

Bachelor of Applied Science in Computer Engineering

Algorithm Analysis and Design DSAL 3001

Assignment #11 25 marks

20 %

21/03/2022

Name_____ Student ID_____

1. Give a formal definition for Big O. [2 marks]

2. Use that definition to show that $8n + 5$ is $O(n)$. [5 marks]

3. **Algorithm** doEx (A, n)
 Input an array X of n integers
 $t \leftarrow 0$
 for $i \leftarrow 0$ **to** $n - 1$ **do**
 $t \leftarrow t + A[0]$
 for $j \leftarrow 1$ **to** i **do**
 $t \leftarrow t + A[j]$
 $B[i] = t$
 return t

- i. What does the above algorithm do? Give a high level statement that a non-programmer can easily understand. [5 marks]

- ii. Give a big O characterization of this algorithm. Clearly show how you arrive at your answer, showing any working if necessary.

[5 marks]

4. i. An array has 2000 items in sorted order. How many comparisons are required if a linear search is carried out on the array before it can be determined that the search target is not present in the array. [3 marks]

- iii. If a binary search is used instead, what is the maximum number of comparisons required to find an item if it exists in the array? [2 marks]

- iv. If this number is increased to 4000, how many comparisons will then be required? [3 marks]
