Computer Science 2300: Homework 2

Due: February 23, 2012

Note: Please use rigorous, formal arguments. You will not receive full credit otherwise. “DPV” refers to the Dasgupta, Papadimitriou and Vazirani textbook. Homework is due at the beginning of lecture.

1. (10 points) Problem 2.16 in DPV (the infinite array problem)
2. (10 points) Problem 2.20 in DPV (sorting an array of integers in $O(n + M)$ time)
3. (10 points) Problem 2.22 in DPV (computing the $k$th element in the union of two sorted lists)
4. (10 points) Problem 2.25(a) in DPV (converting decimal integer $10^n$ into binary)
5. (10 points) Problem 1.19 in DPV (GCD of Fibonacci numbers)
6. (10 points) Problem 1.20 in DPV (modular inverses)
7. (10 points) Suppose you want to build a max heap. Show the result of calling `build-heap` (as discussed in class) on the array $(1, 4, 2, 3, 9, 7, 8, 10, 14, 16)$. Then show the result of inserting the key 12 into the resulting heap.