Q2. Write a program to measure the distance using ultrasonic sensor and make LED blink using Arduino.

Example of an Arduino program that measures distance using an ultrasonic sensor (HC-SR04) and makes an LED blink based on the measured distance.

Components Needed:

☐ Arduino board (e.g., Arduino Uno)

☐ HC-SR04 ultrasonic sensor

☐ LED

Wiring:

1) Place the HC-SR04:

☐ VCC to 5V on Arduino

☐ GND to GND on Arduino

☐ Trig to digital pin 9

☐ Echo to digital pin 10

2) Connect the LED:

☐One end to the default terminal and double click on it and select IO13

☐ The other end of the resistor to GND.

Arduino Code:

```
const int trigPin = 9;
const int echoPin = 10;
const int ledPin = 13;
```

```
void setup() {
    // Start the serial communication
    Serial.begin(9600);
    // Set pin modes
    pinMode(trigPin, OUTPUT);
    pinMode(echoPin, INPUT);
    pinMode(ledPin, OUTPUT);
}
void loop() {
    // Clear the trigPin
    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    // Set the trigPin high for 10 microseconds
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);
    // Read the echoPin
    long duration = pulseIn(echoPin, HIGH);
    // Calculate the distance in cm
    float distance = duration * 0.034 / 2;
    // Print distance to Serial Monitor
    Serial.print("Distance: ");
    Serial.print(distance);
    Serial.println(" cm");
```

```
    // Blink the LED based on distance
    if (distance > 10) { // If distance is more than 40 cm
        digitalWrite(ledPin, HIGH); // Turn LED on
    } else {
        digitalWrite(ledPin, LOW); // Turn LED off
    }
    // Wait before next measurement
    delay(500);
}
```

Explanation:

1) Setup: The pins are initialized, and serial communication is started for debugging.

2) Loop:

☐ The ultrasonic sensor sends a pulse and measures the time taken for the echo to return.

☐ The distance is calculated based on the duration of the pulse.

☐ If the distance is more than 10 cm, the LED will blink on; otherwise, it will be off.

3) Delay: The loop pauses for half a second before taking the next measurement.

Connections: