Want to know

$$\sum_{i=1}^{n} \lfloor n/i \rfloor \cdot i^2.$$

Since $\lfloor n/i \rfloor = k$ for $n/k \geq i > n/(k+1)$, we can split in intervals $[n/(k+1), n/k)$:

$$\sum_{i=1}^{n} \lfloor n/i \rfloor \cdot i^2 = \sum_{i=1}^{n} \left(i \sum_{j=\lfloor n/(i+1) \rfloor + 1}^{\lfloor n/i \rfloor} j^2 \right).$$

Since

$$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6},$$

we have

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

Hence we can calculate

$$\sum_{j=\lfloor n/(i+1) \rfloor + 1}^{\lfloor n/i \rfloor} j^2$$

quickly.

We can split up:

$$\sum_{i=1}^{n} \lfloor n/i \rfloor \cdot i^2 = \sum_{i=1}^{\sqrt{n}} \lfloor n/i \rfloor \cdot i^2 + \sum_{i=1}^{\sqrt{n}} \left(i \sum_{j=\lfloor n/(i+1) \rfloor + 1}^{\lfloor n/i \rfloor} j^2 \right).$$