Extra Credit #4

Out: May 23, 2023
Due: May 30, 2023 @ 3:00 PM (start of lecture)

Code Optimization (30 points)

For this assignment there is **no collaboration allowed**

For the following code fragments, rewrite or write them to minimize the number of lines and/or words of code. That is, the number of lines of code and/or the number of words the assembled code generates. The operation of the code is correct (there are no errors) and must not be changed. In problems #1 and #2 no additional registers may be used or changed. In problem #3 no conditional branches may be used in the code. The code is only required to have the effects listed in the comments. Other "side effects" do not need to be replicated and no new "side effects" should occur. Be sure to test your code syntax in the assembler.

1) Check if R16 decremented to 0 (5 points)

```
;jump IFF R16 is 0 after decrementing it (LastRow is a label within 50
bytes)
DEC R16
CPI R16, 0
BREQ LastRow
```

2) Check if R16 decremented to 0xFF (5 points)

```
;jump IFF R16 is 0xFF after decrementing it
; (NextRow is a label within 50 bytes)
DEC R16
CPI R16, 0xFF
BREQ NextRow
```

3) Sgn function of R16 (12 points)

Given:	`R16` - 8-bit signed value
Result:	`R16` - sgn function of the original value in R16 (-1 for R16 < 0, 0 for R16 = 0, and +1 for R16 > 0)
Code:	can be done in 5 instructions

4) Increment time value in `R17|R16` (8 points)

Given:	`R17|R16` - 16-bit time value in BCD, R17 is the minutes (0 to 99) and R16 is the seconds (0 to 59)
Result:	`R17|R16` - the original time incremented by 1 second in the same format
Code:	modify the attached code to accomplish this

Resources

- Homework Q&A

Last updated April 12, 2023 04:49 PM by glen@caltech.edu