Due January 25, 6:00pm

Instructions: Get an EECS instructional computer account if you don’t have one already. Register with the grading system.

Please write your name, the username for your instructional account, your TA’s name, your discussion section time (e.g., Tue 3pm) prominently on the first page of your homework. Also list your study partners for this homework, or “none” if you had no partners.

You are welcome to form small groups (up to four people) to work through the homework, but you must write up all your solutions strictly by yourself, and you must acknowledge any ideas you got from others (including from books, papers, web pages, etc.). Please read the collaboration policy on the course web page.

This homework is due Wednesday, January 25, at 6:00pm electronically. You need to submit it via glookup with your instructional computer account.

1. (10 pts.) Getting started
   What is the answer to the following question?
   (a) Why did the computer scientist die in the shower?
      The answer is found on the course newsgroup, www.piazza.com If you have not been invited, please email satishr@cs.berkeley.edu.
      Look for the note from Satish Rao titled “The answer to question 1,” and write down the answer you find there. Instructions on how to access the newsgroup may be found on the course web page.
      (Why are we having you do this? Piazza is where we post solutions, clarifications on homeworks, and can receive help from fellow students and course staff for your questions.)
   (b) Please read the course policies on the web page, especially the course policies on collaboration. If you have any questions, contact the instructors via piazza. Once you have done this, please write “I understand the course policies.” on your homework to get credit for this problem.

2. (20 pts.) Rank the following functions in decreasing order of growth (O(·) notation). Note all ties, if any. Choose three tricky comparisons, and explain briefly why they are so.
   (a) $n \log n$
   (b) $n$
   (c) $n^2$
   (d) $\sqrt{n}$
   (e) $2^n$
   (f) $n \sqrt{\log n}$
(g) $3^n$
(h) $n \log^2 n$
(i) $\log n$
(j) $n \log(\log n)$
(k) $n^{78}$
(l) $n^\frac{3}{2}$
(m) $f(n) = n^2$ if $n$ is prime and $\sqrt{n}$ otherwise.
(n) $n^n$
(o) $n^{\log n}$
(p) $n!$
(q) $3^n$
(r) $3^{n/2}$
(s) $4^{n/2}$
(t) $2^{\sqrt{\log n}}$

3. **(10 pts.)** Problem 0.4 from the book (page 9, it starts: "Is there a faster...")

4. **(10 pts.)** Problem 1.5 (page 39, "Unlike a decreasing...")

5. **(10 pts.)** Problem 1.30 (page 40, "The grade school...")

6. **(10 pts.)** Problem 1.29 (page 40, "Let $[m]$ denote...")