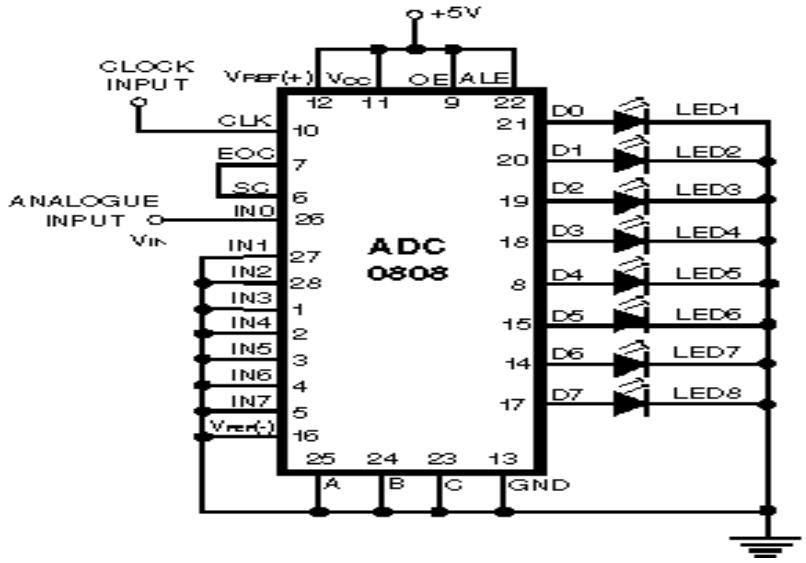
MINI PROJECT

Part A: Analog to Digital Converter

Introduction

Normally analogue-to-digital converter (ADC) needs to convert analogue data into digital format. This requires hardware and by using the circuit of A-to-D converter (ADC 0808). The ADC 0808 is an 8-bit A-to-D converter, having data lines D0-D7. It works on the principle of successive approximation. It has a total of eight analogue input channels, out of which any one can be selected using address lines A, B and C. Here, in this case, input channel IN0 is selected by grounding A, B and C address lines as shown in the figure below.



In order to visualize the digital output, the row of eight LEDs (LED1 through LED8) have to be connected, wherein each LED is connected to respective data lines D0 through D7.The ADC 0808 IC requires clock signal of typically 550 kHz, which can be easily derived from an astable multivibrator constructed using 7404 inverter gates. Since ADC works in the continuous mode, it displays digital output as soon as analogue input is applied. The decimal equivalent digital output value D for a given analogue input voltage Vin can be calculated from the relationshipbetween

analog input and decimal output. For further more explanations, the control signals **EOC** (end of conversion), **SC** (start conversion), **ALE** (address latch enable) and **OE** (output enable) are interfaced by means of a microprocessor. However, the circuit shown here is built to operate in its continuous mode without using any microprocessor. Therefore the input control signals **ALE** and **OE**, being active-high, are tied to Vcc (+5 volts). The input control signal **SC**, being active-low, initiates start of conversion at falling edge of the pulse, whereas the output signal **EOC** becomes high after completion of digitization. This **EOC** output is coupled to **SC** input, where falling edge of **EOC** output acts as **SC** input to direct the ADC to start the conversion.

As the conversion starts, EOC signal goes high. At next clock pulse EOC output again goes low, and hence SC is enabled to start the next conversion. Thus, it provides continuous 8-bit digital output corresponding to instantaneous value of analogue input. The maximum level of analogue input voltage should be appropriately scaled down below positive reference (+5V) level.

Task 1:Using an 8-bit ADC. Find the 8-bit ADC resolution, what will its digital output be for an analog input of 1.17, 1.47, 1.83, 2.26, 4.23, and 4.88 V.

Task 2: Present the digital output of the analog values using the connected LED's.
Task 3: Determine the analog value in both cases:

a- LED's all **ON**
b- LED's all **OFF**

Items requested:
1-Breadboard
2- 8-bit ADC
3- LED's (COLORES BASED ON AVAILABILITY-Not Visible)
4-Wires
5-Voltage regulator
6- Voltage Supply (Battery 5 Volt)

Notes: The Mini projects should be performed with full cooperation of the group members.
(Due date ……)