

Homework Assignment 2

CS 430 Introduction to Algorithms
Spring Semester, 2012

Due: Wednesday, February 1

1. (a) Let $\Pi = (\pi_1, \pi_2, \dots, \pi_n)$ be a random permutation of $\{1, 2, \dots, n\}$. What is the expected value of

$$\frac{1}{n} \sum_{i=1}^n |\pi_i - i|?$$

- (b) Explain why this value is the average distance that an item will move during sorting.
- (c) What can be concluded about a sorting algorithm (such as insertion) that performs only adjacent interchanges?
2. Problem 6.4-3 on page 160
3. Problem 7-4 on page 188. Add a part (d), as follows: Determine the *average stack depth*, assuming that all permutations are equally likely. (*Hint*: You need an analysis that is somewhat similar to that done in class on January 23.)
4. Problem 8-3(a) on page 206
5. Problem 9.3-8 on page 223