

Malla Reddy University

I B.Tech II Semester – CSE/AIML/CS/DS/IT/IOT

Question Bank

Data Structures and Its Applications

Course Code: MR22-1ES0105

UNIT-I

1. What is an array? How do arrays differ from lists? Explain the types of an arrays with a suitable example for each one.
2. What is the difference between a data type and a data structure? Can you classify data structures based on their characteristics.
3. Explain the types (Built-in and user-defined) of data structures with an examples.
4. Write the differences between linear and non-linear data structures.
5. Explain linear search technique with an example program?
6. Define Binary search? Explain with an example program?
7. Explain the quick sort algorithm. Write a python program to implement a quick sort for an array using input method.
8. Explain the Merge sort algorithm. Write a python program to implement a Merge sort for an array using input method.
9. Explain the Bubble sort algorithm. Write a python program to implement a Bubble sort for an array using input method.
10. Explain the Selection sort algorithm. Write a python program to implement a Bubble sort for an array using input method.

UNIT-II

1. What is stack, and what are the main characteristics of a stack.
2. What are queues, and what are the main characteristics of a queues.
3. Explain the stack operations and write down its applications.
4. Explain the queue operations and write down its applications.

5. Discuss the principle of Stack data structure. Implement stack data structure using python program.
6. Discuss the principle of Queue data structure. Implement Queue data structure using python program.
7. What are queues, and how do they differ from stacks in terms of their structure and operations?
8. Write the procedures for insertion, deletion and traversal of a queue.
9. What is a circular queue, and how do they differ from regular queues? Write a python program to insert an element in a circular queue.
10. Write down the differences between stack, queue and circular queue.

UNIT-III

1. Explain Linked list with neat diagram. How does a doubly linked list differ from singly linked list? Write the advantages and disadvantages of Linked list.
2. What is linked list? Write a python program to implement a singly linked list.
3. Write a python program to implement a doubly linked list.
4. Describe the process of deleting a node from a doubly linked list with an example and write a python program to implement it.
5. What is a circular linked list and how it is different from a singly & doubly linked list? Discuss in detail its operations with examples.
6. Write a python program to implement Circular linked list.
7. Explain how to traverse a circular linked list with an example program.
8. Describe the process of deleting a node from a circular linked list with the help of an example program, taking suitable example explain the process.
9. Explain how to implement a stack using linked list with example. Describe the operations supported by stack using a singly linked list with an example program.
10. Explain how to implement a queue using linked list, also describe the operations supported by queue using a singly linked list with an example program.

UNIT-IV

1. Define Tree. Why do we need tree data structure and explain the following:
a. Root node **b.** Parent & child node **c.** ancestor **d.** path **e.** sibling

2. Discuss in detail the characteristics of Tree and the operations performed on Trees with suitable examples.
3. What is a binary tree? What are the operations that can be performed on a binary tree? Briefly explain each operation with an example program.
4. What is Binary search Tree? Discuss the properties of BST and explain the **insert** operation in BST with suitable examples. Write a python program for it?
5. Describe the delete operation in a binary search tree. What are the different cases to consider during deletion, and how the tree is adjusted? Explain it with a simple python program and suitable examples.
6. Write a python program to search an element into a binary search tree. Explain the process with an example tree.
7. Write a Python function to perform an inorder traversal of a binary tree. Provide an example of using the function to print the elements of a tree.
8. What is Tree Traversal and what are the different types of tree traversal techniques available. Explain each with suitable examples.
9. Write a Python program to implement Tree traversal techniques.
10. What is Binary Tree? What are the applications of trees and explain in detail how Trees are used in real time applications.

UNIT-V

1. Define a graph and its characteristics. How is a graph different from other data structures? Explain with suitable examples.
2. Describe the characteristics of a graph. Discuss the concepts of vertices, edges, directed and undirected graphs, weighted and unweighted graphs.
3. Write the difference between linear and non-linear data structures. Explain with suitable examples discussing pros and cons.
4. Explain depth First Search with an example.
5. Explain breadth-first search with an example.
6. How does depth-first search (DFS) algorithm work, and what data structure is typically used? Implement the DFS in Python for graph traversal.
7. How does breadth-first search (BFS) algorithm work, and what data structure is typically used? Implement the BFS algorithm in Python for graph traversal.

8. Compare and contrast BFS and DFS algorithms in terms of their implementation, traversal order, and the data structures used. Discuss the advantages and disadvantages of each algorithm.
9. Give any five applications of graph, where we can apply them in real time scenario.
10. Explain the differences between tree and graph with suitable examples and neat diagrams.