

Lecture #1

Plan

- **solving Berge Mystery Story ([island-story.pdf](#), [library-story.pdf](#))**
- **interval graphs**
 - **interval model to graph**
 - **graph to interval model (interval graph recognition problem)**
- **other applications of interval graphs**
 - **physical mapping of DNA**
 - **archeology**
 - **temporal reasoning**
 - **scheduling**
 - ...
- **talks**
 - **a real-world problem leading to a graph problem**
 - **special properties of those graphs**
 - **how to solve the graph problem efficiently utilizing those properties**
 - **interpreting graph solution to real-life problem**
- **basic graph notions and notations**
 - **simple graphs (undirected, unweighted, loopless, w/o multiple edges)**
 - **path and simple path**
 - **cycle and simple cycle**
 - **induced subgraph, induced cycle, induced path**
 - **adjacency lists**
 - **adjacency matrix**
 - **the complement of a graph**
- Interval graph characterizations
 - chordality
 - co-comparability, comparability
 - induced cycles
 - asteroidal triples
 - umbrella-free ordering
- 4 classical graph problems
 - cliques and clique number
 - independent set and stability number
 - coloring and chromatic number
 - clique cover and clique cover number
 - inequalities between corresponding numbers
- solving 4 classical problems on interval graphs efficiently
 - equalities between corresponding numbers
 - implications for real-life problems
- the world of intersection graphs

References:

1. Chapters 1 and 8 of M. Golumbic's book plus related papers/material
2. http://videlectures.net/sicgt07_kratochvil_gig/
3. <http://www.fi.muni.cz/~hlineny/Vyuka/GT/Grafy-lect-eng-9.pdf>
4. http://en.wikipedia.org/wiki/Intersection_graph