ELECTRICAL ENGINEERING
School of Engineering

EGRE 427 Advanced Digital Design

Laboratory/Homework No. 1

Programming the PIC 17C44 Microcontroller for a Controll Applications Using Basic Digital I/O

I. Getting Started

This homework must be pledged as your own (individual) work – write it out and sign it.

Log onto the PC in the Digital Systems Prototyping Lab that controls the PIC Microcontroller emulator. Follow the first tutorial on the PIC tutorial page:

http://www.people.vcu.edu/~rhklenke/tutorials/pic/index.html

to compile and run the simple test program for the robotic arm.

II. Assignment

The system board for the robot arm has 6 switches mounted in it. These switches are connected to the PORTD inputs of the 17C44 as described in the table below. The switches are wired such that the normal voltage the PORTD inputs when the switches are not pressed is 0V and the voltage on the inputs when the switches are pressed is 5V.

Switch Label	PORTD input	Function
"D"	D0	Moves the robot arm down in elevation
"U"	D1	Moves the robot arm up in elevation
"L"	D2	Moves the robot arm to the left in rotation
"R"	D3	Moves the robot arm to the right in rotation
"O"	D4	Moves the robot arm grip further open
"C"	D5	Moves the robot arm grip further closed

Write a new program for the arm that reads the value on the switches and moves the robot arm in the commanded direction. The robot arm should start in a "rest" position that you specifically define in your program. You can assume (or require) that only one switch is closed at a time. When a switch is pressed, the robot should move an incremental amount in the commanded direction, not all at once. If the switch is continuously depressed, the arm should move in a steady manner in the commanded direction until the limits of travel (as defined in the original arm.c program) are reached. At no point in time should the arm move past those defined limits. The servo pulses should be generated every 10ms, ±1ms, regardless of the motion of the servo arm.

For this assignment, you must turn in a cover sheet with your name, date, and a brief paragraph stating how you tested your program and if it worked, and a complete listing of all of your code (all *.h and *.c files). You must also demonstrate the operation of your program to the instructor.