CSC212 Tutorial #3
Performance Analysis-2

Question 1: Find the total number of primitive operations and the Big Oh notation of the following methods:

	Statements	S/E	Freq.	Total
1	`for (int i = 0; i < n-5; i++)`	1	n-4	n-4
2	`for (int j = n; j >= 2; j--)`	1	n(n-5)	n^2-5n
3	`S.O.P(i);`	1	(n-5)(n-1)	n^2-6n+5
	Total Operations	$2n^2 - 10n + 1$		
	Big Oh	$O(n^2)$		

	Statements	S/E	Freq.	Total
1	`for (int i = 0; i < n; i++)`	1	n+1	n+1
2	`for (int j = 0; j <= i; j++)`	1	$\frac{n^2}{2} + \frac{3n}{2}$	$\frac{n^2}{2} + \frac{3n}{2}$
3	`S.O.P(i);`	1	$\frac{n^2}{2} + \frac{n}{2}$	$\frac{n^2}{2} + \frac{n}{2}$
	Total Operations	$n^2 + 3n + 1$		
	Big Oh	$O(n^2)$		

Line 2:

$$\sum_{i=0}^{n-1} i + 2 = \sum_{i=0}^{n-1} i + \sum_{i=0}^{n-1} 2$$
$$= \frac{n-1(n-1+1)}{2} + 2n$$
$$= \frac{n^2-n}{2} + \frac{4n}{2}$$
$$= \frac{n^2}{2} + \frac{3n}{2}$$

Line 3:

$$\sum_{i=0}^{n-1} i + 1 = \sum_{i=0}^{n-1} i + \sum_{i=0}^{n-1} 1$$
$$= \frac{n-1(n-1+1)}{2} + n$$
$$= \frac{n^2-n}{2} + \frac{2n}{2}$$
$$= \frac{n^2}{2} + \frac{n}{2}$$

Question 2: Find the simplest *g(n)*, *c* and n_0 for the following *f(n)* s.t: *f(n)* ≤ *cg(n)*, ∀*n* ≥ n_0.

$5n^3 \log n + 20n^2 - 4n + 3 \leq 5n^3 logn + 20n^3 logn + 3n^3 logn$

$\leq 28n^3 logn$

C = 28

g(n) = $n^3 logn$

n_0 = 2

Question 3: Find the big Oh notation for the following functions:

$2^{4logn+2} + n^3 logn$

= $2^{4logn} * 2^2 + n^3 logn$

= $n^4 * 4 + n^3 logn$

= $4n^4 + n^3 logn$

$O(n^4)$