

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Information Technology–Core Choice Course

ADVANCED DATA STRUCTURES

Time : Three hours

Maximum : 75 marks

PART A — (20 marks)

Answer ALL questions

- I. (A) Choose the Correct Answer (5 × 1 = 5)
1. The data structure required to check whether an expression contains a balanced parenthesis is _____
 - (a) Stack
 - (b) Queue
 - (c) Array
 - (d) Tree
2. Which scheme uses a randomization approach?
 - (a) hashing by division
 - (b) hashing by multiplication
 - (c) universal hashing
 - (d) open addressing
3. In a binary max heap, worst case complexity will be
 - (a) $O(n)$
 - (b) $O(\log n)$
 - (c) $O(\log \log n)$
 - (d) $O(1)$
4. What are the operations that could be performed in $O(\log n)$ time complexity by red-black tree?
 - (a) insertion, deletion, finding predecessor, successor
 - (b) only insertion
 - (c) only finding predecessor, successor
 - (d) for sorting
5. Floyd Warshall algorithm is used for solving _____
 - (a) all pair shortest path problem
 - (b) single source shortest path problem
 - (c) network flow problem
 - (d) sorting problem
- (B) Fill in the Blanks (5 × 1 = 5)
6. Process of inserting an element in stack is called _____
7. _____ Steps are involved in creating a hash function using a multiplication method.

8. _____ can be used as priority queue.
9. Double rotation is also called as _____
10. The general method to solve the single-source shortest-path problem is known as _____
- II. Answer ALL questions (5 × 2 = 10)
11. Write the Difference between stack and queue.
12. What is hash function?
13. Define percolate down.
14. What is double rotation?
15. Determine topological Sort.

PART B — (5 × 5 = 25)

Answer ALL the questions choosing either (a) or (b)

16. (a) Define circularly list and explain its types.
Or
(b) Write a short note on merge sort with an example.
17. (a) Explain about separate chaining.
Or
(b) Illustrate the following:
(i) Universal hashing
(ii) Extendible hashing
18. (a) Elucidate Maxheap.
Or
(b) Give a short note on basic heap operations.
19. (a) Explain how to insert and delete an element in a tree.
Or
(b) Mention the properties of red-black tree.
20. (a) Discuss about Bellman Ford algorithm.
Or
(b) Illustrate Floyd Warshall algorithm.

PART C — (3 × 10 = 30)

Answer any THREE questions

21. Discuss about quick sort algorithm with an example.
 22. Elucidate Hash Tables without Linked Lists.
 23. Write a detailed note on Binary Heap.
 24. Explain how to perform insertion and deletion of an element in red-black tree with suitable example.
 25. Demonstrate Shortest-Path Algorithms with example.
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