EE 2905

Dr. Johnson

Homework 9

1 – With a 10b ADC and a 3.3v reference – provide the following values   40 pts

A) Step size

   3.3/1024 = 3.223mV

B) binary adc value for an input of 2.5v

   2.5V / 3.223mV = 775.8 → 775 → 11 0000 0111

C) measured voltage if the ADC result is 0x13A

   01 0011 1010 = 314 → 314 * 3.223mV = 1.012v to 1.015223V

2 – Using the code below – provide the following values assuming you are using our 3.3V mbed system   40 pts

```
AnalogIn myadc(A3);
…
int main(void){
…
    float foo;
    uint16_t boo;
    float loo;
…
    myadc.set_reference_voltage(5.0);
    foo = myadc.read();
    boo = myadc.read_u16();
    loo = myadc.read_voltage();
…
```

if the external voltage being measured is 1.2V, provide the values for

foo   1.2/3.3 = 363mV

boo   (1.2/3.3) * 65535 = 23830 = 0x5D16

loo   (1.2/3.3) * 5.0 = 1.818V

3 – provide a single line of code for each change   20 pts

uint8_t foo;

a) set bit 3 of foo to 1

foo |= 0x08;   or   foo = foo | 0x08;

b) set bits 1 and 5 of foo to 1

foo |= 0x22;   or   foo = foo | 0x22;

c) set bit 4 of foo to 0

foo &= ~0x10;   or   foo = foo & ~0x10;   or   foo = foo & 0xEF;

d) if foo was originally 33, what is it after this line of code

foo = (foo | 0x12) & ~0x48

foo = 0010 0001
        0010 0001 | 0001 0010 & ~0x48
        0011 0011 & ~0x48
        0011 0011 & ~(0100 1000)
        0011 0011 & 1011 0111
        0011 0011 = 0x33 = 51