

ECE G205 Fundamentals of Computer Engineering
Fall 2003

Homework 2: Due by Wednesday September 24 2003

- This test contains 2 problems. They allow you to earn 100 points.
- Show your work, as partial credit can be given. You will be graded not only on the correctness of your answer, but also on the clarity with which you express it. **Be neat.**
- **No late submissions will be accepted.**
- Only homework returned in a 9in × 12in envelope will be accepted. (If you cannot find such envelope, ask the Instructor.) Please, write your name and the class name (ECE G205) on the envelope (write clearly, please).
- For the two problems an e-mail to the TA should be sent that contains the code and the executable of a program that implements the solutions to the problems as functions.

Write your name here: _____

- **Problem # 1 [50 points].** Give a *recursive* implementation of (i.e., write a C++ recursive program for) insertion sort. **(a)** Determine the worst case time complexity of your solution. **(b)** Can a function that solves the sorting problem be written that requires less than n comparisons? (n is the number of the elements in the array.) **(c)** Prove the correctness of your implementation.

- **Problem # 2 [50 points]**. Solve exercise 2.3-5 of the textbook (page 37), *binary search*, detailing the computation of the worst-case running time and providing an iterative and a recursive C++ implementation.