Protein folding

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Appendix

The number of states can be expressed as:

$$400^{300} = 2^{4\times300} \times 5^{2\times300} = 2^{1200} \times 5^{600}$$

The magnitude of the number of states is exceptionally large. Finding all states would require a significant amount of time. If each state could be identified within 10^{-12} seconds, the cumulative time required to find all states of the system would be $2^{1200} \times 5^{600} \times 10^{-12}$ seconds, which simplifies to $2^{1200} \times 5^{600} \times 5^{-12} \times 2^{-12}$ seconds, resulting in $2^{1200-12} \times 5^{600-12}$ seconds, or $2^{1188} \times 5^{588}$ seconds. This timeframe is extensive, significantly surpassing the estimated age of the Earth, approximately 4.5 billion years, equivalent to 10^{17} seconds.
Furthermore, signed integers can represent values up to $2^{32} - 1$, In contrast, unsigned integers can only represent values up to half the magnitude of signed integers due to their obligation to account for negative values. Floating point numbers be it single or double precision, represent numbers in a somewhat different manner. As such single precision floating point numbers can represent numbers up to 3.4×10^{38}, while double precision floating point numbers can represent numbers up to 1.7×10^{308}.
When adding a single-precision number to a double-precision number, there typically won't be any loss of precision, provided the result remains a double-precision number and the magnitudes of the numbers are not vastly different. However, when multiplying a single-precision number and a double-precision number, loss of precision can occur due to the limited precision of the single-precision representation.
According to the GCC manual, the smallest value that can be added to a single-precision number and still produce a change is 1.192×10^{-7}, while for double precision, it is 2.220×10^{-16}.