

Section 23.2: Decision, Search, and Optimization

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Three Types of Computational Problems

Decision problem: Output "yes" if there is a feasible solution and "no" otherwise.

Search problem: Output a feasible solution if one exists, "no solution" otherwise.

used to
define
complexity
class NP

Optimization problem: Output a feasible solution with best-possible objective function value (or "no solution", if none exist).

Note: every optimization problem has a natural search version (e.g., find a TSP tour with cost ≤ 1000 , or report that none exist).

Optimization reduces to search via binary
search on target objective function value