

## CHAPTER

## 5

## Searching and Sorting

## Syllabus Topics

**Searching** : Sequential Search, Binary Search.

**Hashing** : Hash Functions: Truncation, Mid-square Method, Folding Method, Division Method.

**Collision Resolution : Open Addressing** : Linear Probing, Quadratic Probing, Double Hashing, Separate Chaining  
Bucket Hashing. Analysis of all searching techniques.

**Sorting** : Insertion sort, Selection sort, Merge sort, Quick sort and Radix sort. Analysis of all sorting techniques.

**Self-learning Topics** : Implementation of different sorting techniques and searching.

5.1	Searching - Introduction.....	5-3
UQ. 5.1.1	Write short note on Searching Algorithms. (MU - Dec. 16, 5 Marks).....	5-3
5.1.1	Sequential / Linear Search .....	5-3
5.1.2	Binary Search .....	5-4
UQ. 5.1.5	Short notes on : Binary search (MU - Dec. 18, 5 Marks).....	5-4
UQ. 5.1.11	How does binary search different from linear search ? (MU - Dec. 19, 3 Marks).....	5-7
5.2	Hashing.....	5-7
UQ. 5.2.1	Short notes on : Hashing techniques. (MU - Dec. 18, 5 Marks) .....	5-7
5.2.1	Hash Table .....	5-8
5.2.2	Bucket.....	5-9
5.2.3	Collision .....	5-9
UQ. 5.2.6	What is Collision? (MU - Dec.17, Dec.18, May 19, Dec.19, 3 Marks) .....	5-9
5.3	Hash Functions : Hash Functions : Truncation, Mid-Square Method, Folding Method, Division Method.....	5-9
UQ. 5.3.1	Describe hash functions. (MU - May 14, 10 Marks) .....	5-9
5.3.1	Characteristics of Good Hash Function.....	5-10
5.4	Collision Resolution .....	5-10
UQ. 5.4.1	What are the methods to resolve collision? (MU - Dec. 17, Dec.18, May 19, Dec.19, 4 Marks).....	5-10
5.4.1	Open Addressing : Linear Probing, Quadratic Probing, Double Hashing .....	5-11
UQ. 5.4.2	Explain Linear probing with an example. (MU - Dec. 17, Dec.18, May 19, Dec.19, 3 Marks).....	5-11
5.4.2	Separate Chaining.....	5-13





5.4.3	Bucket Hashing .....	5-13
5.5	Analysis of All Searching Techniques.....	5-14
5.6	Sorting.....	5-15
5.6.1	Classification of Sorting .....	5-15
5.6.2	Sorting Algorithm.....	5-16
5.6.3	Efficiency of Sorting Algorithm .....	5-16
5.7	Sorting Techniques .....	5-17
5.7.1	Insertion Sort .....	5-17
UQ. 5.7.2	Explain in brief insertion sort. (MU - Dec. 13, 5 Marks) .....	5-17
UQ. 5.7.3	Write short note on : Insertion Sort. (MU - Dec. 19, 5 Marks) .....	5-17
UQ. 5.7.4	Solve : Insertion sort algorithm. (MU - May 17, 5 Marks. ....	5-19
5.7.1(A)	Examples of Insertion Sort .....	5-19
5.7.2	Selection Sort.....	5-21
UQ. 5.7.7	Short notes on : Selection sort (MU - Dec. 18, 5 Marks) .....	5-21
5.7.2(A)	Examples of Selection Sort .....	5-23
5.7.3	Merge Sort.....	5-24
UQ. 5.7.11	Write short note on : Merge sort. (MU - Dec. 15, 5 Marks).....	5-24
UQ. 5.7.12	Write an algorithm for merge sort and comment on its complexity. (MU - Dec. 17, May 18, Dec. 18, Dec.19, 10 Marks).....	5-24
UQ. 5.7.13	Write an algorithm for merge sort and comment on its complexity. (MU - May 16, Dec. 17, 10 Marks) .....	5-26
5.7.4	Quick Sort.....	5-26
UQ. 5.7.15	Implement quick sort with example and find its complexity. (MU - May 14, 10 Marks).....	5-26
UQ. 5.7.16	Explain quick sort using an example. Write algorithm for it and comment on its complexity. (MU - Dec. 14, Dec. 17, Dec. 18, 10 Marks) .....	5-26
UQ. 5.7.17	Write an algorithm for quick sort and comment on its complexity. (MU - Dec. 19, 5 Marks).....	5-26
UQ. 5.7.18	Write an algorithm to implement Quick sort. Explain with an example. (MU - May 15, Dec. 17, 10 Marks) .....	5-27
5.7.5	Radix Sort.....	5-28
UQ. 5.7.21	Write short note on : Radix sort. (MU - May 16, 5 Marks) .....	5-28
5.7.6	Comparison of Sorting Techniques .....	5-32
5.7.7	Analysis of All Sorting Techniques .....	5-32
5.8	Implementations of Different Sorting Techniques and Searching.....	5-33
5.8.1	Implementation of Sequential / Linear Search .....	5-34
5.8.2	Implementation of Binary Search .....	5-34
5.8.3	Implementation of Insertion Sort .....	5-34
UQ. 5.8.3	Write a program to sort an array using insertion sort algorithm. (MU - May 15, 10 Marks).....	35
5.8.4	Implementation of Selection Sort .....	5-35
5.8.5	Implementation of Merge Sort .....	5-36
5.8.6	Implementation of Quick Sort .....	5-37
5.8.7	Implementation of Radix Sort.....	5-39
• Chapter Ends.....		5-40
		5-40