CS F364
Design & Analysis of Algorithms

ALGORITHMS - COMPLEXITY

Complexity Class: NPC

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CSIS, BITS, Pilani

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A KITTY OF NP-COMPLETE PROBLEMS

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│  Circuit-SAT │───│     SAT      │───│   CNF-SAT    │───│     3SAT     │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
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Circuit-SAT — SAT — CNF-SAT — 3SAT

3SAT

CLIQUE   VERTEX_COVER

SET_COVER   SUBSET SUM   HAM-CYCLE
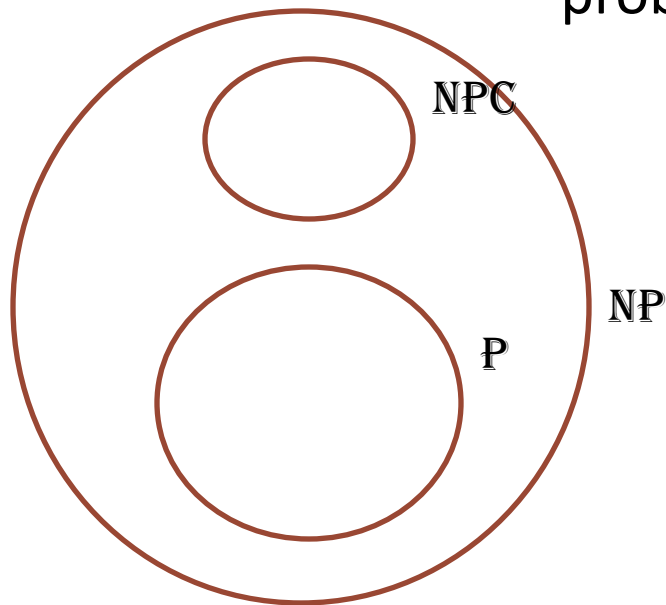
0/1 KNAPSACK   TSP

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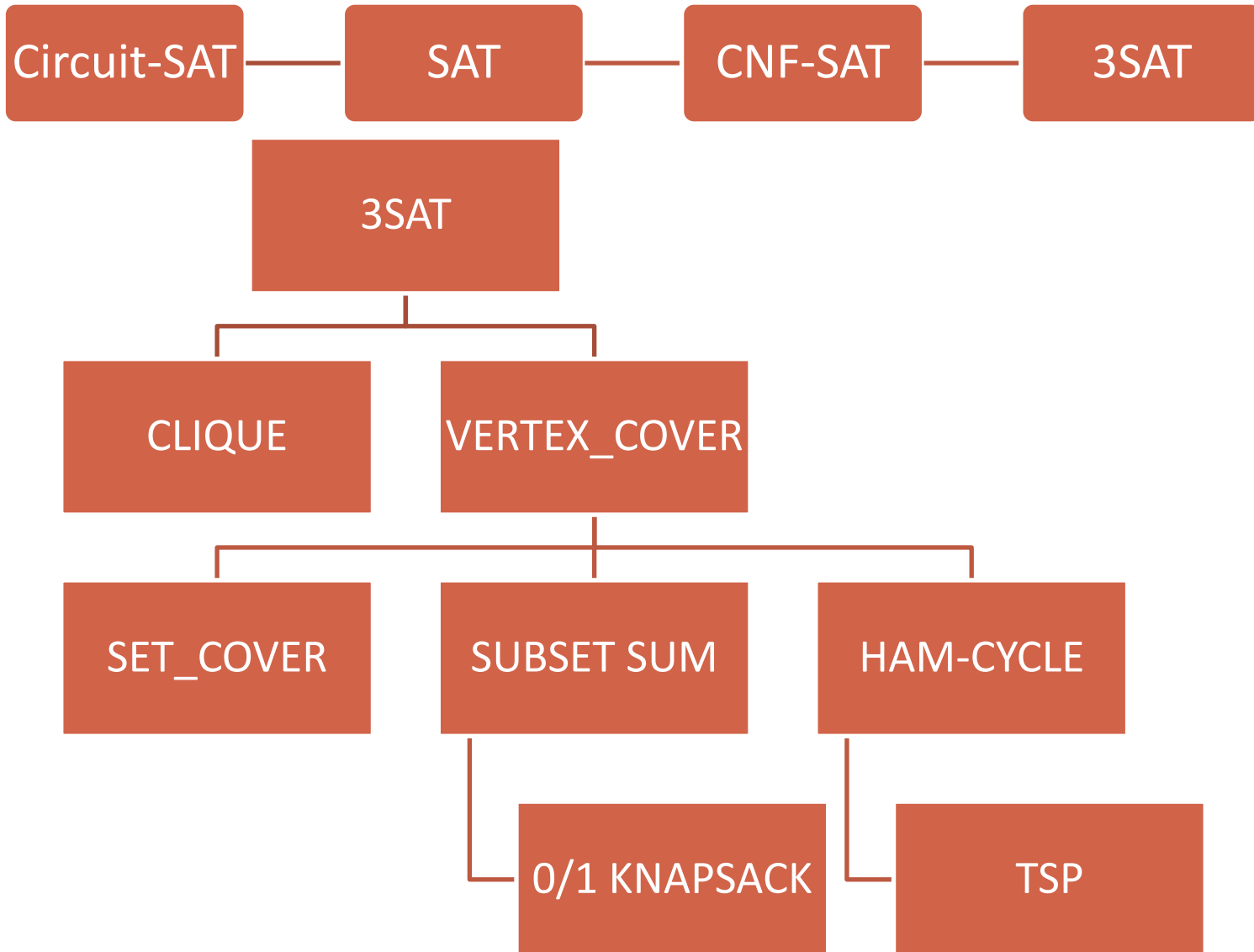
NP-Completeness

- Given any NP-complete problem π, all NP-complete problems polynomially reduce to π

  - i.e. for all NP-complete problems π and π'

    $\pi' \leq \pi$ and $\pi' \leq \pi$

- What is the implication?

  - Can be an NP-complete problem be in P ?

COMPLEXITY CLASSES AND RELATIONS AMONG THEM

- **Current Belief:** NPC is the class of all NP-complete problems

Arguments: ?!

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