

COMP361 Tutorial on Algorithms Analysis

Question 1

Using the definitions of O , Ω , and Θ , show that:

1. $n^{5/2} \in \Omega(n^2)$;
2. $n^k \in O(k^n)$ for any constant $k > 1$;
3. $\log(n!) \in \Theta(n \log n)$.

Question 2

Rank the following functions in increasing order of growth:

1. $f(n) = n^{2.5}$
2. $f(n) = \sqrt{2n}$
3. $f(n) = n + 10$
4. $f(n) = 10^n$
5. $f(n) = 100^n$
6. $f(n) = n^2 \log(n)$

Question 3

Maintenance of insertion sort loop invariant proof needs parts 1 and 2 proved - please prove them!

Question 4

Devise a stable version of counting sort.

Question 5

Do an example of a Radix Sort for NZ car number plates (6 alphanumeric symbols).