

# ECE 376 - Homework #11

SCI Interrupts, z-Transforms - Due Monday, April 15th

## SCI Interrupts

Write a program which

- Has the operator type in a four digit number on a keyboard
- With a range from 100.0 to 999.9
- The PIC reads that number using SCI interrupts (serial port), then
- The PIC displays the number on the LCD (100Hz to 999Hz), and
- The PIC outputs that frequency using Timer1 Compare interrupts

1) Give a flow chart for your program

- Separate flow charts for each interrupt used

2) Write the corresponding C code

3) Verify your code works

- Check the endpoints (100Hz and 999Hz)
- Check a few points in between

## z-Transforms

4) Assume X and Y are related by the following transfer function

$$Y = \left( \frac{2s+30}{(s^2+4s+20)} \right) X$$

a) What is the differential equation relating X and Y?

b) Find y(t) assuming

$$x(t) = 2 + 3 \sin(4t)$$

5) Assume X and Y are related by the following transfer function

$$Y = \left( \frac{1.3(z+1)}{(z-0.8)(z-0.5)} \right) X$$

a) What is the difference equation relating X and Y?

b) Find y(t) assuming a sampling rate of T = 0.01 second

$$x(t) = 2 + 3 \sin(4t)$$

c) Find y(t) assuming

$$x(t) = 2u(t)$$