

COMP 7712: Assignment 2
Due date: 09/13/2016

1. Use the definition of O and Ω to explain that:

- (a) $3n^2 + n^3 \in O(n^3)$
- (b) $3n^2 + n^3 \in \Omega(n^3)$

2. Write down the running time of this function in terms of Θ .

```
1. G(n)
2.   s = 0
3.   i = 1
4.   while i ≤ n do
5.       s = s + i
6.       i = i · 4
7.   return s
```

3. Write down the running time of this function in terms of Θ .

```
1. F(n)
2.   s = 0
3.   for i = 0 to n do
4.       s = s + i
5.   for i = 0 to n do
6.       j = 1
7.       while j ≤ i do
8.           s = s · (i + j)
9.           j = j · 2
10.  return s
```

4. Use substitution to find the running time of this function: $T(n) = n^2 + T(\frac{n}{2})$.
5. Use substitution to find the running time of this function: $T(n) = n^2 + 4T(\frac{n}{2})$.
6. Use substitution to find the running time of this function: $T(n) = n^2 + 8T(\frac{n}{2})$.