Computational Physics HW1 pro3

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Since $f_0 = 2, f_n = f_{n-1}^2$, we have $f_1 = 4, f_2 = 16, \cdots, f_n = 2^{2^n}$. Then we can calculate the maximum value for different data types.

a)For int, the maximum value it can store is $32767 = 2^{15} - 1 < 2^{2^4}$, so the maximum value for f_n is $f_4 = 2^{2^4}$ which means the maximum n is $n = 4$.

b)For long int, the maximum value it can store is $2147483647 = 2^{31} - 1 < 2^{2^5}$, so the maximum value for f_n is $f_5 = 2^{2^5}$ which means the maximum n is $n = 5$.

c)For unsigned long int, the maximum value it can store is $4294967295 = 2^{32} - 1 < 2^{2^5}$, so the maximum value for f_n is the same as the condition in long int and the maximum n is $n = 5$.