CSCI 516 - Fundamental Concepts in Computing and Machine Organization
Programming Assignment 1

Due on: 11:55 PM, 09/27/2022

Requirement

- Compile and simulate the assembly program (.S file) using DS-5 simulator.
- Comment your assembly code.
- Name the source file according to the question number, like: 1.S; 2.S, 3.S, etc...
- **Only** upload the .S files to D2L, DO NOT upload the entire DS-5 project.

Questions

1. Write a LEGv8 assembly code to compute the sum and mean of four 64-bit values. The four values are stored in an array. Compute the sum and mean and store the sum and mean in X20 and X21 respectively. Assume all values are 64-bits. Do not use divide and branch instructions in your code. Comment your assembly code. (You can use the some code from the test.S in Programming Assignment 0, there was an array with 3 values; but you need an array with 4 values here)

2. Implement the below C code snippet using LEGv8 assembly program. Your LEGv8 assembly program should generate the exact same thing like the C code does. Base address of x is stored in register X0. Assume variables a and b are stored in registers X20 and X21. Assume all values are 64-bits. Do not use divide and multiply instructions in your code. Comment your assembly code.

```
a = a + b;
x[1] = a + x[2];
x[2] = a >> 4;
x[a] = 2*b;
x[3] = x[a/2] - b;
```

3. Write an ARMv8 assembly program to computer and store y, where $y = x^z$. The inputs x and z are in X19 and X20 respectively, and the inputs are 64-bits, non-negative integers less than 10. Store the result y in X21.