

Summary: Lecture 8

Summary for the chapters 9.3 and 9.4. [2, 1]

IndependentSet

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INDEPENDENTSET

Input: An undirected Graph G and a number k .

Question: Is there a set of k nodes with no edges in between? (INDEPENDENTSET)

INDEPENDENTSET is NP-complete.

Proof idea:

- triangle construction

TODO

Questions:

HamiltonPath is NP-complete

HAMILTONPATH is NP-complete.

Proof idea:

- Another reduction from 3SAT

TODO

Questions:

TSP(D)

TSP(D)

TSP(D) is a decision version of TSP.

Input: A $n \times n$ distance matrix and a bound $B \in \mathbb{N}$

Question: Is there a round tour of length $\leq B$ that visits all *cities*?

TSP(D) is NP-complete.

Proof idea:

- budget of nodes is $B = |V| + 1$

TODO

Questions:

Knapsack

Knapsack

KNAPSACK is NP-complete.

- filled in in one dimensional array on the board

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TODO

Questions:

References

- [1] Martin Berglund. *Lecture notes in Computational Complexity*.
- [2] Christos H. Papadimitriou. *Computational Complexity*. Addison-Wesley Publishing Company, 1994.