# CS101 Assignment Solution # 1 Fall 2021

## Question no 1:

### PART A:

Encode the following decimal fractional value to binary floating point notation using the 8-bit floating-point format.

### Solution:

- -3.5

As number is negative so sign bit notation is 1.

- First convert 3.5 into binary

Binary of 3.5 is 011.1

Mantissa field:

0111

radix in .0111 must be moved 3 bit to the right to obtain 011.1

So exponent is positive 3…

Final 8 bit floating point notation is

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |

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### PART B:

Decode the following 8-bit floating point binary value to decimal fractional value.

- 00101100

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |

Mantissa is:

.1100

Exponent:

010

It is in 3-bit excess notation-4:

-2

Exponent is negative so shift radix (.1100) left

.001100

Convert it into decimal fractional value

.001100 is equal to .0011

| | | | | |
|---|---|---|---|---|
| . | $2^{-1}$ | $2^{-2}$ | $2^{-3}$ | $2^{-4}$ |
| . | 1/2 | ¼ | 1/8 | 1/16 |
| . | 0 | 0 | 1 | 1 |

0+0+1/8+1/16=0.1875Answer

***QUESTION NO 2:***

**Perform the binary addition on the following decimal numbers.**

46( 3/8) and 92(7/8)

***SOLUTION:***

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Convert into binary
46(3/8)=101110.0110
92(7/8)=1011100.1110

Now,
Addition

1+0=1
1+1=0 (1 carry)
1+1+1=1(1 carry)
0+1=1

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 0 | 1 | 1 | 1 | 0 | 0 | . | 1 | 1 | 1 |
| | 0 | 1 | 0 | 1 | 1 | 1 | 0 | . | 0 | 1 | 1 |
| | | | | | | | | | | | + |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | . | 0 | 1 | 0 |

So,
10001011.010 **Answer.**

## ***QUESTION NO 3:***

The logical operations (AND, OR, NOT, and XOR etc.) discussed in the video lessons can be combined to perform some specific operations. Two such operations (circuits) are depicted in the first column "Circuits" of the following table. You are required to determine the output of each of the following circuits for the input values given in column 2 and column 3.

## ***SOLUTION:***

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| Circuits | What would be the output when the upper input is 1 and the lower input is 0? | What would be the output when upper input is 0 and the lower input is 1? |
|---|---|---|
| INPUTS<br>OUTPUT | 0 | 0 |
| INPUTS<br>OUTPUT | 0 | 1 |

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