Code for Ultra Servo:

Code 3 :

```
#include <ESP8266WiFi.h>
#include <Servo.h>

// Define pin connections
const int trigPin = D1;       // Trig pin of the ultrasonic sensor connected to D1 (GPIO 5)
const int echoPin = D2;       // Echo pin of the ultrasonic sensor connected to D2 (GPIO 4)
const int servoPin = D4;      // Servo motor control pin connected to D3 (GPIO 0)

// Define threshold distance (in centimeters)
const int distanceThreshold = 20;  // Adjust this value based on your specific needs

// Create servo object
Servo servo;

void setup() {
  // Start serial communication for debugging
  Serial.begin(9600);

  // Set up the ultrasonic sensor pins
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);

  // Attach the servo to the defined pin
  servo.attach(servoPin);

  // Initialize servo to 0 degrees (lid closed)
  servo.write(0);
```

```
  // Print initial status
  Serial.println("Smart Bin Initialized. Lid Closed.");
}

void loop() {
  // Measure the distance using the ultrasonic sensor
  int distance = getDistance(trigPin, echoPin);

  // Print the measured distance to the serial monitor (for debugging)
  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.println(" cm");

  // Check if the distance is below the threshold (person detected)
  if (distance <= distanceThreshold) {
    // Open the bin lid (servo to 90 degrees)
    servo.write(180);
    Serial.println("Person detected! Lid opened.");
  } else {
    // Close the bin lid (servo to 0 degrees)
    servo.write(0);
    Serial.println("No person detected. Lid closed.");
  }

  // Short delay before the next loop
  delay(500); // Delay in milliseconds
}

// Function to calculate distance from ultrasonic sensor
int getDistance(int trigPin, int echoPin) {
  // Send a 10us pulse to trigger the ultrasonic sensor
```

```
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Read the echo pin and calculate the distance
  long duration = pulseIn(echoPin, HIGH);
  int distance = duration * 0.034 / 2; // Speed of sound is 0.034 cm/us
  return distance;
}
```