

**ECE-395: Lab 1 – Worksheet****Group:** \_\_\_\_\_**Date:** \_\_\_\_\_**Names:** \_\_\_\_\_**Part 1: Memory access and moving data**

<b>Instruction</b>	<b>Value after execution of instruction</b>	
LDR R1, const_val	R1 =	
LDR R0, =const_val	R0 =	
	First 8 bytes of memory starting at address in R0	
LDR R1, [R0]	R1 =	
LDRH R1, [R0]	R1 =	
LDRB R1, [R0]	R1 =	
LDR R0, =equate_val	R0 =	
LDR R1, =const_val	R1 =	
STR R0, [R1]	R0 =	R1 =
	First 8 bytes of memory starting at address in R1	
MOV R2, R0	R0 =	R2 =
MOVS R2, #0	R2 =	

**Question:**

*LDR R0, =const\_val* has different behavior than *LDR R0, =equate\_val*.

Why?

**Part 2: Arithmetic and logic operations**

<b>Instruction</b>	<b>Value after execution of instruction</b>					
MSR APSR,R0 (first)	R1 =		R2 =		R3 =	
	N =	Z =	C =	V =		
ADDS R2,R1	R1 =		R2 =			
	N =	Z =	C =	V =		
SUBS R2,R1	R1 =		R2 =			
	N =	Z =	C =	V =		
ADDS R3,R1	R1 =		R3 =			
	N =	Z =	C =	V =		
SUBS R3,R1	R1 =		R3 =			
	N =	Z =	C =	V =		
MSR APSR,R0 (second)	R1 =		R2 =		R3 =	
	N =	Z =	C =	V =		
ADD R3,R1	R1 =		R3 =			
	N =	Z =	C =	V =		
CMP R1,R2	R1 =		R2 =			
	N =	Z =	C =	V =		
CMP R2,R1	R1 =		R2 =			
	N =	Z =	C =	V =		
CMP R1,R1	R1 =					
	N =	Z =	C =	V =		
CMP R1,#0x40	R1 =					
	N =	Z =	C =	V =		
CMP R2,#0x40	R1 =					
	N =	Z =	C =	V =		
CMN R1,R3	R1 =		R3 =			
	N =	Z =	C =	V =		
CMN R1,R3	R1 =		R3 =			
	N =	Z =	C =	V =		

**Part 3: Unconditional Branches**

Instruction	Value after execution of instruction
B spot3	R15 (PC) =
B spot4	R15 (PC) =
B spot2	R15 (PC) =
B spot1	R15 (PC) =

**Question:**

What is the address of:

spot1: \_\_\_\_\_

spot2: \_\_\_\_\_

spot3: \_\_\_\_\_

spot4: \_\_\_\_\_

**Part 4: Conditional Branches*****BNE Instruction***

Loop	Instruction	Value after execution of instruction
1	SUBS R0,#1	R0 = N =      Z =      C =      V =
	BNE dec_cnt	R15 (PC) =
2	SUBS R0,#1	R0 = N =      Z =      C =      V =
	BNE dec_cnt	R15 (PC) =
3	SUBS R0,#1	R0 = N =      Z =      C =      V =
	BNE dec_cnt	R15 (PC) =
4	SUBS R0,#1	R0 = N =      Z =      C =      V =
	BNE dec_cnt	R15 (PC) =

**BGE Instruction**

Loop	Instruction	Value after execution of instruction			
1	SUBS R0,#1	R0 =			
		N =	Z =	C =	V =
	BGE dec_cnt	R15 (PC) =			
2	SUBS R0,#1	R0 =			
		N =	Z =	C =	V =
	BGE dec_cnt	R15 (PC) =			
3	SUBS R0,#1	R0 =			
		N =	Z =	C =	V =
	BGE dec_cnt	R15 (PC) =			
4	SUBS R0,#1	R0 =			
		N =	Z =	C =	V =
	BGE dec_cnt	R15 (PC) =			

**Part 5: Subroutines with Linked Branches**

Loop	Instruction	Value after execution of instruction
1	LDR R0,=value1	R0 =
		First 4 bytes of memory starting at address in R0
1	BL change_value	R14 (LR) =
		R15 (PC) =
1	LDR R0,=value2	R0 =
		First 4 bytes of memory starting at address in R0
1	BL change_value	R14 (LR) =
		R15 (PC) =
2	LDR R0,=value1	R0 =
		First 4 bytes of memory starting at address in R0
2	BL change_value	R14 (LR) =
		R15 (PC) =
2	LDR R0,=value2	R0 =
		First 4 bytes of memory starting at address in R0
2	BL change_value	R14 (LR) =
		R15 (PC) =