



J. Sambal

Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A++' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Arrear Examination – November 2024
II Semester

Class : 2023 Batch
Major : Computer Applications / *Comp. Science*

Time: 3 Hours
Max. Marks: 100

23BC303 / 23BCAC03 Data Structures

Course Outcomes:

1. To understand the basic ideas of algorithms and data structures.
2. Apply linear and nonlinear data structures to programming solutions.
3. Understand and apply tree and graph structures.
4. Ability to choose and implement appropriate data structures in real-time problems.
5. Obtain knowledge of advanced data structures.

Part A

10 x 1 = 10

Choose the Correct Answer

1. Provide the format for the representation of string in the memory in C language. CO1 K1
a. Array of characters b. Object
c. Primitive data type d. Linked list of characters
2. The notation _____ is the formal way to express the upper bound of an algorithm's running time. CO1 K2
a. $O(n)$ b. $\Omega(n)$
c. $\theta(n)$ d. $f(n)$
3. Trees and graphs are _____ data structures. CO2 K1
a. Primitive b. Linear c. Non-linear d. Derived
4. Which data structure is needed to convert infix notation to postfix notation? CO2 K1
a. Stack b. Trees c. Branch d. Queue
5. Which of the following points is/are not true about Linked List data structure when it is compared with an array? CO2 K3
a. Random access is not allowed in a typical implementation of Linked Lists
b. Access of elements in linked list takes less time than compared to arrays
c. Arrays have better cache locality that can make them better in terms of performance
d. It is easy to insert and delete elements in Linked List
6. A collection of nodes (or) vertices and their edges (or) links is CO3 K2
a. Stack b. Lists c. Tree d. Queues
7. What data structure is used in standard implementation of Breadth first search? CO3 K1
a. Stack b. Queue c. Linked List d. Tree
8. Which file organization is primarily concerned with the relationship between the key of the record and its physical location? CO4 K3
a. Sequential b. Direct c. Indexed d. Hierarchical
9. What will be the slot allotted for 22 in the hash table? CO4 K3
Hash function = $\text{key} \bmod 5$
Elements = 12, 15, 22, 25 and 37
a. 0 b. 1 c. 2 d. 3
10. What is a B-tree primarily used for? CO5 K1
a. Sorting elements in an array b. Implementing hash tables
c. Indexing in databases d. Storing binary search trees

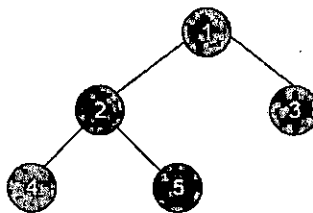
Part B

Answer all questions

5x 6= 30

Each answer should not exceed 400 words or two pages

- 11.a. Define data structure. Explain the types of data structures with a neat diagram. CO1K2
(Or)
- 11.b. Explain the operations on data structures. CO1K2
- 12.a. Mention the structure of stack with operations. CO2K1
(Or)
- 12.b. Discuss queues with operations and mention their representations. CO2K2
- 13.a. With an example, explain the different types of representation of tree. CO3K1
(Or)
- 13.b. Write the inorder, preorder and postorder traversal of the following tree. CO3K3



- 14.a. Present the different types of graphs with examples. CO3K1
(Or)
- 14.b. Write short notes on Hash Tables. CO4K1
- 15.a. Discuss indexing and its data structures. CO4K2
(Or)
- 15.b. What are balanced search trees? Explain. CO5K1

Part C

5 x 12 = 60

Answer all questions

Each answer should not exceed 800 words or four pages

- 16.a Discuss the categories of algorithms with examples. CO1K2
(Or)
- 16.b. Explain the asymptotic analysis of algorithms. CO1K2
- 17.a. Explain the conversion of infix to postfix expression with example using stack. CO2K4
(Or)
- 17.b. Discuss singly linked lists with operations. CO2K2
- 18.a. Discuss binary tree types with neat diagrams. CO3K2
(Or)
- 18.b. Express various graph representations with example. CO3K2
- 19.a. Illustrate depth-first search and breadth-first search traversal of a graph. CO3K2
(Or)
- 19.b. Discuss file organization and its access methods. CO4K2
- 20.a Define Hashing. Explain various Hash Functions in detail. CO5K1
(Or)
- 20.b. Explain B-trees and its operations in detail. CO5K1