ICLeafAI

Assessment on Basic Data Structures

Duration: 30 Minutes
Passing Score: 70% (14 out of 20 points)
Question Types: Multiple Choice (1 point each), Essay (5 points each)

Section 1: Multiple Choice Questions (1 point each)

Question 1:
What data structure uses a Last In First Out (LIFO) method?
- A) Queue
- B) Stack
- C) Array
- D) Linked List

Question 2:
Which of the following is NOT a linear data structure?
- A) Array
- B) Stack
- C) Graph
- D) Queue

Question 3:
In a linked list, which pointer is used to reference the next node?
- A) Previous Pointer
- B) Next Pointer
- C) Head Pointer
- D) Tail Pointer

Question 4:
What is the time complexity of accessing an element in a hash table on average?
- A) O(1)
- B) O(n)
- C) O(log n)
- D) O(n^2)

Question 5:
Which of the following data structures would you use to implement a priority queue?
- A) Stack
- B) Queue
- C) Heap
- D) Array

Question 6:
Which operation in a binary search tree (BST) has a time complexity of O(log n) for balanced trees?
- A) Insertion
- B) Deletion
- C) Search
- D) All of the above

Question 7:
In which of the following scenarios would you prefer using a linked list over an array?
- A) When you need fast access to elements by index
- B) When the size of the data structure is fixed
- C) When you need dynamic memory allocation and frequent insertions/deletions
- D) When the data structure is small and can fit in cache

Question 8:
Which of the following operations is NOT typically associated with a queue?
- A) Enqueue
- B) Dequeue
- C) Peek
- D) Pop

Section 2: Essay Questions (5 points each)

Question 9:
Explain the differences between stacks and queues in terms of their structure, operations, and use cases. Provide at least two real-world examples for each data structure.

Question 10:
Discuss the advantages and disadvantages of using linked lists compared to arrays. Include aspects such as memory usage, performance for various operations, and practical applications.

Scoring Criteria:
- Multiple Choice Section: 1 point for each correct answer (Total: 8 points)
- Essay Section: Grading will be based on clarity, depth of understanding, and relevance of examples provided (Total: 10 points for each essay, 20 points total).

Total Points Possible: 28 points
Minimum Needed to Pass: 14 points (70%)

Instructions:
- Answer all multiple-choice questions first, then move on to the essay questions.

- For essay questions, be sure to structure your answers clearly, using paragraphs and bullet points where appropriate.
- Manage your time effectively to ensure you can complete all questions.

Generated: 2025-10-28 00:01:40
User: user-1