Department of Mathematics and Computer Science
University of Southern Denmark, Odense

November 22, 2012
LMF

DM538 – Weekly Note 11

Lecture, week 48

Tuesday, November 27

Kleinberg and Tardos: Algorithm Design (photocopies)

- Section 13.2: Global Minimum Cut
- Part of Section 13.3: Collecting coupons
- Section 13.4: MAX 3-SAT

Exercises, week 48

Thursday, November 29

1. Cormen, Leiserson, Rivest, and Stein: Introduction to Algorithms, 3rd ed.
   - Exercise 5.3-7
   - Problem 5-2
     Question d: Hint: Recall the coupon collector's problem
     Questions f and h: Look only at $k \leq 2$.
2. This exercise is about *contention resolution*. We have a system with 10 processes. Certain pairs of processes are in conflict, meaning that they need access to the same resource. Hence, such a pair cannot run at the same time. Assume that each proces is in conflict with exactly 2 other processes.

   Consider the following randomized algorithm for finding a largest possible set S of processes that can run simultaneously.
   Each process independently picks a random value; it chooses 1 with probability p and 0 with probability $1 - p$.
   If it chooses 1, and all conflicting processes choose 0, then the process enters the set S.

   What is the optimal value of p?
   What is the expected size of S for this value of p?
   Assuming the above strategy is used t times, give a lower bound on the probability that all processes enter the set S at least once, for $t = 25$ and $t = 50$.

Lecture, week 49

Tuesday, November 27

Kleinberg and Tardos: Algorithm Design (photocopies)

- Section 13.5: Median Finding and Quicksort
- Section 13.6: Hashing: A Randomized Implementation of Dictionaries

2. obligatory assignment

Remember that the deadline for handing in the second obligatory assignment is on Thursday, November 29 at 4:00 pm.

Remember to hand in both an electronic and a printed version, and remember that the electronic version must be a **pdf**-file. Also remember to write your CPR-no on the frontpage.