

DM553/MM850 – Spring 2023 – Weekly Note 15

This is the last weekly note!

Instructor positions at IMADA

Please note that we have now opened positions as instructor in the fall of 2023, see 'ledige stillinger SDU instruktører' [https://www.sdu.dk/da/service/ledige stillinger/1209763](https://www.sdu.dk/da/service/ledige_stillinger/1209763)

Everyone interested should consider applying! Being instructor and having the responsibility to explain the solution of a problem to fellow students is a very good way of increasing your own understanding. This does not only apply to the stuff you are instructor in: when you have to explain your solution to others you become better at identifying the core of a problem and that helps you become a better student also in other courses. The deadline is short, May 18, so please apply soon. If you are in doubt whether you are suitable, or have any other questions about this, you are very welcome to talk to Lene Favrhøldt about it.

Exam info

- The exam will take place June 13-15
- The exam questions are posted along with exam info in a separate file on the home page.
- Spørgetime (questions concerning the exam) Friday June 8, 10.15-12 in U14. Here you can ask questions about the exam and or various things in the curriculum that you would like to have clarified. If it is very technical stuff, please send me an email with your question the day before.

Stuff covered in Week 19

I showed how to solve the problems in the third set of exam problems.

Week 20

There are no classes in Week 20 but there are exercises in Week 21!

Exercises Tuesday May 23, 2021

- Left over problems from previous weeks.

- Cormen 35.1. Hint for (a) first show that subset-sum is also NP-complete when the sum of the element in the set S is exactly $2t$. Then use this to create an instance of bin packing which has a solution with 2 bins if and only if the subsetsum instance is a 'yes'-instance (there is a subset whose sum is t).
- Prove that the hamiltonian cycle problem is NP-complete even if the input is a bipartite graph (that is, we can partition the vertices of the input graph $G = (V, E)$ into two sets X, Y such that every edge is of the form xy where $x \in X$ and $y \in Y$). Use this to show that TSP is NP-complete even when there are only two weights 1,2 and the edges of weight 2 form two disjoint cliques.
- You may discuss with Magnus which topics could be good to choose for your presentation of the different exam questions.
- Discuss how to use the pumping lemmas for regular languages and context-free languages.
- Discuss how to use Rice's Theorem for proving undecidability.