

## Summary: Lecture 8

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

Title
Content

### IndependentSet

IndependentSet
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

### HamiltonPath is NP-complete

HAMILTONPATH is NP-complete.

#### Proof idea:

- Another reduction from 3SAT

### 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 <i>cities</i> ?

TSP(D) is NP-complete.

#### Proof idea:

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

### Knapsack

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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.