Problem 16 - Power Digit Sum

Gautam Manohar

11 June 2018

This document originally appeared as a blog post on my website. Find it at gautammanohar.com/euler/16.

1 Problem Statement

What is the sum of the digits of 2^N?

2 My Algorithm

Python has built-in infinite precision integer arithmetic, so this problem is easily done. We find 2^N using built-in modular exponentiation in $O(\log N)$ time. The length of this number is $\lceil N \log_1 02 \rceil \in O(N)$. And so our solution has complexity $O(N \log N)$.