Computational Methods Summer 2021

HOMEWORK 4

Due Date: Tuesday, June 8

1. Express $x = (12.8)_{10}$ as a normalized double-precision IEEE floating point number $fl(x)$ (i.e. in the form $\pm 1.\text{mantissa} \times 2^E$), using the round-to-nearest rule.

2. (a) Explain why between 2^{53} and 2^{54}, the only double precision floating point numbers that exist are the even numbers.

   (b) Suppose we type the following into the MATLAB command prompt

   $$x = 2^{53} + 1$$

   What will MATLAB store in x? Explain.

3. (Optional, not graded) Express $(12.8)_{10}$ as a *computer word*. (You will need to read the supplementary notes about how exponents are stored using the *exponent bias*.)