

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.