LED Blinking using 3-Pin Ultrasonic Sensor

This experiment uses a 3-pin ultrasonic sensor and an LED. When an object is detected within 20 cm, the LED blinks.

Arduino Code

```
#define ultraPin 9
#define ledPin 6

long duration;
int distance;

void setup() {
  pinMode(ultraPin, OUTPUT);
  pinMode(ledPin, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  pinMode(ultraPin, OUTPUT);
  digitalWrite(ultraPin, LOW);
  delayMicroseconds(2);
  digitalWrite(ultraPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(ultraPin, LOW);

  pinMode(ultraPin, INPUT);
  duration = pulseIn(ultraPin, HIGH);

  distance = duration * 0.034 / 2;

  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.println(" cm");

  if (distance > 0 && distance <= 20) {
    digitalWrite(ledPin, HIGH);
    delay(300);
    digitalWrite(ledPin, LOW);
    delay(300);
  } else {
    digitalWrite(ledPin, LOW);
  }
}
```

Pin Description

VCC → 5V supply
GND → Ground
SIG → Connected to Arduino pin 9
LED → Connected to Arduino pin 6 through a resistor

Code Explanation

The ultrasonic sensor uses a single signal pin for both triggering and echo reception. Initially, the pin is configured as OUTPUT to send a 10 microsecond pulse. Then the pin is changed to INPUT to receive the echo signal. The time taken for the echo to return is measured using pulseIn(). Distance is calculated using the speed of sound formula. If the measured distance is less than or equal to 20 cm, the LED blinks; otherwise, it remains OFF.

Distance Formula

Distance (cm) = (Duration × 0.034) ÷ 2
Division by 2 accounts for the forward and return travel of the ultrasonic wave.

This experiment is suitable for Arduino basics and Anna University laboratory records.