

Practice Problems for Homework 3

For Problem # 2, you can look at the practice problems and problems for the second homework on the adversary lower bound technique.

1. Suppose you are given the task to sort one thousand 32-bit keys. You have decided to use radix sort for this problem and want to decide how many bits each radix sort digit. Which is best among having 1 bit per radix sort digit, 4 bits per radix sort digit, 8 bits per radix sort digit or 16 bits per radix sort digit? You are provided with a counting sort procedure with exact time complexity of $5n + 4k$. Show your work.
2. Give the asymptotically fastest algorithm you can to sort n integers in the range of 0 to $(n^4) - 1$. You should give a very clear and complete high-level description of your algorithm. Be sure to analyze the time complexity of your algorithm as a function of n . You are NOT restricted to use a comparison sorting algorithm (although are welcome to if you want).