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Mechatronics Laboratory
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Laboratory Task Sheet 11

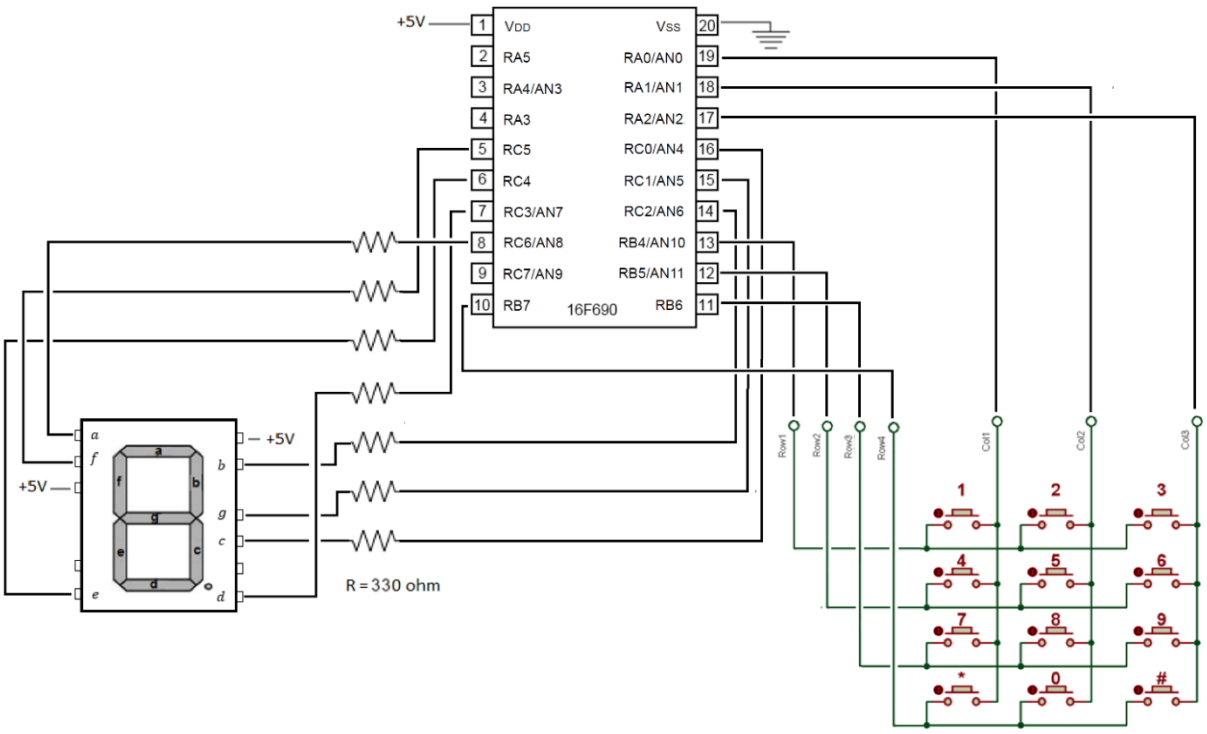
Title: Keypad Readout

Registers to be learned: WPUB Register

Objective: Program the microcontroller such that the seven segment LED displays any number pressed on the keypad. The microcontroller must detect the pressed button by sending digital signals to the keypad on PORTA0-2 and reading the digital signals received from the keypad on PORTB4-7 in every iteration.

Tasks

1. Create the circuit below using a seven segments LED, a bank of resistors, and a keypad.



2. Make a copy of the P16f690_Template file and name it TASK11Group00. Open the file in MPLAB Software and use the table below to construct the code.

Suggested Code Structure
Define Digit and Save Memory Bytes
Start
Call Initialization **Go to Main**
Main Call KeypadColumn Move Digit to Work register Call GetCode Move Work Register to PORTC Go to Main
KeypadColumn Clear PORTA0 and set PORTA1 and PORTA2 Move decimal 1 to Digit Move PORTB to Save XOR Work Register with binary 11110000 If the result of XOR is not zero, go to KeypadRow If the result of XOR is zero, go ahead Clear PORTA1 and set PORTA0 and PORTA2 Increment Digit . . . Clear PORTA2 and set PORTA0 and PORTA1 Increment Digit . . . Go to KeypadColumn
KeypadRow Swap Save and put the result in Work Register XOR Work Register with binary 00001110 If the result of XOR is zero, return If the result of XOR is not zero, go ahead Add decimal 3 to Digit Repeat this for 00001101 Add decimal 3 to Digit Repeat this for 00001011 Add decimal 3 to Digit Repeat this for 00000111

Add decimal 3 to Digit
Return

Get Code
Modify your code from previous tasks such that when the Star Button is pressed letters ‘d’ be displayed and when the Pound Button is pressed, letter ‘P’ be displayed

Initialization
Bank2
Use ANSEL and ANSELH Registers to define all the ports as digital
Use WPUB Register to turn on Weak Pull Up for PORTB4-7
Bank1
Use OSCCON Register to set the oscillator on 8 MHz
Use TRISA Register to define PORTA0-2 as output
Use TRISB Register to define PORTB4-7 as input
Use TRISC Register to define PORTC as output
Use OPTION_REG to turn on the Weak Pull Up main switch
Bank0
Initialize PORTA0-2
Initialize PORTC to turn off all the LEDs
return

end

3. Program the microcontroller and test it on the circuit.
4. Demonstrate the result to the instructor.
5. Upload the code on D2L and save it for yourself.