ECE 376 - Homework #2

Assembler & Flow Charts - Due Monday, September 9th

Assembler Programming

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

Command	W	A	B
; Start	11	12	13
incf B,W			
decf A,F			
iorwf A,W			
andwf B,F			
movlw 15			
subwf A,W			

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

```
unsigned char A, B, C;

A = B + 2*C + 3;
```

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

```
unsigned int A, B, C;

A = B + 2*C + 3;
```

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

```
unsigned char A, B, C;

if(A > B) C += 1
if(A < B) C -= 1
```

5) The flow chart on the left is for turning your PIC into a JK flip-flop:

- RB0 = CLK (output changes on the rising edge of RB0)
- RB1 = K
- RB2 = J
- PORTC = Q (all eight pins)

Write the corresponding assembly code

6) The flow chart to the right generates random numbes when you press a button:

- RB0: 6-sided die
- RB1: 8 sided die
- RB2: 16-sided die

Write the corresponding assembly code

Problem #5

```
Start
  |
PORTB = Input
PORTC = Output
  |
RB0 = 1?  --yes-->
  | no
RB0 = 1?  --no-->
  | 
Check RB1:RB2
  = 10 |  = 01  = 00  = 11
PORTC = 0xFF | PORTC = 0x00 | Toggle all pins on PORTC
```

Problem #5

Problem 6: Die Roll

```
Start
  |
PortB = Input
PortC = Output
  |
PORTB = 0?  --yes-->
  | no
Button?
  RB0 |  RB1  | Other
Increment PORTC mod 6 | Increment PORTC mod 8 | Increment PORTC mod 16
  |
PORTB = 0?  --No-->
  | yes
```

Problem 6: Die Roll