Project Euler Problem 6

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25 December 2018

Find $S = (1 + 2 + \cdots + 100)^2 - (1^2 + 2^2 + \cdots + 100^2)$. We know the following:

$$\sum_{1 \leq k \leq n} k = \frac{n(n+1)}{2};$$

$$\sum_{1 \leq k \leq n} k^2 = \frac{n(n+1)(2n+1)}{6}$$

through some simple calculations.

Thus using $n = 100$ and substitution we have $S = 25502500 - 338350$.

Solution: 25164150