**Subject Lab: Algorithms & Complexity**          **Lab Duration: 10:40-12:35**
**Lab Code: ECSE202L**                                          **Max Marks: 10**


## Submission Guidelines:

1. The purpose of the course is to learn how to analyse the complexity of the algorithm.
2. You are supposed to do this assignment on your own. While you may discuss the problem with other students, you are not allowed to copy any part of the code from other students or to copy from any other source. Any form of **plagiarism** will not be tolerated. If there is substantial overlap between the codes submitted by two students, both will get reduction in the course grade.
3. The assignment should be **shown to lab instructor** in the lab session and **must be submitted** on LMS by **given date**.
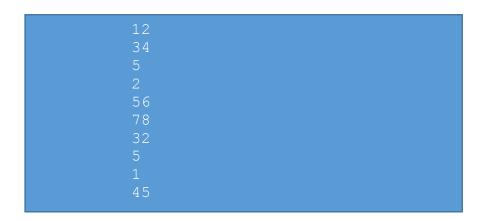
It should also carry the following statement:

"*I have done this assignment on my own. I have not copied any code from another student or any online source. I understand if my code is found similar to somebody else's code, my case can be sent to the Disciplinary committee of the institute for appropriate action.*"


## Lab Assignment 3

Q1.  In this assignment, students are required to randomly generated 100 numbers and write it down in a output file "Lab3_input.txt". Next, students are required to read the input file "Lab3_input.txt" and sort the numbers using:   a) Insertion sort (b) Selection sort (c) Bubble sort

 With each algorithm, students are required to find the time complexity (in terms of number of iterations) of the algorithm to sort the data.

For example, suppose the randomly generated file has following numbers:

```
12
34
5
2
56
78
32
5
1
45
```

Expected output:  A output file by name "Lab3_output.txt":

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Insertion sort

1

2
5
5
12
32
34
45
56
78

 Selection sort:

1
2
5
5
12
32
34
45
56
78

Bubble sort:

1
2
5
5
12
32
34
45
56
78

| Case/Time complexity | Bubble | Selection | Insertion |
|---|---|---|---|
| Best Case | 32 | 40 | 40 |
| Worst case | 32 | 23 | 65 |
| Average Case | | | |

# Bennett University Greater Noida
## Department of CSE

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Q2. In this question, you will get the file from your lab instructor which will be taken as input to read the data. Based on the given input file, you are supposed to sort the data by applying
(a) Insertion sort (b) Selection sort (c) Bubble sort
Again you have to find the expected running time of all the algorithms to sort the data in:
(i) Best case (ii) Average case (iii) Worst case.
For example, the given file will hold the data in this form:

```
S
W
A
T
D
Z
```

Expected Output:

```
Insertion sort

A
D
S
T
W
Z
Selection sort:
A
D
S
T
W
Z
Bubble sort:
A
D
S
T
W
Z
```

| Case/Time complexity | Bubble | Selection | Insertion |
|---|---|---|---|
| Best Case | 5 | 6 | 6 |
| Worst case | 6 | 6 | 5 |
| Average Case | 2 | 4 | 3 |