CSE340: Computer Architecture

Assignment 3 [MSDH]

Chapter 3 (Arithmetic For Computers)

Total Marks: 30 (Marks are indicated in third brackets after each question)

# [CO2] Question 1 [Marks: 3]

Let's assume you are trying to multiply the contents of register *x5* and *x6*. Now, **write** the RISCV code for adding the *lower 32-bit* of the multiplication result with the value stored in register *x7*, saving the result in register *x16*.

# [CO2] Question 2 [Marks: 3]

Let's assume you are trying to divide the contents of register *x5* with *x6*. Now, **write** the RISCV code for adding the *remainder* of the result with the value stored in register *x7*, saving the result in register *x16*.

# [CO2] Question 3 [Marks: 5]

Consider the below equation and **write** RISCV code for it:

X = ( A[3] + B[5] ) - ( B[2] + 5X );

Assume array A stores floating point values and its base address in *x16* and array B stores floating point values and its base address is in *x17* variable X is in floating point register *f18*, all variables are of the *float* *datatype*. You can also use *mul/div instructions!*

# [CO1] Question 4 [Marks: 6]

Consider the value - 63.7712

1. Let’s assume you have a 21-bit register having 6-bit for exponent. Now **convert** this value using IEEE floating point representation. Also convert this into hexadecimal form. **[3]**
2. Let’s assume you have a 12-bit register having 4-bit for exponent. Now **convert** this value using IEEE floating point representation. Also convert this into hexadecimal form. **[3]**

# [CO1] Question 5 [Marks: 4]

**Perform** multiplication between 1001 (Multiplicand) and 111 (Multiplier) using the *long multiplication* approach. Suppose the *product* and *multiplicand* registers are 8-bit and the *multiplier* register is 4-bit.

# [CO1] Question 6 [Marks: 3]

**Perform** multiplication between 0101 (Multiplicand) and 11 (Multiplier) using the *optimized multiplication approach*. Suppose the *product* register is 8-bit and the *multiplicand* register is 4-bit.

# [CO1] Question 7 [Marks: 3]

Suppose X = 7ACD0000 and Y = 5BCA0000. **Perform** X + Y using IEEE floating point representation.

# [CO1] Question 8 [Marks: 3]

Suppose X = - 9.325 and Y = 14.409. **Perform** X \* Y using IEEE floating point representation.