# Embedded Systems Laboratory
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Analog to Digital Converter

Introductioin:

Read the datasheet Chapter Analog-to-Digital Converter. The related registers are **ADC**, **ADCSRA** and **ADMUX.** I summarized several hints as follows:

- Set the bit ADSC to start every single AD convert. This bit will be cleared after each conversion.
- ADC register contain the 10-bits conversion result: ADC = 1024*V(in)/V(aref)
- On completing a single AD conversion, an ADC interrupt will be triggered if the corresponding enable bit is set.

The following is the design circuit.
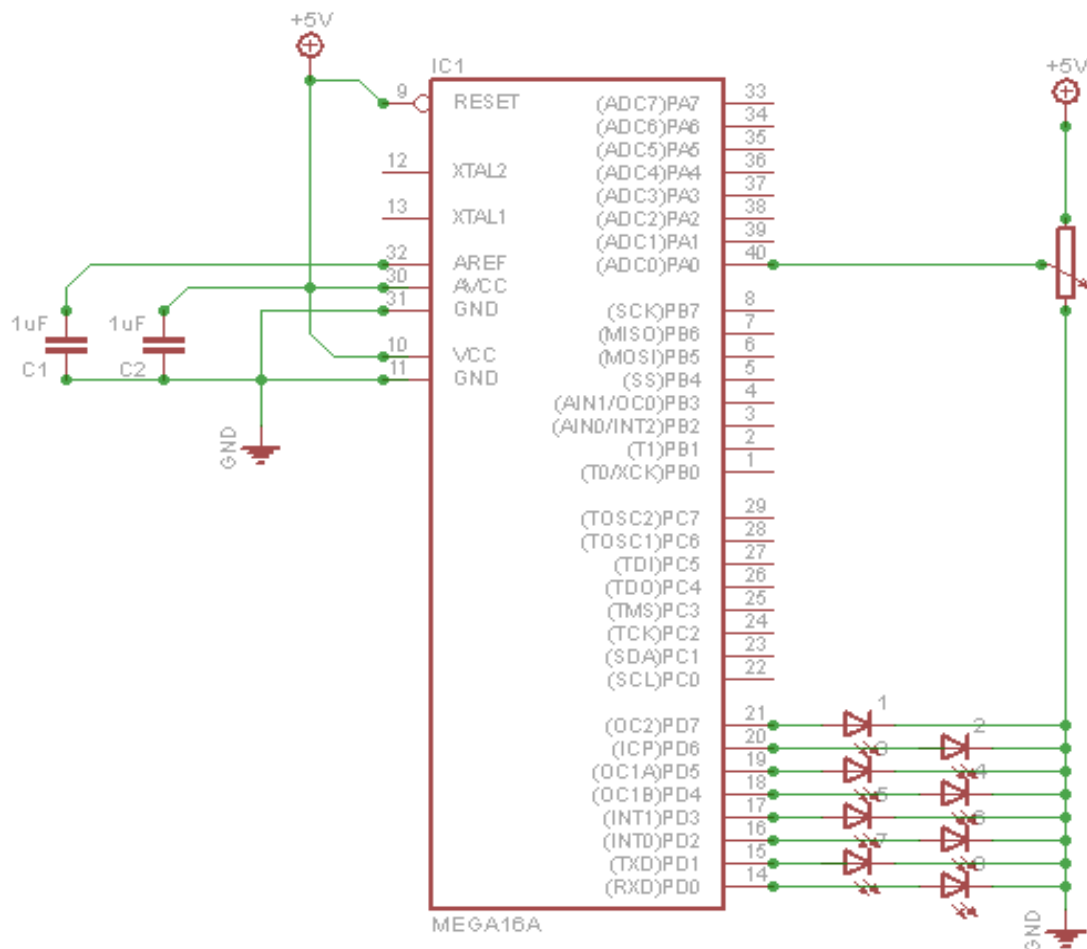
Pre Lab Tasks:

1.Read the ATmega328 datasheet (Chapter - Analog to Digital Converter)

2. Design your program to convert an analog voltage input to a 12 bits value in free run mode.

Lab Assignments:

1. Using a Potentiometer to control the input voltage.

2. Write codes to convert an input voltage into 16 bits value. Output any 8 bits out of these 12 bits to PORTD.

3. Connect 3 pins of PORTD to 3 LEDs and observe the AD converting results.

Lab Report: The requirements are the same as the previous lab.