Project Euler Problem Solutions

Alexandre Ye

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1 Multiples of 3 and 5

1.1 Problem Statement

If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23. Find the sum of all the multiples of 3 or 5 below 1000.

1.2 Solution

The sum of the natural numbers below N which is a multiple of d can be written as

$$S(N,d) = \sum_{i=d}^{\left\lfloor \frac{N}{d} \right\rfloor} i = d\left\lfloor \frac{N}{d} \right\rfloor (1 + \left\lfloor \frac{N}{d} \right\rfloor)/2$$

Solution $= S(999,3) + S(999,5) + S(999,15) = 233168$