Institut for Matematik og Datalogi
Syddansk Universitet

November 23, 2004
JFB

Introduction to Computer Science
E04 – Lecture 12

Announcement

You can learn about career possibilities at KarriereKick, December 1, 15:00–17:00, in U100. There is information about it at

http://www.karrierekick.sdu.dk.

Lecture, November 22

Klaus Meer introduced some basic questions related to neural networks. He explained how neural networks in principle could be used for tasks such as pattern recognition. He dealt with a most basic example of a one-layer, feed-forward network called perceptron (or McCulloch-Pitts network). A few ideas behind the famous Perceptron Learning Algorithm were explained. Notes were handed out at lecture.

Lecture, November 29

Jørgen Bang-Jensen will lecture on graph problems and heuristics. There will be notes.

Lecture, December 6

Brian Vinter will lecture on GRID computing.

Discussion section: week 49

Discuss the following problems, from the notes handed out in lecture 12, in groups of three or four.

1. Opgaverne 1.25, 1.26, 1.27, 1.28 and 1.29 in Bjarne Toft's notes. For 1.25, just use the graph given there, since 1.18 is not in the notes.

2. Problems 11 and 12 on page 438 of the notes handed out in lecture 12.

3. Problems 1a, 4 (except b.ii and b.iii), 6, and 7 on pages 446–447 of the notes handed out in lecture 12.

4. Problems 14 and 15 on page 450 of the notes handed out in lecture 12.

5. Input a graph $G = (V, E)$ and a weight function on the edges

   A. Order the edges $e_1, e_2, \ldots, e_m$, $m = |E|$ in decreasing order of weights.

   B. Consider the edges in the order $e_1, e_2, \ldots, e_m$ and delete the current edge if it can be removed from the current graph (i.e., the one we have after the deletions made so far) without destroying the connectivity of the graph (i.e. there must still exists a spanning tree).

   (1) Show an execution of the algorithm on the graph (a) on Figure 11.16 page 447.

   (2) Try to show that the algorithm will always end up with a minimum spanning tree of the input graph G. Hint: relate the algorithm to Kruskal's algorithm.

Assignment due 8:15, December 7

Late assignments will not be accepted. Working together is not allowed. (You may write this either in English or Danish, but write clearly if you do it by hand.) Show your work where it is relevant.

1. Problem 1b on page 446 of the notes handed out in lecture 12.

2. Problem 4.b.ii on page 447 of the notes handed out in lecture 12.