

CSE 3101: DESIGN AND ANALYSIS OF ALGORITHMS  
Assignment 3, Weight: 4%,  
Due: June 11, in the drop box by 6:45 pm or in class by 7:10 pm

1. Suppose that your computer has a special functional unit that can merge two sorted lists of size at most  $m$  each in time  $m^{1-\epsilon}$  for some  $1 > \epsilon > 0$ . Design a divide and conquer algorithm that uses this hardware to sort lists of length  $n$ . Analyze the running time of your algorithm. [To get full credit your algorithm must be the most efficient possible.]
2. Suppose quicksort were to always pivot on the  $\lceil n/3 \rceil$ -th smallest value. Suppose also that finding this value is achievable in linear time. Write down a recurrence for the worst-case running time of this version of quicksort and solve it.