: Ultrasonic sensors are used primarily as proximity sensors. They can be found in automobile self-parking technology and anti-collision safety systems. Ultrasonic sensors are also used in robotic obstacle detection systems, as well as manufacturing technology. In comparison to infrared (IR) sensors in proximity sensing applications, ultrasonic sensors are not as susceptible to interference of smoke, gas, and other airborne particles (though the physical components are still affected by variables such as heat). Ultrasonic sensors are also used as level sensors to detect, monitor, and regulate liquid levels in closed containers (such as vats in chemical factories).

Arduino is an open-source platform used for creating interactive electronics projects. Arduino consists of both a programmable microcontroller and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the microcontroller board. Arduino Mega also doesn't need a hardware circuit (programmer/ burner) to load a new code into the board. We can easily load a code into the board just using a USB cable and the Arduino IDE.

Fig 1: Ultrasonic sensor

Apparatus:

1) Arduino Mega
2) Breadboard
3) Ultrasonic Sensor
4) OLED display
5) Connection wires

Experimental Setup:

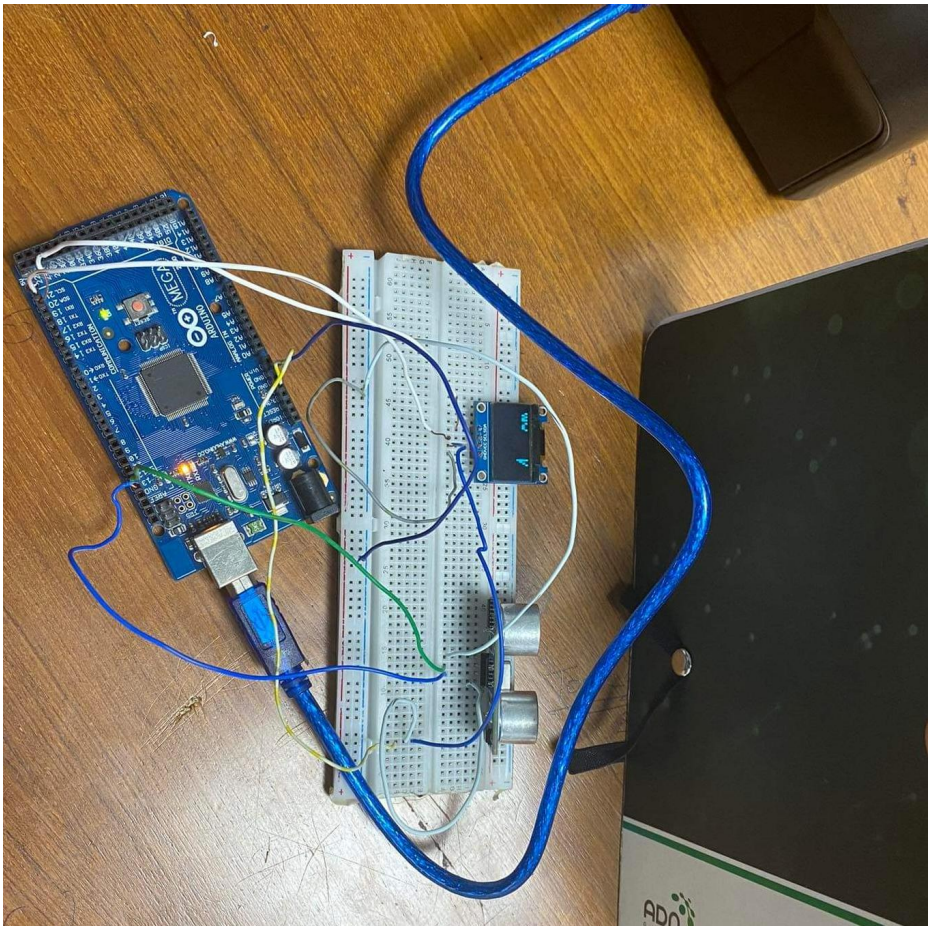
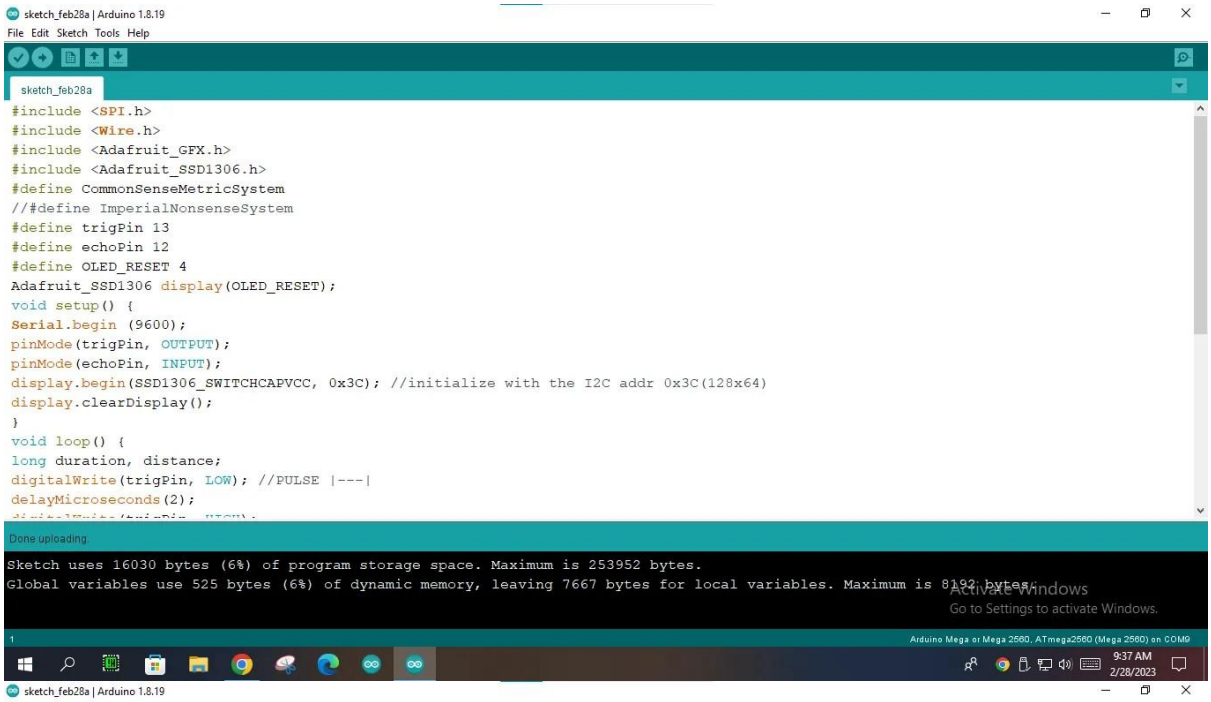
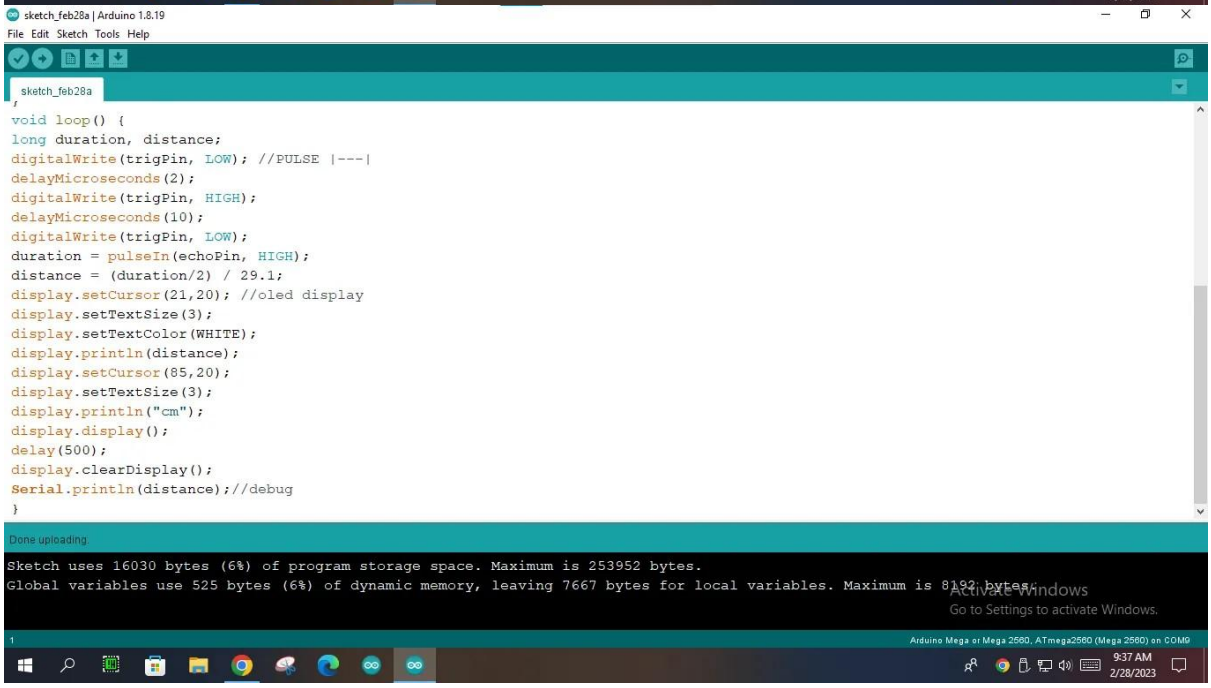


Fig 2: Hardware setup for distance measuring system

Codes of the Program:

First of all, we imported some header files like SPI.h, and Wire.h ,Adafruit_GFX, Adafruit_SSD1306, and Adafruit_BMP085. Then we set the screen width, and height. In the setup function, we passed SSD1306_SWITCHCAPVCC to generate the display voltage. Then we defined the trigger and echo pins. Then in the loop function, it just takes input through the sensor and shows the output in OLED.





Simulation result:

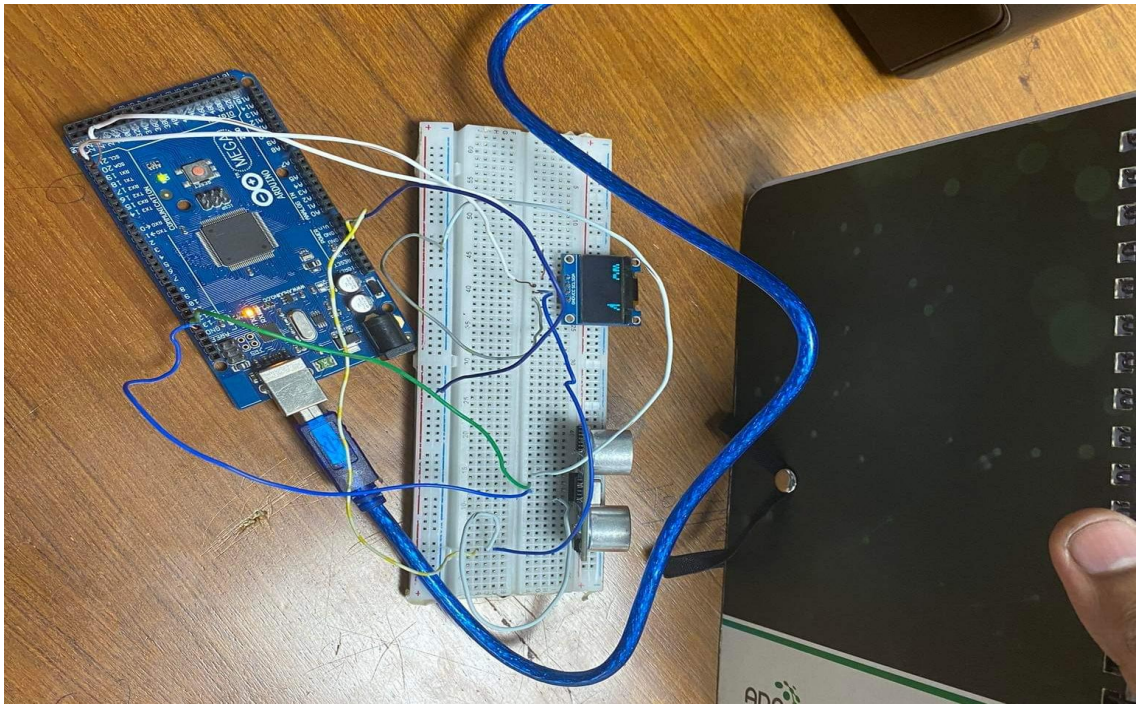


Fig 3: Obstacle at 1cm distance

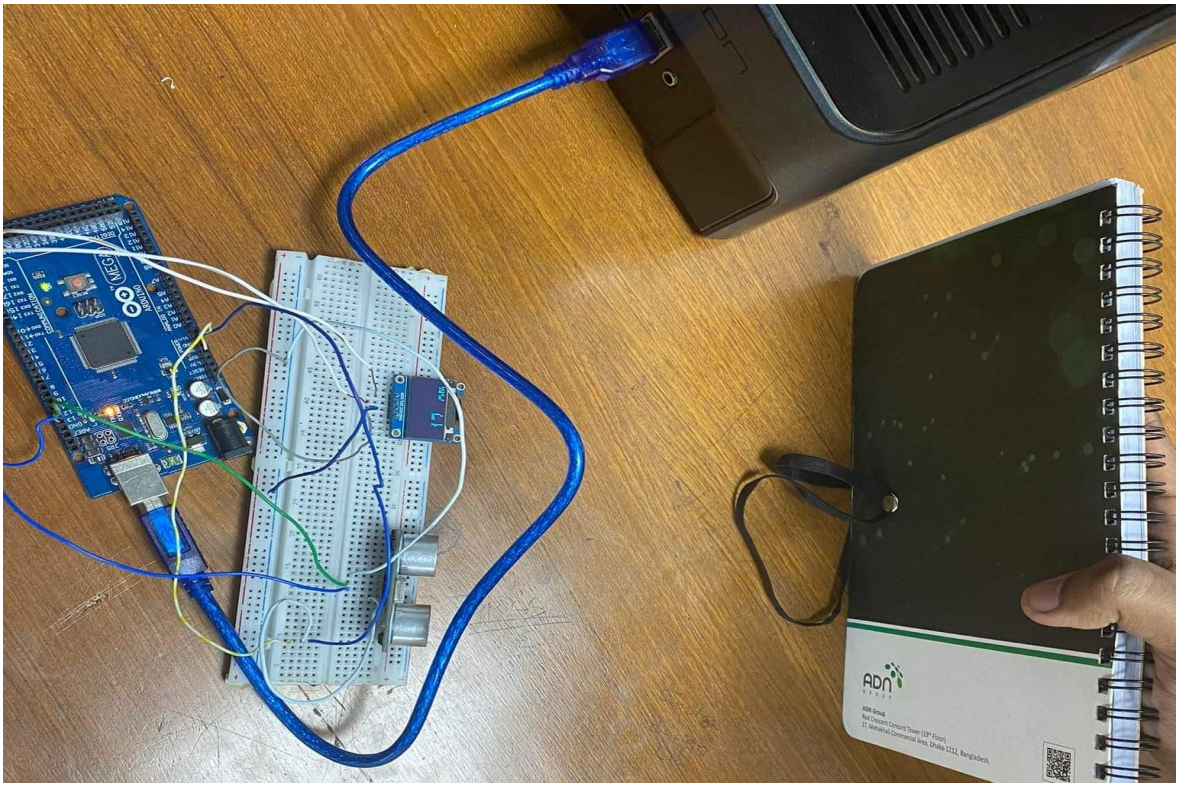


Fig 4: Obstacle at 17cm distance

Discussions: In this experiment, a hardware setup was implemented to measure the distance of an obstacle and display it on an OLED display. A circuit diagram was generated to connect the display and the ultrasonic sensor to the Arduino Mega microcontroller. An Arduino code was written for Arduino ide and it was connected through a USB cable. After uploading the code to Arduino, the ultrasonic sensor detected an obstacle's distance and showed the distance in cm as per the written code. It was easy to implement and has much usefulness.