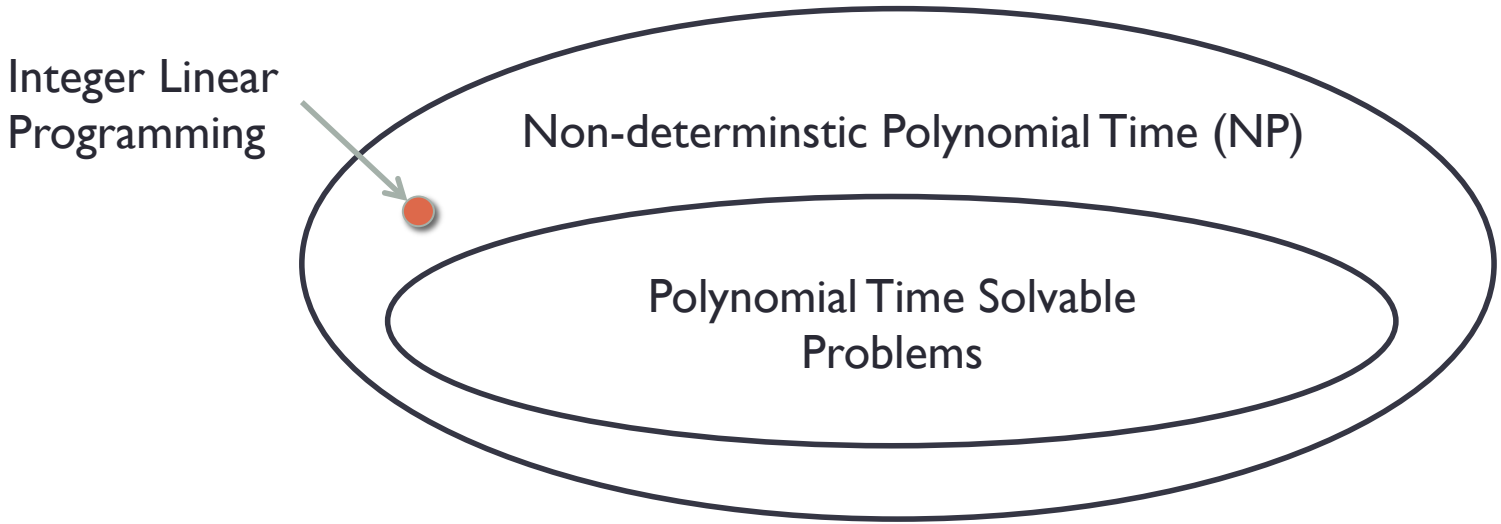
COMPLEXITY OF ILP

Complexity of Integer Linear Programs

Integer Linear Programming problems are NP-complete



Implications of P vs NP question

- P=NP
  - Considered an unlikely possibility by experts.
  - In this case, we will be able to solve ILPs in polynomial time.

- P != NP
  - In this case, we can show a non-polynomial lower bound on the complexity of solving ILPs.

Current State-of-the-art

- We have some very good algorithms for solving ILPs
  - They perform well on some important instances.
  - But, they all have exponential worst-case complexity.
- Compared to LPs,
  - The largest ILPs that we can solve are a 1000-fold smaller.
- Two strategies:
  - Try to solve the ILP
  - Find approximate answers for some special ILP instances.