

first find the prime factorization of n .

Pollard's rho algorithm takes expected time $\tilde{O}(n^{\frac{1}{4}})$ [1].

the current best algorithm (GNFS) for a b -bit integer n takes time $O(\exp(\sqrt[3]{\frac{64}{9}b \log^2 b}))$.

https://en.wikipedia.org/wiki/Integer_factorization

next enumerate all divisors of n . this is not the bottleneck.

Let $d(n)$ be the divisor function, i.e. the number of divisors of n . $d(n) = o(n^\epsilon)$, and more precisely

$\limsup_{n \rightarrow \infty} \frac{\log d(n)}{\log n / \log \log n} = \log 2$.

https://en.wikipedia.org/wiki/Divisor_function

lower bound: integer factorization.

References

- [1] John M Pollard. A monte carlo method for factorization. *BIT Numerical Mathematics*, 15(3):331–334, 1975.