

Lecture #3

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