Design and Analysis of Algorithm (CS 412)
Instructor: Dr. Ayesha Enayet
Date: 25th January 2024
CS 6th

SIS ID:_____ Name:_____

A. Identify whether each of the following statement is true or false. Justify your answer.

1. f(n)=o(g(n)) if and only if g(n)= ω(f(n)) (T/F)
   True, g(n) is a set of all functions with growth greater than f(n); it implies that f(n) is a set of all functions with growth smaller than g(n).
2. o(g(n)) ∩ ω(g(n)) is the empty set. (T/F)
   True, disjoint sets: o(g(n)) is a set of all functions with growth smaller than g(n) and ω(g(n)) is set of all functions with growth greater than g(n).
3. $2n^2+O(n)=O(n^2)$ (T/F)
   True, n^2 is the highest degree term of the polynomial (dominating term), and O(n) is a set of function with linear growth; hence max($2n^2$,O(n)) is $O(n^2)$

B. Is $\frac{n}{2}$= ω(n)? if yes, give values for c and n_o. If no, justify with the help of a formal definition of Little-Omega notation.

By definition $\frac{n}{2}$= ω(n) iff for all constants c>0 $\frac{n}{2} > c$.n, but for all c<1/2, the condition does not hold.

C. Given that, c1. $2n^2<=2n^2+2n+2<=c2.2n^2$, find out the values of c1 and c2.

The condition holds for c1=1 and c2=2 for n_o=2 c1<=3<=c2 is also a possible solution for n_o=1