# CSE 340: Computer Architecture

## Fall 2024

Quiz 3 (Set A)

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**Name:** Shouvik
**ID:** **Section:**

### Question 1 (10 marks)

Convert the following floating point number to the IEEE 754 **standard** single precision floating point format: 0.203125

### Question 2 (10 marks)

Convert the following word to a single precision binary floating point number, assuming that there are 9 bits for the exponent: 0xA0F10000

### Question 3: SURPRISE (5 marks)

How would you check whether an overflow has occurred during integer multiplication using the available RISC-V multiplication instructions? Answer precisely.

1. $(0.203125)_{10} = (0.001101)_2 = 1.101 \times 2^{-3}$

exp = $-3+127 = 124 =$ 0111 1100, frac = 101

bin → 0 01111100 10100....0

s e f

2. bias = $2^{9-1} - 1 = 255$

0xA0F10000 = 1010 0000 1111 0001 0000 ... 0000

s e f

biased exp = $(0100\ 0001)_2 = 131$, actual exp = 131 − 255 = −124

result = $-1.11\ 0001 \times 2^{-124}$

3. mul, mulh instructions.

check if msb of mul result = all bits of mulh.

then no overflow.