Institut for Matematik og Datalogi
Syddansk Universitet

April 29, 2022
JBJ

DM867 – Spring 2022– Weekly Note 12

Stuff covered in week 17

- I lectured on Chordal graphs (originally called triangulated graphs). These are graphs with no induced cycle of length more than 3. They will play an important role in the definition of tree-width. The presentation is based on Chapter 4 in the book 'Algorithmic Graph Theory and Perfect Graphs by M.C. Golumbic. This chapter is available from the home page. Among others we saw how to recognize chordal graphs (by producing a perfect elimination sequence (p.e.s.) of the vertices) and how to use a p.e.s. of a chordal graph to solve the maximum clique problem, find the chromatic number and produce a maximum independent set as well as a minimum clique cover of a chordal graph.
- I also showed how to produce a perfect elimination sequence of a chordal graph via LexBFS and proved that a graph is chordal if and only if it is the interesection graph of subtrees of some tree.

Classes in Week 18

- I will introduce tree-width and tree-decompositions of graphs. These constitute a very important tool to obtain efficient algorithms for classes of graphs with low tree-width. This is based on Chapter 10 in the book:"Invitation to fixed paramerter algorithms" by R. Niedermeier, Oxford 2006. This is available from the home page. We will cover (parts of) Sections 10.1, 10.2 and 10.4
- I will also show how to relate the game of cops and robbers to tree-width of graphs. There is no litterature for this, except my lecture notes.