

# Subexponential-time complexity and the ETH

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# Poly-time, subept-time, ept-time

ept-time

$2^n$



poly-time

$2n, n^2, \text{ etc.}$

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subept-time

$$n^{\log n}, 2^{\sqrt{n}}, \text{ etc.}$$



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$2n$ ,  $n^2$ , etc.

# Subexponential time

**Subexponential time:**  $2^{o(n)}$  time, where:

a function is  $o(n)$  if it can be expressed as  $\frac{n}{s(n)}$  for some unbounded, nondecreasing computable function  $s$

**Example:**  $\sqrt{n} = o(n)$ , because  $\sqrt{n} = n/\sqrt{n}$

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- ▶ 3-colorability needs time  $2^{O(n)}$
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**Variant:** Strong ETH; use to show optimality for quadratic time algorithms.