Chapter 1 ........................................................................................................................................
1. Introduction to algorithms
2. Properties of algorithms
3. Real time analysis of an algorithm
4. Big-O notation, Rate of growth
5. Big Omega Ω, Big Theta Θ notation

Chapter 2 ........................................................................................................................................
1. Linked list ................................................................................................................................
   a. Traversing and searching linked list
   b. Merging two lists
   c. Reversing a list and circular list
   d. Applications of lists
2. Doubly linked list ........................................................................................................................
   a. Inserting and deleting a node on doubly linked list
   b. Applications of doubly linked list
3. Stack data structure ....................................................................................................................
   a. Operations on the stack memory Representation of stack
   b. Array representation of stack
   c. Applications of stack
   d. Evaluation of arithmetic expression, matching parenthesis, infix and postfix operations, recursion
4. Queue data structure ...................................................................................................................
   a. Queue, operations on the queue
   b. Memory representation of queue
   c. Array and linked list representation of queue
   d. Circular queue, deque, priority queue, application of priority queue
   e. Applications of queues
Chapter 3

1. Divide and conquer
2. Master theorem
3. Master theorem for subtract
4. Master theorem for guessing
5. Algorithms design techniques:
   a. Introduction, classification, classification by implementation and design method
6. Greedy algorithms:
   a. Introduction, greedy strategy, elements of greedy algorithms, advantages and disadvantages of greedy method, greedy applications, understanding greedy technique

Chapter 4

a. Array: Introduction to one-dimensional array traversing, insertion, deletion, searching
b. Sorting, merging of arrays, multidimensional arrays
c. Sparse arrays, sparse matrix advantages and limitations of arrays

Chapter 5

1. Sorting and searching techniques
   a. Bubble, selection, insertion, merge, quick, radix sort
   b. Searching: Sequential, binary, indexed sequential searches, binary search
   c. Selection algorithms: Selection by sorting, partition-based selection algorithm, linear selection algorithm - Median of medians algorithm, finding the K smallest elements in sorted order

Chapter 6

1. The graph
   a. Introduction, graph, graph terminology, adjacency matrix representation of graph
   b. Adjacency list or linked representation of graph
   c. Graph and Python
c. Operations performed on graph, graph traversal, BFS and DFS traversal, applications of the graph
d. Shortest path problems, spanning trees

Chapter 7

1. Tree
   a. Tree, binary tree, properties of binary tree
   b. Memory representation and operations performed on binary tree
   c. Binary tree traversals, Huffman algorithm, binary search tree
   d. Operations on binary search tree, heap, memory representation and operation on heap, heap sort
   e. Advanced tree structures: Red black tree, operations performed on red black tree, AVL tree, operations performed on AVL tree, 2-3 Tree, B-Tree

Chapter 8

1. Hashing techniques
   a. Hash function, address calculation techniques, hashing functions
   b. Collision resolution, linear probing, quadratic, double hashing, bucket hashing, deletion and rehashing

Chapter 9

1. Maps: Implementing the map abstract data type; using hashing