Project 3

Ultrasonic Distance meter using Arduino

Aim: This project will use an ultrasonic sensor to measure the distance between two objects. And the distance will be shown on LCD Display

Description:

The HC-SR04 ultrasonic sensor uses SONAR to determine the distance of an object just like the bats do. It offers excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package from 2 cm to 400 cm or 1" to 13 feet.

Components:

1. Arduino uno

Fig 3. Arduino uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.
The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

2. Ultrasonic Sensor (HC-SR 04)

Fig 4. Ultrasonic Sensor

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).

3. LCD Display (16 x 2)

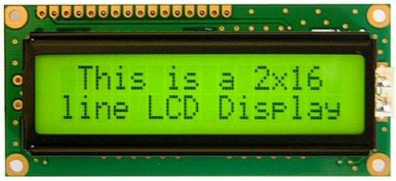

Fig 5. LCD Display

A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

4. Breadboard

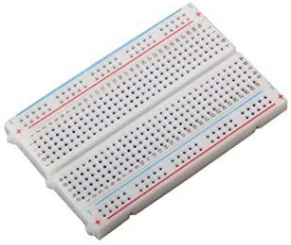

Fig 6. Breadboard

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode).

5. Jumpers

Fig 7. Jumpers

A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering

Procedure:

Step 1: Parts Required

Required components are given in components section. One unit of all components required and some jumper wires.

Step 2: Connect the components

Connect the components and wire as shown in below fig 8.
Link : https://www.tinkercad.com/embed/fyeDN6FfF4T?editbtn=1

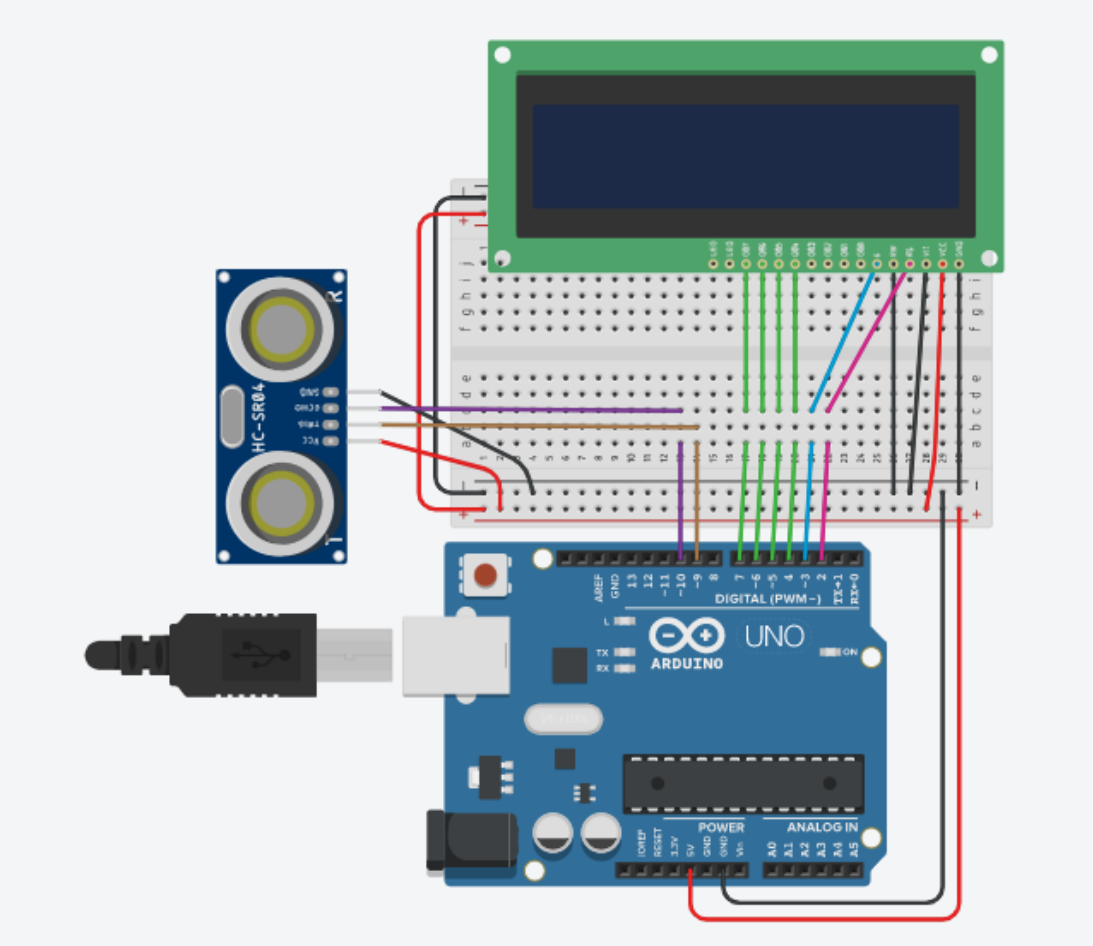

Fig 8. Connections

Step 3: Upload the code

Upload the sketch to your Arduino. Use code which is given in code section. Kindly check the perfect COM port and watch the measurement.

Pin Connections:

PIN	CONNECTION
2	RS (LCD DISPLAY)
3	E (LCD DISPLAY)
4	D4 (LCD DISPLAY)
5	D5 (LCD DISPLAY)
6	D6 (LCD DISPLAY)
9	TRIGGER PIN (ULTRASONIC SENSOR)
10	ECHO (ULTRASONIC SENSOR)

Simulation Output of Proteus Software:

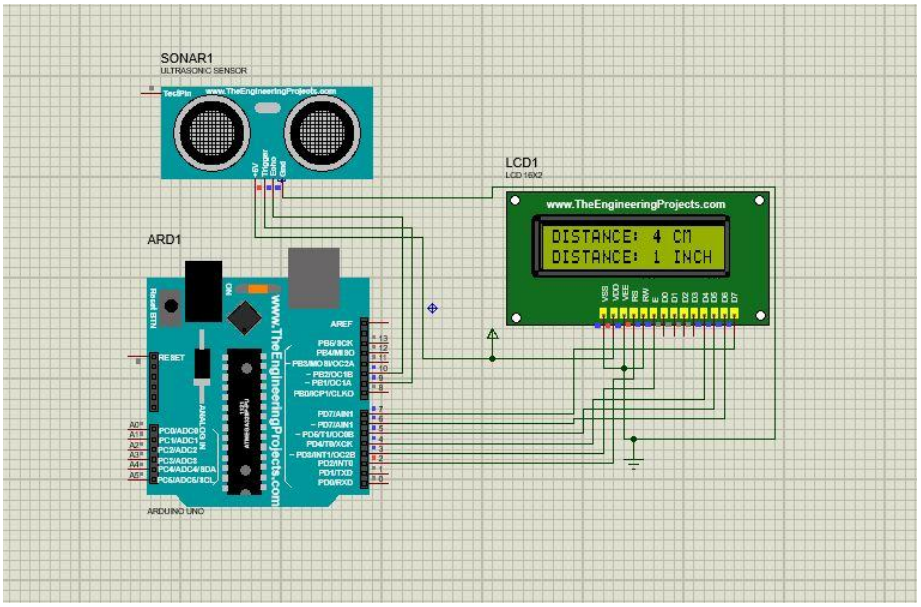

Fig 9. Output