BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-III

ASSIGNMENTS

(July-2025 & January-2026 sessions)

MCS-021,MCS-023,MCS-014,BCS-031,BCSL-032,BCSL-033,BCSL-034

SCHOOLOFCOMPUTERANDINFORMATIONSCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	**:**	**MCS-021**
Course Title	**:**	**Data and File Structures**
Assignment Number	**:**	**BCA(III)/021/Assignment/2025-26**
Maximum Marks	**:**	**100**
Weightage	**:**	**30%**
Last Dates for Submission	**:**	**31st October,2025(For July Session)**
	:	**30th April,2026(For January Session)**

This assignment has 16 questions of 5 Marks each, answer all questions. Rest 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1. Write a program in C to accepts two polynomials as input and prints the resultant polynomial due to the addition of input polynomials.

Q2. Write a program in 'C' to create a single linked list to store integers and perform the following operations on it:

(i) Find the sum of all even integers and odd integers separately and print them.

(ii) Traverse the linked list and store all the even integers in the beginning nodes and all odd integers in thereafter nodes in a separate linked list.

Q3. Write a program in 'C' to input two matrices and perform the following operations on them.

(i) Multiply both the matrices and display the resultant matrix.

(ii) Find the sum of main diagonal elements of the resultant matrix, computed in (i)

(iii) Find the inverse of the matrix obtained after multiplication in (i)

Q4. Use the appropriate data structures and write a program in C to evaluate the following expressions:
Prefix expression: +, -, *, 3, 2, /, 8, 4, 1
Postfix expression: 10, 5, +, 60, 6, /, *, 8, -

Q5. Draw the binary tree for which the traversal sequences are given as follows:

(i) Post order: D H K E C F M N L G B A
In order: D C H E K A F B M L N G

(ii) Pre order: A B C D E F G H J K
In order: B D C E A G J H K F

Q6. Write a program in 'C' to implement a binary search tree (BST). Traverse and display the binary search tree in the Inorder, Preorder and Post order form.

Q7. Define AVL tree. Create an AVL tree for the following list of data if the data are inserted in the order in an empty AVL tree.

2, 12, 15, 4, 30, 10, 1, 35, 18, 25, 28, 50, 42, 6, 8

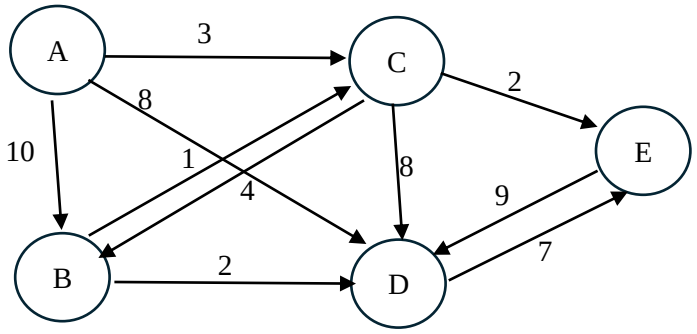
Further delete 1, 4, 8 and 10 from the above AVL tree.

Q8. Define a B-tree and its properties. Create a B-tree of order-4, if the data items are inserted into an empty B-tree in the following sequence:

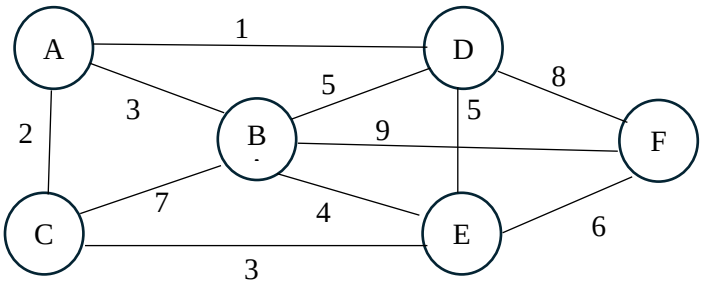
10, 2, 15, 25, 60, 45, 35, 80, 20, 8, 4, 55, 50, 68, 62, 40

Further, delete the items 2, 4, 8, and 10 from the B-tree.

Q9. Apply Dijkstra's algorithm to find the shortest path from the vertex 'S' to all other vertices for the following graph:



Q10. What is minimum spanning tree (MST)? Apply Kruskal's algorithm to find the MST for the following graph.



Q11. Apply Insertion and Bubble sorting algorithms to sort the following list of items. Show, all the intermediate steps. Also, analyze the number of swap and comparison operations performed in both the methods.

5, 20, 10, 12, 30, 35, 40, 50, 45, 55, 7, 8, 2

Q12. What is a heap tree? Create a min heap tree for the following list of items inserted in the order. Also, explain the heap sort with the help of thus created heap tree.

10, 20, 5, 25, 30, 18, 3, 70, 55, 45, 12, 24

Q13. Write a program in 'C' language to perform binary search algorithm.

Q14. What is hashing? Explain the hash functions. Also, discuss the collision resolution methods in hashing.

Q15. What is Red-Black tree? Explain insertion and deletion operations in a Red-Black tree with the help of a suitable example.

Q16. Explain Direct File and Indexed Sequential File Organization.