Factorial Trailing Zeroes

Trailing zeroes in n! come from factors of 10, i.e, pairs of 2×5.
But in factorials, there are plenty of 2's, so the count is determined only by how many 5's are in the prime factorization of numbers from 1...n.

Idea:

- Count how many multiples of 5 are in 1...n → contributes at least one 5.
- Count how many multiples of 25 → contributes an extra 5.
- Count how many multiples of 125, 625, ... until 5^k < n.
- Formula: ans = n/5 + n/25 + n/125...

Complexity:

Time: $O(\log_5 n)$
Space: works efficiently up to n = 10^4 (and much larger).