

## Homework Assignment #2

### Note

This assignment is due 2PM Wednesday, April 1, 2009. Please write or type your answers on A4 (or similar size) paper. Drop your homework by the due time in Yih-Kuen Tsay's mail box on the first floor of Management College Building II. Late submission will be penalized by 20% for each working day overdue. You may discuss the problems with others, but copying answers is strictly forbidden.

### Problems

1. Solve the following exercise problems in Manber's book:  
3.5(a)(d) (10 points), 3.12 (10 points), 3.18 (10 points), 3.30 (be aware of the ceiling function; 10 points), 5.6 (10 points), 5.8 (10 points), 5.12 (10 points), 5.17 (10 points), 5.22(a)(b) (with 4, instead of 3, pegs, starting as usual with all  $n$  disks on the first peg; 10 points).
2. Consider binary trees where each node stores a non-negative integer. Design an algorithm (using the "Design by Induction" approach) that, given such a tree  $T$  and a non-negative integer  $k$  as input, determines whether  $T$  contains a branch (from the root to a leaf) such that the sum of all numbers stored on the nodes of the branch equals  $k$ . (Note: adding two integers may result in an overflow. You must prevent this from happening.) (10 points)
3. Bonus problem: 5.18 in Manber's book (again, you must use the "Design by Induction" approach). (20 points)