ECE 3724/CS 3124 Quiz #7 Reese Solution
Answer each of the following questions (you can use a calculator)

a. (2 pts) Given an 8-bit ADC with a VREF+ = 5 V, and a VREF- = 0V, what is the 8-bit output code for an input voltage of 1.35 V?

Code = Vin/Vref * 2^N = 1.35/5 * 256 = 69.12, so 69 (0x45)

b. (3 pts) Write a C function called *char get_adc()* that first selects the AN1 input channel, delays for 20 microseconds using *DelayUs(20)*, then starts a PIC18 ADC conversion, waits for the conversion to end, and returns the upper 8-bits of the result assuming left justification.

```
char get_adc() {
  CHS2 = 0; CHS1 = 0; CHS0 = 1; // select channel
  DelayUs(20);          // delay
  GODONE = 1;          //start a conversion
  while(GODONE);   //wait for end of conversion
  return(ADRESH);
}
```

c. (2 pts) Write C code that configures the PIC18 to select the AN1 ADC channel, and uses an ADC clock of FOSC/16. The AN3 input must be configured as VREF+, with VREF- as VSS. The input channels AN2-AN0 must be analog inputs, I don't care what the other input channels are. Configure for LEFT justification, and ensure that the ADC is turned on. For clarity, use individual bit assignments, and do not assume any default bit values.

```
CHS2 = 0; CHS1 = 0; CHS0 = 1; // select channel AN1
ADCS2 = 1; ADCS1 = 0; ADCS0 = 1;  //FOSC/16
ADFM = 0; // left justified
PCFG3 = 0; PCFG2 = 0; PCFG1 = 0; PCFG0 = 1;  // AN3-AN0 config
ADON = 1;
```

d. (3 pts) How many clock cycles does an 8-bit FLASH ADC take to convert? an 8-bit successive approximation ADC to convert? an 8-bit counter-ramp ADC to convert?

Flash – 1 clock cycle
8-bit successive approximation = 8 clocks (1 per bit)
8-bit counter ramp = variable, up to 2^8, or 256 clocks.