Institut for Matematik og Datalogi
Syddansk Universitet

May 10, 2017
JFB

On-Line Algorithms – F17 – Lecture 17

Announcement

Vi har netop opslået instruktorater for efteråret. Alle der er interesserede opfordres til at søge. Det at skulle forklare stoffet for andre er en virkelig god måde at øge sin egen forståelse på. Det gælder ikke blot det stof man skal gennemgå (og derfor kunne godt), men gennem at man skal forklare for andre, bliver man også bedre til at finde ind til kernen i problemer og dermed bliver man selv bedre til at studere. Fristen for at søge er 10/5 og opslaget kan ses dels omkring på IMADA samt via SDU ledige stillinger.

Lecture, April 26

We finished section 12.2.3 in the textbook and began on the article "Online Bin Packing with Advice", Joan Boyar, Shahin Kamali, Kim S. Larsen, Alejandro López-Ortiz. *Algorithmica*, 74(1): 507-527, 2016. The publication is available through the course's homepage. We covered the introduction to advice in the slides and up through Theorem 1 in the article.

Lecture, May 2

We will finish the article "Online Bin Packing with Advice" (covering sections 3 and 5), and begin on the article "The Advice Complexity of a Class of Hard Online Problems", Joan Boyar, Lene M. Favrholdt, Christian Kudahl, Jesper W. Mikkelsen. *Theory of Computing Systems*, First Online 2016. The publication is also available through the course's homepage.

No class on May 5

Lecture, May 9

We will finish the article "The Advice Complexity of a Class of Hard Online Problems",

Problems for May 10

1. Consider the lower bound proof in Theorem 1 of the article "Online Bin Packing with Advice", with $n = 5$ and $k = 2$. Which sequences are produced, and how much advice is needed? Are there other sequences one could have included to increase the amount of advice needed?

2. Consider the online algorithm with advice in Theorem 4 of "Online Bin Packing with Advice". What does a bad sequence look like when some critical bin only has one item? What does a bad sequence look like when all critical bins have more than one item?

3. Go through the reduction from 2-SGKH to Binary Separation with the string $\langle 0, 1, 0, 0\rangle$ as input. Suppose you want to produce values in the range $[1/2, 5/8]$. You may assume that your algorithm for guessing "large" or "small" for Binary Separation alternates, starting with "large".

4. Go through the reduction from Binary Separation to Bin Packing with the sizes $\langle \frac{7}{16}, (S, \frac{15}{32}), (L, \frac{29}{64}), (S, \frac{59}{128}), S\rangle$ as input. Let $\varepsilon = \frac{1}{256}$. You may assume that your algorithm for Bin Packing is First-Fit.