2. Connect both an ultrasonic sensor and a touch sensor to the Arduino. Display a counter on the 7-segment display that increments every time an object (such as a hand) crosses a specified distance threshold (detected by the ultrasonic sensor). Use the touch sensor to reset the counter.

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
};
                                    // Distance threshold in cm
long distanceThreshold = 20;
int counter = 0;
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() {
  long duration, distance;
```

```
                                    // Trigger the ultrasonic sensor
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Read the echo
  duration = pulseIn(echoPin, HIGH);

  // Calculate distance in cm
  distance = duration * 0.034 / 2;

  // Check if distance is less than the threshold
  if (distance < distanceThreshold) {
    counter++;
    delay(500); // Debounce delay to avoid multiple increments
  }
                            // Reset counter if touch sensor is activated
  if (digitalRead(touchPin) == HIGH) {
    counter = 0;
delay(500);                          // delay for touch sensor
  }
```

```
  // Display counter on the 7-segment display
  displayNumber(counter % 10);           // Display only single-digit for simplicity
                                         // Print to Serial Monitor for debugg
  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.print(" cm, Counter: ");
  Serial.println(counter);
  delay(100);                            // Short delay for loop
}

void displayNumber(int 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]);
  }
}
```