

CSc 30100, Fall 2021
Assignment 2
Due September 27, 2021

The startup for which you work has just invented a technology that has six storage states per storage unit. It's calling a storage unit a HexBit.

Your assignment is to develop a floating point system based on HexBits which means that its β will be 6.

You've been told to dedicate one HexBit to store the sign of the floating-point number, p Hexbits to store the significand of the number, and q HexBits to store the exponent of the number.

You've been given three additional requirements:

- Your system must have a machine epsilon that is less than or equal to the machine epsilon of a binary 64 number in the IEEE Standard-754, which is $\sim 1.11 \times 10^{-16}$.
- The largest number that can be represented in your system (other than $+\infty$) must be greater than or equal to the largest binary 64 number that can be represented in the IEEE Standard-754, which is $+1.7976931348623157 \times 10^{+308}$.
- The representation of the exponent must use an offset (rather than an explicit sign).

Please answer the following question about your system.

1. What is p for your system?
2. What is q for your system?
3. What is the offset for the exponent for your system?
4. What is the wobble of your system?
5. What is the machine epsilon of your system?

Please submit your work on Blackboard as a PDF file. Please name your file as LastName_FirstName_AS02.pdf.

You must discuss your answers and describe how you can up with them. Just stating a correct answer won't get you more than half credit.

If you collaborate on this or any other assignment, you must have contributed substantially to anything you submit; just using a current (or past) classmate's work without having contributed substantially to it is not collaboration -- it's cheating.

If you collaborate with anyone you must indicate with whom you collaborated.