No. of Printed Pages : 3

MCS–208

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA) (NEW)

Term-End Examination

June, 2024

MCS-208 : DATA STRUCTURES AND ALGORITHMS

Time : 3 Hours *Maximum Marks : 100*

Weightage : 70%

Note : *Question No.* ***1*** *is compulsory. Attempt any* ***three*** *questions from the rest. All algorithms should be written nearer to 'C' language.*

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1. (a) Write an algorithm for implementation of a Stack using Arrays. 10

(b) Write an algorithm for multiplication of two matrices. 10

(c) Write an association for implementation of Quick Sort. 10

(d) Convert the following expression to postfix : 10

$$a + b * c - d / e * f$$

2. (a) Explain the process of implementing two queues in an array. 10

(b) Explain the process of calculation of storage complexity with an example. 10

3. (a) What are circular linked lists ? Write an algorithm for insertion of an element into a circular linked list. 10

(b) What is a full tree ? What is a complete tree ? Explain the implementation of a tree using linked list. 10

4. (a) What are Tries ? List the main characteristics of tries. 10

   (b) Write Prim's Algorithm to find minimum cost spanning tree (MCST). 10

5. (a) Write an algorithm for implementation of Insertion Sort. 10

   (b) Write Dijkstra's algorithm to find the single source shortest path in a graph. 10

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POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS (PGDCA–NEW)

Term-End Examination

December, 2023

MCS-208 : DATA STRUCTURES AND ALGORITHMS

Time : 3 Hours *Maximum Marks : 100*

Weightage : 70%

Note : *Question No.* ***1*** *is compulsory. Attempt any* ***three*** *questions from the rest. All algorithms should be written nearer to 'C' language.*

1. (a) Write the operations that are performed on queues. Write an algorithm to delete an element from the queue. 10

   (b) What is a Binary Tree ? Write an algorithm to traverse a Binary tree in post-order. 10

(c) What is Linear Search ? Write an algorithm for it. 10

(d) Convert the following expression to postfix : 10

a + (b * c + d)/e

2. (a) Explain the process of implementing two stacks in a single dimensional array. 10

(b) What is meant by worst case time complexity and best case time complexity ? Explain with an example. 10

3. (a) What are Doubly Linked Lists ? Write an algorithm for implementation of a doubly linked list. 10

(b) What are the differences between a tree and a binary tree ? Explain the process of converting a tree into a binary tree. 10

4. (a) What is a Binary Search Tree ? How does it differ from a Binary Tree ? 10

(b) Write Kruskal's algorithm to create minimum cost spanning tree. 10

5. (a) Write an algorithm for implementation of Bubble sort. 10

(b) Write all pairs shortest paths algorithm. 10

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Term-End Examination

June, 2023

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Time : 3 Hours *Maximum Marks : 100*

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Note : *Question No.* ***1*** *is compulsory. Attempt any* ***three*** *questions from the rest. All algorithms should be written nearer to 'C' language.*

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1. (a) Explain various asymptotic notations for analysis of algorithms. 10

   (b) What are structures ? Write an algorithm for addition of two matrices. 10

   (c) What is Linear Search ? Write an algorithm for it. 10

(d) Convert the following expression to postfix : 10

$$(a - b)(c + d)$$

2. (a) What is a queue ? Write an algorithm for implementation of a queue. 10

(b) What is Row Major Representation ? How does it differ from Column Major Representation ? 10

3. (a) What are Doubly Linked Lists ? Write an algorithm for implementation of a Doubly Linked List. 10

(b) What is a Tree ? Write an algorithm for implementation of a Binary Tree. 10

4. (a) Write Kruskal's algorithm. 10

(b) What is Depth First Search ? How does it differ from Breadth First Search ? 10

5. (a) Write an algorithm for Bubble Sort. Also, write its complexity. 10

(b) Write a short note on Binary Search Trees. 10

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Term-End Examination

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MCS-208 : DATA STRUCTURES AND ALGORITHMS

Time : 3 hours *Maximum Marks : 100*

(Weightage : 70%)

Note : *Question no.* ***1*** *is* ***compulsory****. Attempt any* ***three*** *questions from the rest. All algorithms should be written nearer to 'C' language.*

1. (a) Explain the operations that are performed on Stacks. Write an algorithm to push an element to the stack. *10*

(b) What are Arrays ? Write an algorithm to multiply two matrices. *10*

(c) What is Binary Search ? Write an algorithm for it. *10*

(d) Convert the following expression to postfix : *10*

$$(a + b) / (c - d)$$

2. (a) What is a Stack ? Write an algorithm for implementation of a Stack. *10*

(b) What is Storage Complexity ? How does it differ from Time Complexity ? *10*

3. (a) What are Singly Linked Lists ? Write an algorithm for implementation of a Singly Linked List. *10*

(b) What is a Binary Tree ? How does it differ from a tree ? Write an algorithm for traversal of a Binary Tree. *10*

4. (a) What are the properties of an AVL tree ? Explain the possible rotations that are possible on an unbalanced AVL tree. *10*

(b) Write Dijkstra's algorithm. *10*

5. (a) What is Breadth First Search ? How does it differ from Depth First Search ? *10*

(b) What is Hashing ? Write a short note on it. *10*

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Time : 3 hours *Maximum Marks : 100*

(Weightage : 70%)

Note : *Question no.* ***1*** *is* ***compulsory****. Attempt any* ***three*** *questions from the rest. All algorithms should be written nearer to 'C' language.*

1. (a) What is meant by *Big-O* notation ? Explain with an example. *10*

(b) Write an algorithm for Quick Sort. Sort the following set of data in ascending order using Quick Sort. Show all steps of application of algorithm : *10*

110, 50, 60, 70, 150, 80

(c) Define "Queue". Explain the operations that can be performed on a Queue. *10*

(d) Write an algorithm that accepts two strings, S1 and S2, as input and then find whether S1 is a substring of S2. *10*

2. (a) Write an algorithm to delete an element from a Singly Linked List. Make necessary assumptions. *10*

(b) Explain the process of converting a Tree to a Binary Tree with an example. *10*

3. (a) What is meant by Minimum Cost Spanning Tree (MCST) ? How can you find it ? *10*

(b) What is Linear Search ? How does it differ from Binary Search ? *10*

4. (a) Write an algorithm for multiplication of two matrices. *10*

(b) What is Breadth-First Search ? Explain it with an example. *10*

5. (a) What is a Dequeue ? How does it differ from a Queue ? *10*

(b) Write an algorithm for inorder traversal of a Binary Tree. *10*