**Year 2**

## Data Structures and Algorithms – IT2070

**BSc (Hons) in Information Technology**



**Tutorial 6 – Big O notation and Insertion sort Algorithms**

# Semester 2, 2020

## 

1. Find the *Big oh* value for the following functions. Justify your answer.





1. Find the *Big oh* value of the following program fragment.

*j* = 0

for *i* = 0 to n

while*j* ≤ 5

*j* =*j* +1

1. What are the best case and worst case running time (in Big O notation) of the insertion sorting algorithm? When do you get such situations in the insertion sorting algorithm?
2. Illustrate the operations of the ***New Insertion sort algorithm*** for the array with the given set of elements. (For the illustration process assign the values only once to the given algorithm codes and then use diagrammatic way to reach the answer.)

A

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |
| 3 | 4 | 1 | 2 |

***NEW-INSERTION-SORT*** (*A*)

1 **for** *j* = 2 to A.length

2. *i* =1

3. **while** A[*j*] > A[*i*]

4. *i* = *i* + 1

5 *key* = A[*j*]

6 **for** *k* = 0 to *j* - *i* - 1

7 A[*j-k*] = A[*j-k-1*]

8 A[*i*] = *key*