Computer Architecture (CS2323) 2019

Due Sep 18, 11:59 PM

Programming Assignment on FP/FxP/Int

100 points

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Assume we have T-bit storage for a number. Write a C/C++ program for printing int, fixed-point (FxP) and IEEE-754 FP values for a particular combination or all combinations of T-bits. For example, if T=8, then there are a total of 2^8 (=256) combinations.

* For int, we have 1 sign bit and T-1 mantissa bits.
* For FxP, we have 1 sign bit, E integer bits and T-E-1 fraction bits.
* For FP, we have 1 sign bit, E exponent bits and T-E-1 mantissa bits.

Input formats: There are two input formats. Assuming the binary name is MyBinary, we will test:

Format 1: ./MyBinary T E Single ActualCombination
For example,
./MyBinary 8 3 Single 10101100

Here, output file should be named Rollnumber_T_E_Single_ActualCombination.txt
e.g., CS15BTECH11099_8_3_Single_10101100.txt

Format 2: ./MyBinary T E All
For example,
./MyBinary 8 3 All

This should print all 256 combinations.
Here, output file should be named Rollnumber_T_E_All.txt
e.g., CS15BTECH11099_8_3_Single_10101100.txt

The integer is not stored in two's complement or one's complement form, but as a signed integer.

To ensure proper formatting, use this style for printing a single combination:

```
string s;
// read or generate s
std::cout << s <<setw(20) << getIntegerVal(s) << setw(20) << getFixedPoint(s) << setw(20) << getFP(s)<<"\n";
```

We will not test your program with any incorrect output or for T>32. We will also ensure (T-E-1)>=1.

Submission: The name of your submitted file MUST be Rollnumber_Formats.cpp or Rollnumber_Formats.c, e.g., CS15BTECH11099_Formats.cpp CS15BTECH11099_Formats.c (depending on whether you use C++ or C).

You need to upload your code as a single C++/C source file, which can be compiled and run with g++ without using any flags (except -lm for math library). For sake of avoiding compilation issues, do not use c++11 features. Use of STL (e.g., vector, find, etc.) is acceptable.

Output: Your program should print everything in output file. Anything printed on terminal will be ignored. The

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