

CIS*3490 The Analysis and Design of Algorithms

Winter 2019
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Assignment 2 Guide

- 1.1 Develop a brute force algorithm based on the definition of *inversion*, which checks every pair of $(A[i], A[j])$ for $i < j$.
- 1.2 Modify the mergesort algorithm to count the number of inversions in $n \log n$ time.
- 2.1 Develop a brute force algorithm based on the definition of *convex hull*. The algorithm checks every point to see if it is an extreme point of the convex polygon.
- 2.2 Design a divide-and-conquer algorithm of $\Theta(n \log n)$ based on the idea of quicksort.
- 1.3, 2.3 Develop your programs using any C system, as long as your programs can be correctly executed on the Linux system in SOCS. You are allowed to use standard library functions.

Your work should be submitted as a tar file containing something like

`readme.txt`, `design.txt`, `main.c`, `P11.c`, `P12.c`, `P21.c`, `P22.c`, `makefile`.

Any compilation error or warning will result in a mark deduction. There will be some marks allocated for documentation.

Each file should have a comment at the beginning containing your name, id, date, and the assignment name.

The `readme.txt` file should contain the following:

- name, id and assignment number
- a brief description of how to compile and run your programs.

The `design.txt` file should include the algorithms you design for 1.1, 1.2, 2.1, and 2.2, and comparison results.

Each function should have a brief comment describing its purpose. Also, any section of code where it is not easily apparent what the code does should have a short comment.

C function `ftime()` can be used to get program running time.