COSC 221: Computer Organization I
Winter 2013

Programming Project #2: ASCII Conversion

Name: Zane Wonsey **Score:** 100

- *Documentation (20 points)*
  - Submitted zipped folder with source code and sample data 10 (10 points)
  - Provided meaningful comments 10 (10 points)

- *Program Correctness (80 points)*
  - Program written in LC-3 machine language 5 (5 points)
  - Program loads in memory location x3000 5 (5 points)
  - Assumes five ASCII characters are stored starting at x3100 10 (10 points)
  - Converts each ASCII character into 2s complement values 20 (20 points)
  - Stores converted values in original locations 20 (20 points)
  - Calculates the correct sum of the 5 converted values 15 (15 points)
  - Stores the sum in memory location x3200 5 (5 points)

Comments:

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; LC-3 Programming Project two
; Zane Wonsey

0011 0000 0000 0000 ; load the program here

; ########## notes ##########
; number of codes is listed at x3100
; ASCII codes directly follow starting at x3101
; store sum of all codes decimal value to x30FF


; ########## clear the relevant registers ##########

0101 000 000 1 00000 ; x3000  -  AND R0 to clear it    ---    use this for total sum
0101 001 000 1 00000 ; x3001  -  AND R1 to clear it    ---    use this for number count
0101 010 000 1 00000 ; x3002  -  AND R2 to clear it    ---    load current number code into this
0101 011 000 1 00000 ; x3003  -  AND R3 to clear it    ---    use this to LEA for loop

1110 011 011111011   ; x3004  -  LEA into R3 to use for loop
0110 001 011 000000  ; x3005  -  get number of ASCII codes
0001 011 011 1 00001 ; x3006  -  +1 to R3 to have it point at right spot


; ########## count controlled loop below here ##########

0110 010 011 000000  ; x3007  -  load ASCII code to R2
0101 010 010 1 01111 ; x3008  -  AND R2 with 01111 to get decimal
0001 000 000 000 010 ; x3009  -  ADD R2 to the sum in Ro
0111 010 011 000000  ; x300A  -  store R2 into old memory location
0101 010 010 1 00000 ; x300B  -  clear R2
0001 011 011 1 00001 ; x300C  -  +1 to R3 to move pointer on data
0001 001 001 1 11111 ; x300D  -  -1 from R1 to lower count for loop
0000 001 111111000   ; x300E  -  BRp pointing to x3007

; ########## loop is done ##########


0011 000 011101111   ; final STR to store sum in x30FF


; program is done
```