CPE 406/606 Homework Assignment #2 - **due before 11:59 PM February 13, 2018**

NOTE: for **ALL** Homework and Project Assignments:

1. Specifications for assignments will be given in class and posted on the web page. These specifications must not be changed arbitrarily without mutual agreement between students and instructor. If you do not understand the specifications please contact the instructor and we can discuss them until they are clear. If you have specific questions please use email.

2. **Every homework assignment MUST have a cover page** which contains the following **sections**:
   - Your name, course number, HW number, and date
   - A brief description of the assignment and what you did.
   - A discussion of any problems you encountered.
   - A discussion of what you learned while doing the assignment.
   - A description of Completed Lab which includes written text, code listings, diagrams, and photographs.

3. All written material for homework assignments must be typewritten or printed from a word processor. Be sure to keep a copy of any work you submit for this course.

4. Homework is due on WebCampus before 11:59PM on the due date. If you cannot finish on time then it can be turned in late for at most 50% credit. (See course Syllabus for details.)

Homework Assignment #2

1. Write a C language function which will take the unsigned char variable passed to the function and output it to the 82C55 (as mapped in HW 1 and specified in the CPE301 Final Exam) port PA connected to a standard 8-bit printer with the **following characteristics**.

Note that this function will output only one character each time it is called.

Connect BUSY and /STROBE as defined in the CPE301 final exam.

The output of port PA is connected to the **input data lines** of a standard 8-bit printer. Two control signals are used for handshaking. First, the active high BUSY signal from the printer tells the computer that it must wait before sending another character to the printer - when BUSY goes low then it is OK to send the next character. Second, the active low /STROBE signal is sent from the computer to the printer telling the printer that the data lines contain valid data. The sequence of events is shown in the timing diagram below. Thus, the subroutine must accomplish the following: 1) wait for the BUSY signal to go low, 2) output the data to port PA, 3) set the /STROBE signal low, and 4) set the /STROBE signal back high.

Printer Timing Diagram

The timing diagram below illustrates the data and handshake lines during transfer of one data byte to the computer. DATA 1 through DATA 8 and the Strobe line are driven by the computer.

Printer Timing

Interval	Description	Minimum Value	Typical Value
T_{ds}	Delay from DATA written to data Strobe.	0.5 µs	
T_{str}	Data Strobe width.	1 µs	
T_{dh}	Duration of valid data after Strobe.	0.5 µs	
T_{sb}	Delay from falling edge of Strobe to rising edge of Busy.	0.5 µs (max)