EXPERIMENT 5

Aim:

Implementation of Analog to Digital Conversion (ADC) using Arduino Uno.

Components Required:

1. Arduino Uno
2. JHD 16 x 2 LCD module
3. Bread Board
4. Potentiometer
5. Jump wires
6. USB cable

Theory:

Arduino Uno features a built-in Analog to Digital Converter (ADC) module, which allows it to measure analog voltages at its analog input pins (A0 to A5). The ADC resolution of Arduino Uno is 10-bit, meaning it can represent analog voltages in 1024 discrete levels (from 0 to 1023). The ADC resolution determines the precision of the conversion process. In the case of Arduino Uno, the 10-bit resolution means that the range of analog input voltages (0 to 5 volts) is divided into 1024 steps, with each step representing approximately 4.88 millivolts (mV).

The Arduino IDE provides the analogRead() function to read analog voltage values from the specified analog input pin. This function returns an integer value between 0 and 1023, representing the magnitude of the input voltage. The obtained value can then be used for various purposes within the Arduino sketch, such as controlling actuators, displaying information, or performing calculations.

When an analog voltage is applied to one of the analog input pins of the Arduino Uno, the ADC converts it into a digital value. The ADC samples the input voltage and compares it with an internal reference voltage. Based on this comparison, it generates a digital value proportional to the input voltage.

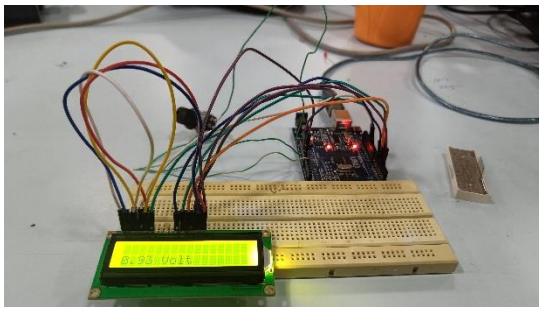
Sketch Code:

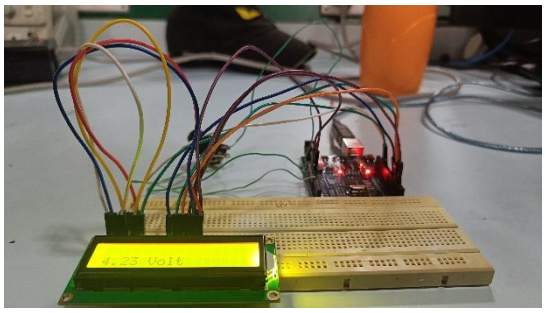
```
#include <LiquidCrystal.h>
```

```
int sensorPin = A0;
int sensorVal = 0;
float pv = 0;
String sv;
Const int rs = 12, en =11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6,d7);
Void setup(){
Lcd.begin(16,2);
Serial.begin(9600);
pinMode(A0,INPUT);
}
Void loop(){
sensorVal = analogRead(SensorPin);
lcd.clear();
lcd.setCursor(0,0);
pv = 4.82 * sensorVal;
lcd.setCursor(0,1);
pv = pv/1000;
sv = pv;
lcd.print(sv + " Volts");
Serial.println(sv + " Volts");
Delay(200);
}
```

Result:

We have successfully implemented Analog to Digital Conversion (ADC) using Arduino Uno and obtained analog voltage readings from the potentiometer.





Conclusion:

In this lab session, we learned how to utilize the built-in ADC of Arduino Uno to convert analog signals into digital values. ADC is a fundamental process in interfacing analog sensors with microcontrollers, allowing them to process real-world data effectively. Understanding ADC and its implementation is essential for various projects involving analog sensors and devices.

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