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SMALL ASSIGNMENT 13

Discussion on a high level with your colleagues is encouraged. Make sure the work submitted is your own. When in doubt, ask a TA or the instructor. If you are not sure what constitutes academic dishonesty, please refer to the AISC web site: https://aisc.uci.edu/.

You can fill out your answers below in text, paste screenshots, and/or include images (make sure the image is right side up & legible).

This homework covers:

- Ch 10: Calculator Example

AISC

Please initial here to indicate you understand UCI's Academic Integrity Policy and confirm that this is your own work you are submitting (this counts for points): CPZ

10.2

HW13Q102.asm

```
1  ;Algorithm to add two single-digit positive integers and produce a single-digit positive sum.
2  ;Assume that the two digits being added do in fact produce a single-digit sum.
3
4          .ORIG x3000
5          LD      R2, NUMBER  ; R2<-(-x0030)
6          TRAP    x23         ; input from keyboard
7          ADD     R1, R0, R2  ; Save digit in R1, subtract by x0030 (ASCII)
8          TRAP    x23         ; input second digit
9          ADD     R0, R1, R0  ; Add two digits
10         TRAP    x21         ; Display result
11         TRAP    x25         ; HALT
12
13 NUMBER  .FILL   xFFD0       ;2s comp of x0030
14         .END
```

10.3

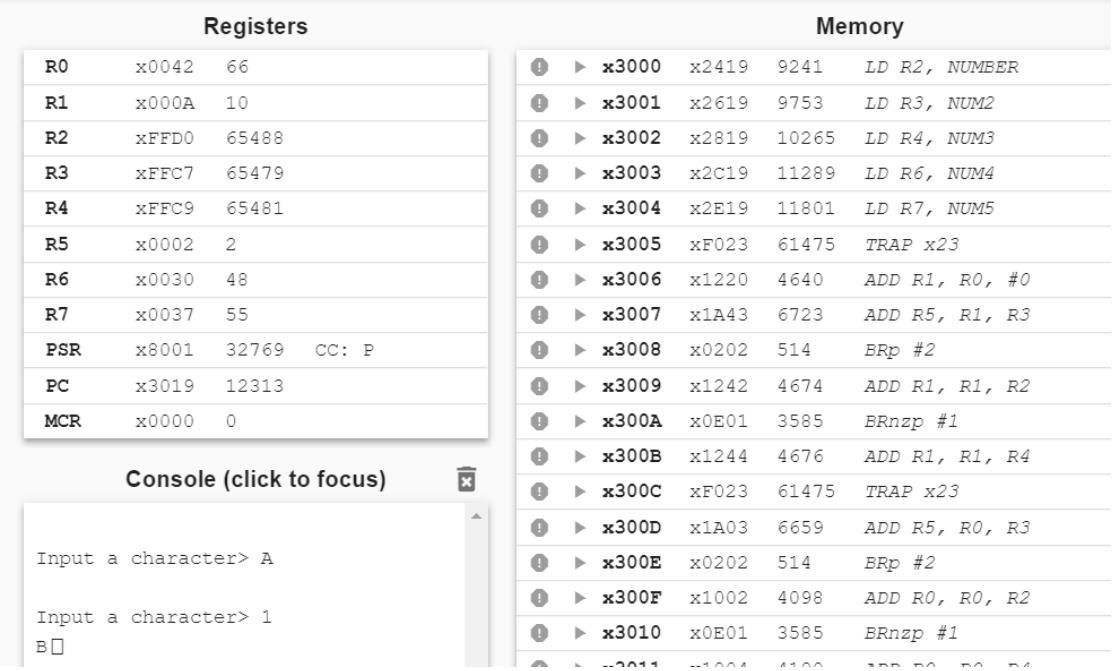
HW13Q103.asm

```
;Algorithm to add two single-digit positive hex numbers and produce a single hex-digit positive sum.
;Assume that the two digits being added do in fact produce a single hex-digit sum.

        .ORIG x3000
        ;loading conversion values
        LD      R2, NUMBER  ; R2<-(-#48)
        LD      R3, NUM2    ; R3<-(-x0039)
        LD      R4, NUM3    ; R4<-(-#55)
        LD      R6, NUM4    ; R6<-#48
        LD      R7, NUM5    ; R7<-#55
        ;1st hex digit
        TRAP    x23         ; input from keyboard
        ADD     R1, R0, #0  ; Save digit in R1
        ADD     R5, R1, R3  ; R5<- R1-x0039
        BRp     #2          ; If positive => A->F
        ADD     R1, R1, R2  ; convert to decimal (0->9)
        BRnzp   #1
        ;...need another branch, do one conversion or the other, not both
        ADD     R1, R1, R4  ; convert to decimal (10->15)
        ;2nd hex digit
        TRAP    x23         ; input second digit
        ADD     R5, R0, R3  ; R5<- R0-x0039
        BRp     #2          ; If positive => A->F
        ADD     R0, R0, R2  ; convert to decimal (0->9)
        BRnzp   #1
        ADD     R0, R0, R4  ; convert to decimal (10->15)
        ;Add two digits
        ADD     R0, R1, R0  ; Add two digits (max of 15)
        ADD     R5, R0, #-9 ; R5<-R0-9
          BRp     #2          ; If positive => A->F
          ADD     R0, R0, R6  ; Convert to ASCII 0->9
          BRnzp   #1
          ADD     R0, R0, R7  ; Convert to ASCII A->F
          ;display and end
          TRAP    x21         ; Display result
          TRAP    x25         ; HALT

NUMBER  .FILL   xFFD0       ;2s comp of x0030 (-#48)
NUM2    .FILL   xFFC7       ;2s comp of x0039
NUM3    .FILL   xFFC9       ;2s comp of x0037 (-#55)
NUM4    .FILL   x0030
NUM5    .FILL   x0037
        .END
```

Example:


Registers
R0 x0042 66
R1 x000A 10
R2 xFFD0 65488
R3 xFFC7 65479
R4 xFFC9 65481
R5 x0002 2
R6 x0030 48
R7 x0037 55
PSR x8001 32769 CC: P
PC x3019 12313
MCR x0000 0
Console (click to focus)
Input a character> A
Input a character> 1
B
Memory
x3000 x2419 9241 LD R2, NUMBER
x3001 x2619 9753 LD R3, NUM2
x3002 x2819 10265 LD R4, NUM3
x3003 x2C19 11289 LD R6, NUM4
x3004 x2E19 11801 LD R7, NUM5
x3005 xF023 61475 TRAP x23
x3006 x1220 4640 ADD R1, R0, #0
x3007 x1A43 6723 ADD R5, R1, R3
x3008 x0202 514 BRp #2
x3009 x1242 4674 ADD R1, R1, R2
x300A x0E01 3585 BRnzp #1
x300B x1244 4676 ADD R1, R1, R4
x300C xF023 61475 TRAP x23
x300D x1A03 6659 ADD R5, R0, R3
x300E x0202 514 BRp #2
x300F x1002 4098 ADD R0, R0, R2
x3010 x0E01 3585 BRnzp #1