Homework 7

CS 4104 (Fall 2009)

Assigned on November 20, 2009.
Hardcopy due at the beginning of class on December 2, 2009.

Instructions:

- **In this homework, we will continue with the policy of working in teams of two students.**
  You can pair up with another student to solve the homework. You are allowed to discuss possible
  algorithms and bounce ideas with your team-mate. Do not discuss proofs of correctness or running
  time in detail with your team-mate. *Each student must write his/her solution individually, and write
  down the name of the other member in your team.* Please form teams yourselves. Of course, you can
  ask me for help if you cannot find a team-mate. You may choose to work alone.

- Your team is not allowed to consult any sources other than your textbook, the slides on the course web
  page, your own class notes, the TA, and the instructor. In particular, do not use a search engine.

- Do not forget to typeset your solutions. *Every mathematical expression must be typeset as a mathe-
  matical expression, e.g., the square of n must appear as n^2 and not as "n^2".* Students using LaTeX
  or LyX can use the corresponding versions of the homework problems to start entering their solutions.

- Describe your algorithms as clearly as possible. The style used in the book is fine, as long as your de-
  scription is not ambiguous. Explain your algorithm in words. A step-wise description is fine. *However,
  if you submit detailed pseudo-code without an explanation, we will not grade your solutions.*

- Do not make any assumptions not stated in the problem. If you do make any assumptions, state them
  clearly, and explain why the assumption does not decrease the generality of your solution.

- Do not describe your algorithms only for a specific example you may have worked out.

- You must also provide a clear proof that your solution is correct (or a counter-example, where appli-
  cable). Type out all the statements you need to complete your proof. *You must convince us that you
  can write out the complete proof. You will lose points if you work out some details of the proof in your
  head but do not type them out in your solution.*

- Analyse your algorithm and state the running time. You will only get partial credit if your analysis is
  not tight, i.e., if the bound you prove for your algorithm is not the best upper bound possible.

Problem 1 (10 points) Solve exercise 4 in Chapter 7 (page 416) of your textbook.

Problem 2 (10 points) Solve exercise 5 in Chapter 7 (page 416) of your textbook.

Problem 3 (30 points) Solve exercise 6 in Chapter 7 (pages 416–417) of your textbook.

Problem 4 (30 points) Solve exercise 7 in Chapter 7 (pages 417–418) of your textbook.

Problem 5 (20 points) Solve exercise 12 in Chapter 7 (page 420) of your textbook.