**Title: Measure 0 to 100Vdc using micro controller**

**1.Algorithm:**

* **Initialize the System:**
* Configure the ADC (Analog-to-Digital Converter).
* Set up I/O pins.
* Initialize the UART for serial communication (if needed).
* **Voltage Divider:**
* Use a voltage divider circuit to scale the 0-100V DC input to a range suitable for the ADC (0-5V).
* **Sampling and Conversion:**
* Continuously sample the ADC channel connected to the voltage divider.
* Convert the ADC result to the corresponding voltage.
* **Display/Output:**
* Output the measured voltage via UART or display it on an LCD.

**Explanation for the code:**

#### **Step 1: Select a Microcontroller (PIC16F877A)**

The PIC16F877A microcontroller is chosen for this assignment. It features an internal 10-bit Analog-to-Digital Converter (ADC), making it suitable for measuring analog voltages.

#### **Step 2: Select Suitable Compiler**

The MPLAB X IDE with the XC8 compiler is chosen for writing the code in Embedded C. This development environment supports PIC microcontrollers and provides tools for debugging and simulation.

#### **Step 3: Write Algorithm for Measurement**

1. **Initialize the ADC**: Set up the ADC to use the appropriate reference voltage and configure the input channel.
2. **Read ADC Value**: Start an ADC conversion on the selected channel and wait for it to complete.
3. **Convert ADC Value to Voltage**: Use the ADC result to calculate the input voltage based on the reference voltage and voltage divider ratio.
4. **Display/Output Voltage**: Send the calculated voltage to a display or output it via UART.
5. **Repeat**: Continuously read and convert the ADC value in a loop.

**Theoretical Calculation:**

The theoretical accuracy depends on the resolution of the ADC and the reference voltage.

* **ADC Resolution**: 10-bit (1024 steps)
* **Reference Voltage**: 5V
* **Voltage Step**: *5V1024=0.00488V\frac{5V}{1024} = 0.00488V*10245V =0.00488V per step

For the voltage divider:

* Input range: 0-100V
* Divider ratio: 21

The voltage step for the input range is:

* *Voltage Step=0.00488V×21=0.10248V\text{Voltage Step} = 0.00488V \times 21 = 0.10248V*Voltage Step=0.00488V×21=0.10248V

The theoretical accuracy is therefore approximately ±0.10248V.