Data Structures and Algorithms

Assignment 01 **Marks 35**

Instructions

Work on this assignment individually.

Absolutely NO collaboration is allowed. Any traces of plagiarism would result in a ZERO marks in this assignment and possible disciplinary action.

Solve all the questions carefully, you can solve them on a simple page instead of taking printouts of this document.

Only **handwritten solution** will be accepted.

Attach your document (image, PDF or in any other digital format) with an Email and send it to the following respective recipient till **Wednesday, March 17, 2021**.

DO NOT compress/zip your solution.

The email must be sent from your **official PUCIT email id**, otherwise it will not be accepted and will be marked ZERO.

The subject of the email should be the exact name of the **assignment** i.e. **Assignment 01**.

Degree	Recipient Email	Subject of Email
BSIT Morning	dsaubt03@gmail.com	Assignment 01
BSIT Afternoon	dsaubt04@gmail.com	

5 MARKS will be DEDUCTED if submission instructions are not followed.

No submissions will be considered after due date.

Name: _____

Roll #: _____

Question # 01 [04]

Obtained **step count** of the following code segment.

Line #	Code	Steps
1	`for (i = 0; i < n * n; i++)`	
2	`for (j = 1; j < n; j = j * 3)`	
3	`temp++;`	
Total Number of Steps **T(n) =**		

Question # 02 [06]

Obtained **step count** of the following code segment.

Line #	Code	Steps
1	`for (i = 0; i < n; i++)`	
2	`for (j = 0; j < n; j++)`	
3	`for (k = 0; k < j; k++)`	
3	`temp++;`	
Total Number of Steps **T(n) =**		

Question # 03 [05]

Order the following functions by growth rate *(slowest to fastest)*:

$$N, \sqrt{N}, N^{1.5}, N^2, NlogN, NlogN^2, \frac{2}{N}, 2^N, 2^{\frac{N}{2}}, 57, N^3 and\ N^2logN$$

Question # 04 [02 + 02 + 02 + 02 + 02]

An algorithm takes **0.5 sec** for input **size 100**. How long will it take for input **size 500** if the running time is?

A. $T(n) = n$

B. $T(n) = n\log_2 n$

C. $T(n) = n^2$

D. $T(n) = n!$

E. $T(n) = 2^n$

Question # 05 [04 + 06]

Show that the following equalities are correct; do not forget to mention the constants (***c*'s and n_0**) for each of these questions

A. $5n^4 + 4n^3 + 50n = O(n^4)$

B. $2n^2 2^n + nlogn = \Theta(n^2 2^n)$

NOTE: - No submission will be accepted after the DUE DATE.

B E S T O F L U C K