NP-Completeness

The P vs. NP Question

Algorithms: Design and Analysis, Part II

The P vs. NP Question

Question: Is P = NP?

P: polynomial-time solvable

NP: can verify correctness of a solution in polynomial time

Widely Conjectured: $P \neq NP$. [though see Gödel 56]

But: has not been proved. [worth $1 million from Clay Institute]

Reasons to believe:

1. (psychological) if P=NP, someone would have proved it by now
2. (philosophical) if P=NP, then finding a proof always as easy as verifying one
3. (mathematical) ??

What's In A Name?

FAQ: What does "NP" stand for? ~~"not polynomial"~~

Answer: "nondeterministic polynomial"

[modern, mathematically equivalent definition via efficient verification of purported solutions]

Historical reference: Knuth, "A Terminological Proposal", 1974.

Passed over: PET <
- "possibly exponential time"
- "provably exponential time"
- "previously exponential time"