**Week 5**

**Name: Joyal Joseph**

**Mobile: +91 6238189424**

| **Data Structure Workouts** |
| --- |
| 1. Learn about Bubble Sort, Insertion Sort, Selection Sort, Quick sort and Merge sort. Complete at least three sample workouts in each of them. 2. Learn the concept of Stack and Queue. Complete at least three sample workouts in each of them & do at least 3 problems from any competitive coding websites (Hacker Rank, Code Chef, Leet code, Algo Expert, etc.)    1. PUSH, POP and Display elements in Stack    2. Enqueue, Dequeue and Display elements in Queue 3. Learn the concepts of Hash Table. Complete at least 3 sample workouts. 4. Learn about the Applications of all structures you covered this week |
| *Bubble sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in the wrong order.This algorithm is not suitable for large data sets.*  *Insertion sort is a simple sorting algorithm like sort playing cards.The array is virtually split into a sorted and an unsorted part.Values from the unsorted part are picked and placed at the correct position in the sorted part.*  *Selection sort is like selecting an element and moving it into its original position in a sorted array. The algorithm repeatedly selects the smallest or largest element from the unsorted portion and moves it to the sorted portion.*  *Quick sort is a sorting algorithm based on the divide and conquer methodology that picks an element as a pivot and partitions the given array around the picked pivot by placing the pivots in its correct position in the sorted array.*  *Mergesort is also based on divide and conquer methodology that works by dividing an array into smaller subarrays,Sorting each sub array and then merging the sorted subarrays back together to form the final sorted array.*  [*https://drive.google.com/drive/folders/1Xx4m22iJHnE91QthRI4cLrsNK6tYEHmG?usp=share\_link*](https://drive.google.com/drive/folders/1Xx4m22iJHnE91QthRI4cLrsNK6tYEHmG?usp=share_link) |
| *A stack is a linear data structure that follows the LIFO principle. Stack has one end,whereas the queue has two ends(front and rear). It contains only one pointer to pointer that points to the topmost element of the stack.*  *A queue is defined as a linear data structure that is open at both ends and the operations are performed on the both sides and the operations are performed at the FIFO order.*  *The real-world example of a queue is the ticket queue outside a cinema hall, where the person who enters first in the queue gets the ticket first, and the last person enters in the queue gets the ticket at last. Similar approach is followed in the queue in data structure.*  [*https://drive.google.com/drive/folders/1yf\_a3LrP2v1qp2YjHY-H9i-uzcbFbncL?usp=share\_link*](https://drive.google.com/drive/folders/1yf_a3LrP2v1qp2YjHY-H9i-uzcbFbncL?usp=share_link) |
| *Hash Tables are a type of data structure in which the address or the index value of the data element is generated from a hash function. That makes accessing the data faster as the index value behaves as a key for the data value. In other words, a hash table contains a key-value pair and the key is generated through a hashing function. A proper hashing function is required to avoid collisions. Collisions are managed mainly through chaining and linear prob.*  [*https://drive.google.com/drive/folders/1hB\_Pb0sHahzA6WmtcBLB311x2tjWIlqa?usp=share\_link*](https://drive.google.com/drive/folders/1hB_Pb0sHahzA6WmtcBLB311x2tjWIlqa?usp=share_link) |
| *Sorting is almost everywhere in real life. We can find sorting from our mobile phones contact list,file manager and almost everything is easily understandable when it is sorted.*  *Bubble sort,insertion sort and selection sort are preferred for sorting relatively smaller data where quicksort and mergesort is preferred for a larger data set.*  *Stacks are used for the Undo buttons in various softwares,the recent most changes are pushed into the stack even the back button in the browser works with the stack.*  *Queues are used in case of printers where the first page will print first and in uploading images.*  *Hash tables are used in a file system where each file can be accessed with its name and password verification,pattern matching,compilers and cryptography uses hash tables and the concept of hashing.* |