

# CSE/MAT 373 Spring 2009 Analysis of Algorithms

February 25, 2009

- Homework is due **March 10** at the beginning of class.
- You write down the solution clearly, and if possible, succinctly. Avoid too many details – a succinct and clean proof is the best.
- Read the “Course Policies” on the class web-page, and strictly follow the guidelines therein.

## Homework 2

1. The *mode* of a set of numbers is the number that occurs most frequently in the set. The set  $\{4,6,2,4,3,1\}$  has a mode of 4.
  - (a) Given an efficient and correct algorithm to compute the mode of a set of  $n$  numbers.
  - (b) Suppose we know that there is an element that occurs  $n/2+1$  times in the set. Give a worst-case linear-time algorithm to find the mode.
2. Given a set  $S$  of  $n$  integers and an integer  $T$ , give an  $O(n^{k-1} \log n)$  algorithm to test whether  $k$  of the integers in  $S$  sum up to  $T$ .
3. Given an  $O(n \log k)$ -time algorithm which merges  $k$  sorted lists with a total of  $n$  elements into one sorted list.
4. Exercise 3.7 of [DPV].
5. Exercise 3.8 of [DPV].
6. Exercise 3.14 of [DPV]. Hint: Keep track of *number* of outgoing edges from each vertex.
7. Exercise 5.1 of [DPV].
8. Exercise 5.3 of [DPV].
9. Exercise 5.9 (b), (d), (f), (g).
10. Exercise 5.10 of [DPV].