NP-Completeness

The P vs. NP
Question

Algorithms: Design
and Analysis, Part II

The P vs. NP Question

Question: Is P = NP ?

polynomial time solvable

can verify correctness of a solution in polynomial time

Widely conjectured: P≠NP. [Though see Gödel '56]

But: Has <u>not</u> 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) ??

Tim Roughgarden

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Historical reference: Knuth, "A Terminological Proposal", 1974.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