

PHY 505 Computational Physics

Homework 1

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Problem 2

$$10 = 0110$$

$$436 = 2^8 + 2^7 + 2^5 + 2^4 + 2^2 = 011011010$$

$$1024 = 2^{10} = 01000000000$$

$13 = 2^3 + 2^2 + 2^0 = 01101$. Then to obtain the two's complement of 13 just flip the numbers and plus 1, so $-13 = 10011$.

$1023 = 2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 0111111111$. Then to obtain the two's complement of 1023 just flip the numbers and plus 1, so $-1023 = 10000000001$.

$1024 = 2^{10} = 01000000000$. Then to obtain the two's complement of 1024 just flip the numbers and plus 1, so $-1024 = 110000000000$.

Problem 3

For series $f_n = f_{n-1}^2$ with $f_0 = 2$, we can rewrite the n th term of the series as $f_n = 2^{2^n}$.

(a) There are 8 bits in *int*, then the maximum value for *int* in C++ is: $2^6 - 1$, so the maximum n is 2.

(b) There are 16 bits in *long int*, then the maximum value for *long int* in C++ is: $2^{15} - 1$, so the maximum n is 3.

(c) There are 16 bits in *unsigned long int*, then the maximum value for *unsigned long int* in C++ is: $2^{16} - 1$, so the maximum n is 3.

