

Student #:

Name: Chester Park

Quiz #1-1 2018 (5 min.)

Note 1: **Return the answer sheet (even the blank one) to show your attendance.**

Consider an ARM assembly program segment below. Assume that `r0`, `r1` and `r2` are initially set to `0x0000_3000`, `0x0000_3010` and `0x0000_0004`, respectively.

```
Label1    LDR      r3, [r0], #4
          STR      r3, [r1], #4
          SUBS    r2, r2, #1
          BNE     Label1
```

(1) Calculate the total number of executions (*not* the number of branches taken) of the `BNE` instruction of the above function [5pt]. 4 executions (branch taken 3 times)

(2) Provide all the values (e.g., `0x00000000`) of the register/memory locations below (in the right side figure) assuming that the above program segment has just been run **completely** [5pt].

[**Before** Running]

Registers

r0	0x0000_3000
r1	0x0000_3010
r2	0x0000_0004
r3	0x0000_0002

Memory

0x0000_3000	0x0000_0000
0x0000_3004	0x0000_0001
0x0000_3008	0x0000_0002
0x0000_300c	0x0000_0003
0x0000_3010	0x0000_0004
0x0000_3014	0x0000_0005
0x0000_3018	0x0000_0006
0x0000_301c	0x0000_0007

[**After** Running]

Registers

r0	0x0000_3010
r1	0x0000_3020
r2	0x0000_0000
r3	0x0000_0003

Memory

0x0000_3000	0x0000_0000
0x0000_3004	0x0000_0001
0x0000_3008	0x0000_0002
0x0000_300c	0x0000_0003
0x0000_3010	0x0000_0000
0x0000_3014	0x0000_0001
0x0000_3018	0x0000_0002
0x0000_301c	0x0000_0003

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Quiz #1-2 2018 (5 min.)

Note 1: **Return the answer sheet (even the blank one) to show your attendance.**

Consider an ARM assembly program segment below. Assume that r0, r1 and r2 are initially set to **0x0000_3000**, **0x0000_3008** and **0x0000_0004**, respectively.

```
Label1    LDR      r3, [r0], #4
          STR      r3, [r1], #4
          SUBS    r2, r2, #1
          BNE     Label1
```

Provide **all** the values (e.g., 0x00000000) of the register/memory locations below (in the right side figure) assuming that the above program segment has just been run **completely** [5pt].

[**Before** Running]

Registers	
r0	0x0000_3000
r1	0x0000_3008
r2	0x0000_0004
r3	0x0000_0002

Memory	
0x0000_3000	0x0000_0000
0x0000_3004	0x0000_0001
0x0000_3008	0x0000_0002
0x0000_300c	0x0000_0003
0x0000_3010	0x0000_0004
0x0000_3014	0x0000_0005
0x0000_3018	0x0000_0006
0x0000_301c	0x0000_0007

[**After** Running]

Registers	
r0	0x0000_3010
r1	0x0000_3018
r2	0x0000_0000
r3	0x0000_0001

Memory	
0x0000_3000	0x0000_0000
0x0000_3004	0x0000_0001
0x0000_3008	0x0000_0000
0x0000_300c	0x0000_0001
0x0000_3010	0x0000_0000
0x0000_3014	0x0000_0001
0x0000_3018	0x0000_0000
0x0000_301c	0x0000_0001

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Quiz #1-3 2018 (5 min.)

Note 1: **Return the answer sheet (even the blank one) to show your attendance.**

Consider an ARM assembly program segment with **multiple transfer instructions** (LDM, STM) below. Assume that r0, r1 and r2 are initially set to **0x0000_3000**, **0x0000_3010** and **0x0000_0002**, respectively.

```
Label1    LDMIA    r0!, {r3-r4}
          STMIA    r1!, {r3-r4}
          SUBS     r2, r2, #1
          BNE      Label1
```

Provide **all** the values (e.g., 0x00000000) of the register/memory locations below (in the right side figure) assuming that the above program segment has just been run **completely** [5pt].

[**Before** Running]

Registers	
r0	0x0000_3000
r1	0x0000_3010
r2	0x0000_0002
r3	0x0000_0002
r4	0x0000_0003

Memory

0x0000_3000	0x0000_0000
0x0000_3004	0x0000_0001
0x0000_3008	0x0000_0002
0x0000_300c	0x0000_0003
0x0000_3010	0x0000_0004
0x0000_3014	0x0000_0005
0x0000_3018	0x0000_0006
0x0000_301c	0x0000_0007

[**After** Running]

Registers	
r0	0x0000_3010
r1	0x0000_3020
r2	0x0000_0000
r3	0x0000_0062
r4	0x0000_0003

Memory

0x0000_3000	0x0000_0000
0x0000_3004	0x0000_0001
0x0000_3008	0x0000_0002
0x0000_300c	0x0000_0003
0x0000_3010	0x0000_0000
0x0000_3014	0x0000_0001
0x0000_3018	0x0000_0002
0x0000_301c	0x0000_0003