**Carleton University**

**Department of Systems and Computer Engineering**

**SYSC 3006 (Computer Organization) summer 2020**

**Lab / Assignment 5 – Answers file**

Student Name: ID#:

### Part 1 – Fragment 1 [3-mark/5]

Questions about Fragment1 SRC.txt (included in lab 5.zip)

1. [0.25-mark] What is the high-level objective (purpose) of the code fragment? Explain the objective in terms of the net effect of the fragment on the variables it modifies.

x

1. [0.25-mark] Write C-like pseudocode that accomplishes the same objective (see lab statement for more details)

x

1. [1-mark] Starting after the SkipOverVariables declaration, add comments to the instructions that document what is being done ... the comments should be at the level of the pseudocode objective, not at the RTL level. For example, consider the instruction:

MOV R4, # 1

An RTL-level comment for the instruction might be: “; move #1 into R4”, which is accurate but says nothing about the net programming objective (i.e. why is loading #1 useful in the context of the program’s objective?). A more appropriate comment might be: “; R4 = address of Arr\_Size”.

|  |
| --- |
| B SkipOverVariables  ; Arr is an array of 3 words  Arr\_Size DCD #3  Arr  DCD #20 ; first (0 - th)element of Arr = 20  DCD #-4; second (1 - th)element of Arr = -4  DCD #0 ; third (2 - th)element of Arr = 0  SkipOverVariables  MOV R2, Arr ; x  LDR R3, [ Arr\_Size ] ; x  CMP R3, #0 ; x  BEQ Done ; x  SUB R3, R3, #1 ; x  ; x  ; x  ; x  Loop ; x  LDR R5, [R2, R3 ] ; x  ; x  ; x  ; x  ADD R5, R5, #10 ; x  STR R5, [R2, R3] ; x  SUB R3, R3, #1 ; x  BPL Loop ; x  ; x  Done  DCD #0xFFFFFFFF ; breakpoint instruction |

1. [0. 5-mark] When the fragment is executed, how many instructions will be executed (including the breakpoint instruction)?

x

1. [0.5-mark] When assembled, how many words of memory will the fragment occupy?

x

1. [0.5-mark]Assemble and run Fragment 1. To validate running the fragment in your lab report, submit the contents of Main Memory RAM before and after executing the fragment. (Hint: right-click on RAM Save Image ...).

Before execution:

|  |
| --- |
| v2.0 raw  x |

After execution:

|  |
| --- |
| v2.0 raw  x |

### Part 2 – Fragment 2 [2-mark/5]

1. [1.5-mark] complete the code by replacing all occurrences of “\*\*\*” with the necessary details and execute the processing for the data values in the template. Do not add additional instructions. Submit your completed (working) SRC fragment. This part of the lab will be easier to complete in the lab if some options for the “\*\*\*” entries have been considered prior to arriving for the lab.

|  |
| --- |
| x (Edit your final completed Fragment2 SRC code here) |

1. [0.5-mark] Assemble and run Fragment 2. To validate running the fragment in your lab report, submit the contents of Main Memory RAM before and after executing the fragment. (Hint: right-click on RAM → Save Image ...)..

Before execution:

|  |
| --- |
| v2.0 raw  x |

After execution:

|  |
| --- |
| v2.0 raw  x |

# Submission deadline

Must be submitted on cuLearn, locate (Assignment 4 submission) and follow instructions. Submission exact deadline (date and time) is displayed clearly within the Assignment 4 submission on cuLearn.

***Note: If you have any question please contact your respective group TA (see TA / group information posted on cuLearn) or use Discord class server.***

Good Luck