**CIS 21JA - Lab 1 Name: \_\_\_Aryan Garg\_\_**

*Note: all binary values shown below have a space inserted at every 4 bits to make it easier to read, the space is not part of the actual data value*  
  
1. (1/2pt) The most significant bit in a binary doubleword is bit number \_31st bit\_\_

2. The color value of a pixel in an image is within a range of 0 to 255.

(1/2pt) Is this color value signed or unsigned data? \_signed\_\_\_

(1/2pt) How many bits is needed to represent a data value between 0 to 255? \_\_8\_\_

3. (1pt) The sequence of numbers on the last slide of the module 1 class notes is the short hand notation of how the computer sees a text string.

What does the first value and last value actually look like for the computer? (Hint: what base does a computer work with?)

First value: HEX 54 → 01010100

Last Value: HEX 64 → 01100100

What does the string look like as a text string for humans? “The End”

Note: To get credit for questions 4-9: *show all work* and read the problem statement carefully so your answer is in the *correct size* for the data.

4. (1.5pt) Convert decimal 28 to binary, and show the result as a byte of data.

DEC 28

28/2 = 14 R 0

14/2 = 7 R 0

7/2 = 3 R 1

3/2 = 1 R 1

1 / 2 = 0 R 1

BINARY 0001 1100

5. (1.5pt) Convert decimal -11 to hexadecimal, and show the result as a word of data.

DEC – 11

11 in binary:

11/2 = 5 R 1

5/2 = 2 R 1

2/2 = 1 R 0

1 / 2 = 0 R 1

0000 0000 0000 1011 = DEC 11

Convert to neg (2 compliment + 1)

1111 1111 1111 0101 = DEC -11

Convert to Hex:

FFF5

6. (1.5pt) Convert the *unsigned* hexadecimal value C2 to decimal, and show the result as a byte of data.

HEX C2 = (12 \* 16^1) + (2 \* 16^0) = 12\*16 + 2 = DEC 194

7. (1.5pt) Convert the *signed* hexadecimal value C2 to decimal, and show the result as a byte of data.

HEX C2 = BIN 1100 0010

Find absolute value of BIN 1100 0010

0011 1101 + 0000 0001 = BIN 0011 1110

Convert -1\* 0011 1110 to DEC

-1\*(2^5 + 2^4 + 2^3 + 2^2 + 2^1) = DEC -62

8. (1pt) Do the following binary subtraction in the same way that the CPU would do the subtraction. Show the result of the subtraction as a byte of data  
 1001 1000 – 1010 1000

Find compliment of 1010 1000

0101 0111 + 0000 0001 = 0101 1000

Add 2 numbers

1001 1000

0101 1000

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1111 0000

9. (1/2pt) If X is false, Y is false, and Z is false, show the result of: X xor (Y and Z)

Y and Z = False and False = False

X xor (Y and Z) = false xor false = false

10. (5pts) Follow the instructions at the link "Set up the IDE for MASM" (in module 1) to set up the IDE with an assembly language project that you can use for the rest of the quarter to write your assembly programs.

Then do the following steps to complete the work:

1. At the Solution Explorer window of the IDE, right click on the hello.asm name and select "Remove". This will remove the hello.asm file from the project.
2. Download the lab1.asm file. Then right click on the Project name and select "Add Existing Item". Find the lab1.asm file and select it to add it to the project.
3. Follow the instruction in the lab1.asm file to modify the code.
4. Build and run the program.
5. Take a screen shot or a take a picture of your program output screen (the pop up screen with output text that says: This is ... assembly program). Then paste the image in the space below.   
   Make sure you paste an image, not the text output. The image is your proof that you've successfully built and run lab1.asm.

