Department of Electrical & Computer Engineering
University of California, Davis

EEC 170 – Computer Architecture
Fall Quarter 2023

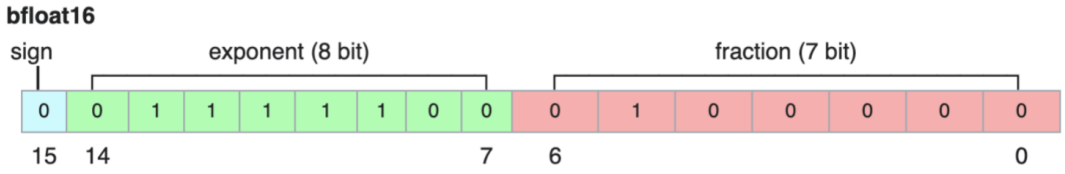
Laboratory Exercise 3: Multiplication in Bfloat16

Specification

Write a RISC-V assembly language function called **bfmult** that takes two 16 bit numbers X and Y in **bfloat16** representation and returns 16 bit product of X and Y also in the bfloat16 representation.
Use the algorithm shown in Figure 3.16 on page 221 of your textbook. See the example on Page 222 of your textbook. That is your first test case.

What is bfloat16 representation?

It is identical to the IEEE 32-bit floating standard representation except that the mantissa is 7 bits instead of 23.



What do you need to do?

a) Write a function bfmult that multiplies X and Y where X and Y are 16 bit bloat16 representation of X and Y.
b) X and Y are passed to the function registers a1 and a2 and the result is returned in register a3.
c) Code to call the function and print the inputs and results are provided. Don't modify that. Just add your code to the function labeled **bfmult**
d) Here is the expected answer after you run the program with the given values in the skeleton file.

```
X = 0x00004020
Y = 0x000040A8
X x Y = 0x00004152
Exited with error code 0
Stop program execution!
-
```

Useful Websites:

1. https://en.wikipedia.org/wiki/Bfloat16_floating-point_format
2. https://cloud.google.com/tpu/docs/bfloat16
3. https://float.exposed/0x3952