3. **Program the Arduino to take a distance reading from the ultrasonic sensor only when the touch sensor is activated. Display the measured distance on the 7-segment display and hold the value for 5 seconds before clearing.**

Program :

```
// Pin Definitions
const int trigPin = 9;
const int echoPin = 10;
const int touchPin = 11;
// 7-Segment Pins
const int segmentA = 2;
const int segmentB = 3;
const int segmentC = 4;
const int segmentD = 5;
const int segmentE = 6;
const int segmentF = 7;
const int segmentG = 8;
// 7-segment display number representation
const int numbers[10][7] = {
  {1, 1, 1, 1, 1, 1, 0},  // 0
  {0, 1, 0, 0, 0, 0, 0},  // 1
  {1, 1, 0, 1, 1, 0, 1},  // 2
  {1, 1, 0, 1, 0, 0, 1},  // 3
  {0, 1, 1, 0, 0, 0, 1},  // 4
  {1, 0, 1, 1, 0, 1, 1},  // 5
  {1, 0, 1, 1, 1, 1, 1},  // 6
  {0, 1, 0, 0, 0, 0, 0},  // 7
  {1, 1, 1, 1, 1, 1, 1},  // 8
  {1, 1, 1, 1, 0, 0, 1}   // 9
};
void setup() {
                                                     // Setup pins
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(touchPin, INPUT);

  // Setup 7-segment pins
  for (int i = 2; i <= 8; i++) {
    pinMode(i, OUTPUT);
  }
  Serial.begin(9600);
}
void loop() {
  if (digitalRead(touchPin) == HIGH) {
    long distance = measureDistance();
    displayNumber(distance);            // Display the measured distance
    delay(5000);                         // Hold the display for 5 seconds
    clearDisplay();                     // Clear the display after 5 seconds
  }
}
```

```
long measureDistance() {
                         // Trigger the ultrasonic sensor
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
                                // Read the echo
  long duration = pulseIn(echoPin, HIGH);
                           // Calculate distance in cm
  return duration * 0.034 / 2;
}
void displayNumber(long num)
             // Assuming we're displaying only single-digit numbers
 {
  if (num < 0 || num > 9) return;
                       // Set segments based on the number
  for (int i = 0; i < 7; i++) {
    digitalWrite(i + 2, numbers[num][i]);
  }
}
void clearDisplay() {
  // Turn off all segments
  for (int i = 0; i < 7; i++)
{
    digitalWrite(i + 2, LOW);
  }
}
```