

Homework Assignment: 2

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1. XSort Algorithm

(a)

$$\begin{aligned} \text{EXAMPLE} &\Rightarrow \text{AXEMPLE} \Rightarrow \text{AEXMPLE} \Rightarrow \text{AEEMPLX} \\ &\Rightarrow \text{AEELPMX} \Rightarrow \text{AEELMPX} \end{aligned}$$

(b) Time Efficiency: $O(n^2)$
Space Efficiency:

(c)

2. Bubble Sort

(a)

$$\begin{aligned} \text{EXAMPLE} &\Rightarrow \text{EAMPLEX} \Rightarrow \text{AELEMPX} \Rightarrow \text{AEELMPX} \\ &\Rightarrow \text{AEELMPX} \Rightarrow \text{AEELMPX} \end{aligned}$$

(b)

(c)

3. Show that $n^2 \in O(n^2 + 10n), n \geq 0$

4. Show that $n \notin \Omega(n^2)$ Choose $k = 1$

Assuming $n > 1$, then

$$\frac{f(n)}{g(n)} = \frac{n}{n^2} < \frac{n^2}{n^2} = 1$$

Choose $c = 1$. Note that $n < n^2$

Thus $n \notin \Omega(n^2)$ because $n < n^2$ when $n > 1$