Practical 4

Q4. To write a program to sense a finger when it is placed on the board Arduino.

To create a Proteus simulation with a capacitive touch sensor on Arduino, follow the steps outlined below. This example uses a simple TTP223 capacitive touch sensor to trigger an LED when a finger is detected.

Components:

1. Arduino Uno (or any other compatible board)
2. TTP223 Capacitive Touch Sensor
3. LED
4. Resistor (220 ohms for the LED)
5. Proteus Simulation Software to create the schematic

Steps to Create the Proteus Simulation:

1. Create a New Project in Proteus:

- Open Proteus and create a new project.
- Select Arduino Uno or any other Arduino model as your microcontroller.

2. Add Components:

- Arduino Uno (or compatible board).

- TTP223 Capacitive Touch Sensor (can be found as "TTP223" in Proteus components).

- LED.

- Resistor (220 ohms).

- Jumper wires.

3. Circuit Setup:

- Capacitive Touch Sensor:

  - Connect the VCC pin of the touch sensor to 5V on the Arduino.

  - Connect the GND pin of the touch sensor to GND on the Arduino.

  - Connect the OUT pin of the touch sensor to a digital input pin on the Arduino (e.g., D2).

- LED:

  - Connect the anode (long leg) of the LED to digital pin 13 of the Arduino.

  - Connect the cathode (short leg) of the LED to GND via a 220-ohm resistor.

4. Arduino Code

```
// Pin configuration
const int touchPin = 2;    // Pin connected to the capacitive touch sensor
const int ledPin = 13;     // Pin connected to the LED

void setup() {
```

```
  // Initialize the touch sensor pin as an input
  pinMode(touchPin, INPUT);

  // Initialize the LED pin as an output
  pinMode(ledPin, OUTPUT);

  // Start serial communication for debugging
  Serial.begin(9600);
}

void loop() {
  // Read the touch sensor state
  int touchState = digitalRead(touchPin);

  // Print the touch state for debugging
  Serial.println(touchState);

  // If a finger is detected (sensor output is HIGH)
  if (touchState == HIGH) {
    digitalWrite(ledPin, HIGH); // Turn on the LED
  } else {
    digitalWrite(ledPin, LOW);  // Turn off the LED
```

```
  }


  delay(100);  // Small delay to prevent bouncing
}
```

How to simulate the Arduino code in Proteus:

1. Add the Arduino Code:

- Right-click on the Arduino Uno in the Proteus schematic and select Edit Properties.

- Click on the Program File field, and choose the `.hex` file that you generated after uploading your code to the Arduino via the Arduino IDE.

2. Simulation:

- After adding the code to the Arduino in the simulation, click the play button in Proteus to start the simulation.

- When you touch the capacitive touch sensor, the LED should light up in the simulation.