ADSA: Advanced Data Structures and Algorithms

Semester: Jan – May 2020; Course Type: PE; Mode: Self-Study for Y16 SLI students of CSE and CCE branches;

Google Classroom Course Name: ADSA Jan 2020; Code: xgdtjh3

CIF: Shared

Text Book:

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein. Introduction to algorithms, 3rd Edition, The MIT Press, 2009.

Evaluation Criteria: as mentioned in the CIF: (i) Mid-term 40% and (ii) End-Term 60%

Topics before Mid-Term:

[A]. For the month of Jan 2020:

1. Algorithm complexity and asymptotic notations;
2. Revision of BT, BST, AVL Tree Operations and their Time Complexities in BIG O notation;
3. Red-Black Trees, 2-3 Tree, B-Tree, Skip List, Heaps: Binomial and Fibonacci;
4. Data structures for disjoint sets: Union Find with applications;

[B]. For the month of Feb 2020 until Mid-Term:

5. Hashing: Fundamentals, Simple Uniform, Double Hashing, Universal & Perfect Hashing, Application;
6. Text Processing: Pattern Matching – KMP algorithm, Boyer Moore algorithm;
7. Tries- Standard Tries, Compressed Tries, Suffix Tries;
8. Implementation and Application of Text Processing Algorithms;

Units – 3 and 4 will be for study post Mid-term.

Home Assignment # 1: For the week of Jan 20th: No need to submit but practice;

1. What are the worst-case time complexity to (i) find, (ii) insert and (iii) delete a key in:
    a. Unsorted array, sorted array, BT, BST and AVL Tree: justify your answer;