CS061 – Programming Assignment 01

Objective   The purpose of this assignment is to familiarize students with the
            basics of LC3 assembly language programming, the SIMPL simulator,
            and rudimentary debugging

Your Tasks   Implement the LC3 program from Lab 01. This is the program that
             used a DO-WHILE loop to multiply two numbers together.

             Once you have the program coded and saved to "assn1.asm"
             (remember to use _exactly_ that name), return to the terminal and load
             the program into the SIMPL simulator by typing:

             simpl assn1.asm

             When the simulator opens, place a _breakpoint_ at the beginning of the
             DO-WHILE loop by right-mouse-clicking that line of code and
             selecting "Mark as Breakpoint".

             Lastly, create a table of values for each register for
             - Before the loop
             - Each iteration of the loop
             - At the end of the program's execution

             Record the table as a block of comments beneath your header and
             above the actual LC3 code.

             Feel free to steal the format of the table below. Obviously, replace
             each "x" in the table with the actual value of the register ☺

Uh...help?   **Overview of LC3 Programming (created by past students)**
             http://www.lc3help.com/tutorials/

             Beginner's Guide to Linux/Unix
             http://www.ee.surrey.ac.uk/Teaching/Unix/index.html

The following program performs the action: R3 ← 6 * 12 (i.e. multiply 6 by 12 and write the result into Register 3) using a DO-WHILE loop:

```
;-------------------------------------------------
; Name: Hayao Miyazaki
; Login: hayam
; Email address: hayam@cs.ucr.edu
; Assignment: assn1
; Lab Section: <021 or 022>
; TA: Sean Foley
;
; I attest that this code was totally given
; to me and that I didn't come up with
; any of it  =P
;-------------------------------------------------


;---------------------------------------------------------------
; REG VALUES        R0   R1   R2   R3   R4   R5   R6   R7
;---------------------------------------------------------------
; Pre-loop          X    X    X    X    X    X    X    X
; Iteration 01      X    X    X    X    X    X    X    X
; Iteration 02      X    X    X    X    X    X    X    X
; ...
; Iteration n       X    X    X    X    X    X    X    X
; End of program    X    X    X    X    X    X    X    X
;---------------------------------------------------------------

.ORIG x3000                        ; Program begins here
;-------------------
; Instructions
;-------------------
LD  R1,  DEC_6                     ; R1 <-- 6
LD  R2,  DEC_12                    ; R2 <-- 12
LD  R3,  DEC_0                     ; R3 <-- 0

DO_WHILE     ADD R3,  R3,  R2      ; R3 <-- R3 + R2
             ADD R1,  R1,  #-1     ; R1 <-- R1 - 1
             BRp DO_WHILE          ; if ( LMR > 0 ) goto DO_WHILE

HALT                               ; Terminate the program
;---------
; Data
;---------
DEC_0   .FILL      #0        ; Put the value 0 into memory here
DEC_6   .FILL      #6        ; Put the value 6 into memory here
DEC_12  .FILL      #12       ; Put the value 12 into memory here

.END
```
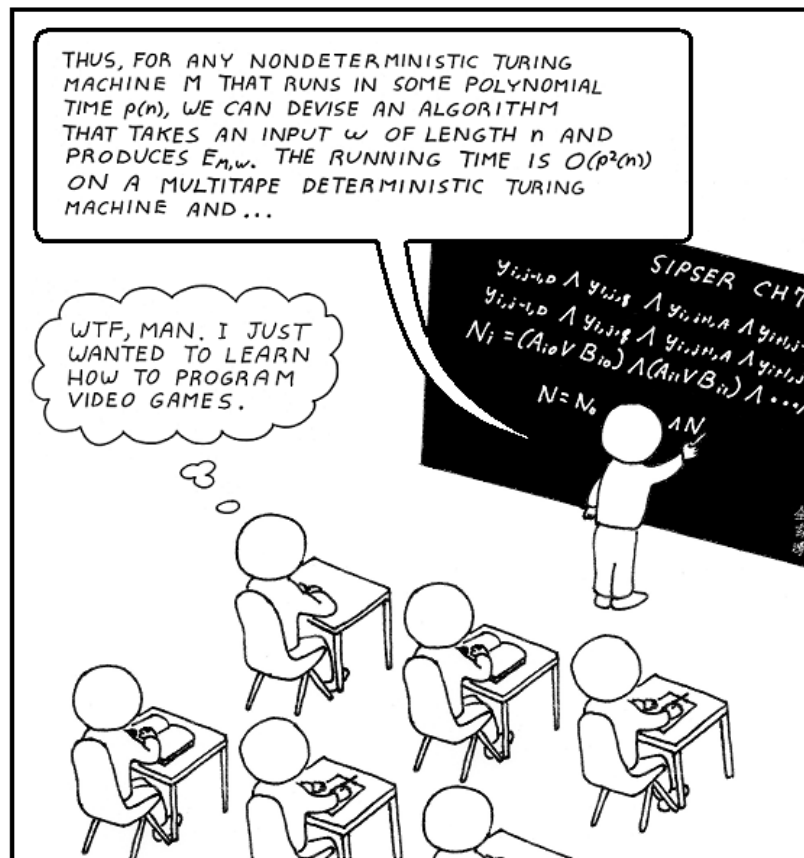
Comics??!Sweet!!!

Source: http://tweets2blog.files.wordpress.com/2009/11/computer_science_major.png?w=561&h=595

Rubric

- This assignment will be graded very leniently. You will be informed of any mistakes, but unless you actually leave things out, you probably won't lose any points.