Daniel Delgado Acosta

CSE 2130

4-17-22

Homework #3a

Lab 1 - ALU Operations:

Assembly Code:

```
.ORIG x3000
LEA R2, xFF
LDR R1, R2, x0
LDR R3, R2, x1
;x+y
ADD R4, R1, R3
STR R4, R2, x2
;x AND y
AND R4, R1, R3
STR R4, R2, x3
;x OR y
NOT R5, R1
NOT R6, R3
AND R4, R5, R6
NOT R4, R4
STR R4, R2, x4
;NOT(x)
NOT R4, R1
STR R4, R2, x5
;NOT(y)
NOT R4, R3
```

```
STR R4, R2, x6
;x+3
ADD R4, R1, #3
STR R4, R2, x7
;y-3
ADD R4, R3, #-3
STR R4, R2, x8
;x even or odd
AND R4, R1, x1
STR R4, R2, x9
HALT
.END

.ORIG x3100
.FILL #
.FILL #
.END
```

Outputs:

X=9 & Y=-13:

x3100	x0009	9	.FILL #9
x3101	xFFF3	-13	.FILL #-13
x3102	xFFFC	-4	
x3103	x0001	1	
x3104	xFFFB	-5	
x3105	xFFF6	-10	
x3106	x000C	12	
x3107	x000C	12	
x3108	xFFF0	-16	
x3109	x0001	1	

X=10 & Y=20:

x3100	x000A	10	.FILL #10
x3101	x0014	20	.FILL #20
x3102	x001E	30	
x3103	x0000	0	
x3104	x001E	30	
x3105	xFFF5	-11	
x3106	xFFEB	-21	
x3107	x000D	13	
x3108	x0011	17	
x3109	x0000	0	

X-11 & Y=15:

x3100	xFFF5	-11	.FILL #-11
x3101	x000F	15	.FILL #15
x3102	x0004	4	
x3103	x0005	5	
x3104	xFFFF	-1	
x3105	x000A	10	
x3106	xFFF0	-16	
x3107	xFFF8	-8	
x3108	x000C	12	
x3109	x0001	1	

X=15 & Y=-11:

x3100	x000F	15	.FILL #15
x3101	xFFF5	-11	.FILL #-11
x3102	x0004	4	
x3103	x0005	5	
x3104	xFFFF	-1	
x3105	xFFF0	-16	
x3106	x000A	10	
x3107	x0012	18	
x3108	xFFF2	-14	
x3109	x0001	1	

X=9 & Y=12:

x3100	x0009	9	.FILL #9
x3101	x000C	12	.FILL #12
x3102	x0015	21	
x3103	x0008	8	
x3104	x000D	13	
x3105	xFFF6	-10	
x3106	xFFF3	-13	
x3107	x000C	12	
x3108	x0009	9	
x3109	x0001	1	

Lab 2 - Arithmetic functions:

Assembly Code:

```
.ORIG x3000
LDI R1, X
LDI R2, Y

;X-Y
NOT R4, R2
ADD R4, R4, #1
ADD R4, R1, R4
STI R4, x_2

;|X|
ADD R3, R1, #0
BRzp ZP1
NOT R3, R3
ADD R3, R3, #1
ZP1 STI R3, absX

;|Y|
ADD R4, R2, #0
BRzp ZP2
NOT R4, R4
ADD R4, R4, #1
ZP2 STI R4, absY

;|X|&|Y| GREATEST
```

```
NOT R5, R4
ADD R5, R5, #1
ADD R5, R3, R5

BRz ZERO
BRp ONE
ADD R5, R3, R5
ADD R5, R4, #0
BRn TWO
ADD R5, R3, R5
ADD R5, R4, #0

ZERO ADD R6, R6, #0
ONE ADD R5, R6, #1
TWO ADD R6, R6, #2
STI R6, Z

HALT
X .FILL X3120
Y .FILL X3121
X_2 .FILL X3122
absX .FILL X3123
absY .FILL X3124
Z .FILL X3125
.END

.ORIG X3120
```

.FILL #

.FILL #

.END

Outputs:

X=9 & Y=-13:

x3120	x0009	9	.FILL #9
x3121	xFFF3	-13	.FILL #-13
x3122	x0016	22	
x3123	x0009	9	
x3124	x000D	13	
x3125	x0002	2	

X=10 & Y=20:

x3120	x000A	10	.FILL #10
x3121	x0014	20	.FILL #20
x3122	xFFF6	-10	
x3123	x000A	10	
x3124	x0014	20	
x3125	x0002	2	

X=-11 & Y=15:

x3120	xFFF5	-11	.FILL #-11
x3121	x000F	15	.FILL #15
x3122	xFFE6	-26	
x3123	x000B	11	
x3124	x000F	15	
x3125	x0002	2	

X=15 & Y=-11:

x3120	x000F	15	.FILL #15
x3121	xFFF5	-11	.FILL #-11
x3122	x001A	26	
x3123	x000F	15	
x3124	x000B	11	
x3125	x0003	3	

X=12 & Y=12:

x3120	x000C	12	.FILL #12
x3121	x000C	12	.FILL #12
x3122	x0000	0	
x3123	x000C	12	
x3124	x000C	12	
x3125	x0003	3	