ECE 376 - Homework #2

Assembler, Flow Charts, Binary Inputs. Due Wednesday, September 7th

Assembler Programming

1) Determine the contents of registers W, A, and B after each assembler command:

Command	W	А	В
; Start	5	6	7
incf A,F			
decf B,W			
addwf A,F			
sublw 3			
andwf A,F			
iorwf B,F			

2) Convert the following C code to assembler (8-bit operations)

unsigned char A, B, C; A = 4*B + 5*C + 6;

3) Convert the following C code to assembler: (16-bit operations)

unsigned int A, B, C; A = 4*B + 5*C + 6;

4) Convert the following C code to assembler (bar chart - if-statements)

unsigned char A, B; if(A == 0) B = 0; if(A == 1) B = 1; if(A == 2) B = 3; if(A == 3) B = 7;

- 5) The flow chart below turns your PIC into a Dungeon's and Dragon's 20-sided die:
 - Press & release RB0 to roll the die
 - If you roll a 20, light up PORTD (critical hit)

Write the corresponding assembler code.

- 6) The flow chart below turns your PIC into a prime-number detector
 - If the buttons on PORTB are a 4-bit prime number {1, 2, 3, 5, 7, 9, 11, 13}, PORTC lights up
 - Otherwise, PORTC = 0

Write the corresponding assembly code





Problem #6: 4-Bit Prime #

Binary Inputs (hardware)

Assume a thermistor has a resistance-temperature relationship of

$$R = 1000 \exp\left(\frac{3905}{T + 273} - \frac{3905}{298}\right) \Omega$$

7) Design a circuit which outputs

- 0V when T < 20C
- 5V when T > 20C

8) Design a circuit which outputs

- 0V when T < 20C
- 5V when T > 25C

Assume three momentary switches are used: {A, B, C}. These switches are

- open when not pressed
- shorted (0 ohms) when pressed

9) Design a circuit which outputs the function Y = AB + C

- 5V when (A and B) is pressed,
- 5V when C is pressed, and
- 0V otherwise.