

ECE 261 HW2

$$1. \quad \cancel{6n \log n = O(n \log n)} \quad \cancel{2^{100} = O(1)} \quad \cancel{\log \log n = O(\log \log n)}$$

$$\cancel{2^{\log n} = O(2^{\log n})} \quad \cancel{2^{10} = O(2^{2^n})} \quad \cancel{|\sqrt{n}| = O(n^i)} \quad \cancel{n^{0.01} = O(n^{0.01})}$$

$$\cancel{1/n = O(1)} \quad \cancel{4n^{3/2} = O(n^{3/2})} \quad \cancel{3n^{0.5} = O(n^{1/2})}$$

$$\cancel{\log 5^n = O(\log 5^n)} \quad \cancel{3^n + \log 2021 = O(2)} \quad \cancel{2^n = O(2)}$$

$$\cancel{\log_4 n^n = O(n)} \quad \cancel{4^n = O(4^n)} \quad \cancel{2n \log^2 n = O(n \log^2 n)}$$

$$\cancel{2^n + n^2 + 3n = O(2^n)} \quad \cancel{(\log n)^{1/2} = O(\log n^{1/2})} \quad \cancel{(n+1)! = O(n!)}$$

2. append: ~~1000~~ n go-through: ~~1000~~ n
 merge: ~~1000~~ $n+m$ go-through-two: nm
 normalize: $2n$ times: ~~1000~~ $\frac{2}{b} = O(n)^2$
 $n+n+2n+(n+m)+n+n^{n^2}$
 $\hookrightarrow O(n^2)$

From fastest to slowest (#1)

$$1. 1/n \quad 2. 2^{100} \quad 3. n^{0.01}$$

$$4. \log \log n \quad 5. |\sqrt{n}| \quad 6. 3n^{0.5} \quad 7. (\log n)^{1/2}$$

$$8. 2^{\log n} \quad 9. \log 5^n \quad 10. \log_4 n^n \quad 11. n^{3/2}$$

$$12. 6n \log n \quad 13. 2n \log^2 n \quad 14. 2^n \quad 15. 2^n + n^2 + 3n$$

$$16. 3^n + \log 2021 \quad 17. 4^n \quad 18. (n+1)!$$