**(10 pts) CS 3843 Computer Organization Recitation #02 Name/abc123:**

**Due Fri Feb 22 , 2019 11:59pm**

1. For a 11-bit CPU:

1. What is the maximum number of values (express in decimal)

2048

1. What is the highest positive number when unsigned (express in decimal)

2047

1. What is the range of values for two’s complement signed values (express in decimal)

-1024 - 1023

1. Show the hex and binary equivalent of -1.

1111111111

0xFF3

2. For 8-bit 2’s complement math, express each number as hexadecimal. Add them together in hexadecimal and show the result. Convert that result to decimal and compare answers. Finally, show the values of each of the four flags after doing the math.

CF: carry flag OF: overflow flag ZF: zero flag SF: sign flag

1. -5 + -38

0xD5

ZF=0

SF=1

CF=1

OF=0

1. 120 + 53

0x9D

ZF=0

SF=1

CF=0

OF=0

3. For 8-bit 2’s complement math, express each number as hexadecimal. For each set of numbers below, perform the logical operations:

a. -5 AND -38

0xDA and 0xFB

= 0xDA

b. -45 AND -90

###### 0xD3 AND 0xA5

1000 0001 or 0x81

1. Use AND to clear bits 2, 3, 4 from the right of 01010110, leaving other bits untouched. Show the result in hex.

0x50

d. -5 OR -38 0xFB OR 0xDA

= 0xFB

e. -45 OR -90

0xD3 OR 0xA5

= 0xF7

f. Use OR to set bits 1, 3, 6, 7 of 01010110, leaving other bits untouched. Show the result in hex.

0xDE

g. -5 XOR -38

0xFB XOR 0xDA

= 0x21

h. 120 XOR -53

###### 0x78 XOR 0x35

=0x4D

i. Use XOR to flip bits 2, 4, 6 of 01010110, leaving others untouched. Show the result in hex.

0x0E

4. Perform an arithmetic shift left, arithmetic shift right, logical shift left, and logical shift right for the following 8-bit numbers. Show the result in binary.

1. 0x73

###### SAL-1110 0110

SAR- 0011 1001

SLR- 0011 1001

1. 0x85

###### SAL-0000 1010

SAR-1100 0010

SLR-0100 0010