Set 4 Homework, Analysis of Algorithms

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- p 194: 8.1-4, p 197: 8.2-4, p 200: 8.3-2, p 204: 8.4-2, p 206: 8.3 or 8.4
- p 215: 9.1-1, p 219: 9.2-1, p 223: 9.3-8 , 9.3-9, p 224: 9-2

Chapter 8

8.1-4 To sort each k sublist, we will use an efficient comparison sort ($\Omega(n\ lg\ n)$).

$$\begin{aligned} T(n) &= k\Omega(n/k\ lg\ n/k) + \Theta(1) \\ &= kc(n/k\ lg\ n/k) + d \\ &= cn\ lg\ n/k + d \\ &\geq cn\ lg\ n/k \\ &\geq cn\ lg\ k \qquad \text{because k is a constant} \end{aligned}$$

Really not sure if I did that right.

8.2-4 First do counting sort up to line 9 ($\mathcal{O}(n+k)$) to get C. Then we get our output with:

$$\begin{aligned} &result := C[a + (a - b)] \\ &result := result - C[a - 1] \quad if\ (a-1) \geq 0 \end{aligned}$$

Which is $\Theta(1)$. That was an interesting/challenging puzzle.

8.3-2

8.4-2

8.3

8.4

Chapter 9

9.1-1

9.2-1

9.3-8

9.3-9

9.2