CS 261 Machine Organisation (Spring 2020) - Homework 3

Name: Jacob Diaz   UIN: 671435740

Due Date: February 11, 5 p.m.
Please submit the completed fillable pdf to Gradescope for Problem 1. Problem 2 will require code in Gradescope.

Problem 1

[50 points, 10 points each question]

There are several bitwise operators to help manipulate bits:

- & - Operates on the corresponding bits of two strings of bits. The result is a 1 if both bits were 1, 0 if not.
- | - Operates on the corresponding bits of two strings of bits. The result is a 1 if either bit was 1, 0 if not.
- ^ - Operates on the corresponding bits of two strings of bits. The result is a 1 if only one bit was 1, 0 if not.
- >> (number) - Operates on one string of bits. Shifts all bits to the right equivalent to the number provided.
- << (number) - Operates on one string of bits. Shifts all bits to the left equivalent to the number provided.
- ~ - Operates on one string of bits. Inverses all of the bits.

Consider variable string1 = 0x12345678 and variable mask = 0xF

Fill in the missing value (???) by inputting what it should be in the Solutions boxes adjacent to the respective Task below. Each Task is distinct so earlier tasks have no bearing on the following ones (updating string1 will only be for that one task). You are not allowed to introduce new variables or strings of bits.

Task	Solution
0x8 = string1 ??? mask	0x8 = string1 & mask
0x01234567 = string1 >> ???	0x01234567 string1 >>4
0x12345000 = string1 >> ??? << ???	0x12345000 = string1 >> 12 <<12
0x0000123F = (string1 >> ???) ??? mask	0x000123F = string1 >> 16 I mask
0x92345678 = ((mask & string1) << ???) ??? string1	0x92345678 = ((mask & string1) << 28) ^ string1

Problem 2 [50 points]

Write a C function hwkThree, that takes an unsigned integer variable. The variable will contain the encoding for a single precision floating point value in normalized form. Your code should take this value, isolate the biased exponent field, subtract the bias, and return the unbiased exponent of the value.

Here is the expected function declaration:

```
int hwkThree(unsigned value);
```