

BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-III

ASSIGNMENTS

(July – 2026 & January - 2027)

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



**SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI, NEW DELHI – 110 068**

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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/2026-27
Maximum Marks	:	100
Weightage	:	30%
Last Dates for Submission	:	31st October, 2026 (For July 2026 Session)
	:	30th April, 2027 (For January 2027 Session)

This assignment has 13 questions with a total of 80 Marks; answer all questions. The remaining 20 marks are for viva voce. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

Q1: (6 Marks)

Write a program in C to accept two polynomials as input and print the resultant polynomial due to the multiplication of the input polynomials.

Q2: (6 Marks)

Write a program in 'C' to create a doubly 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 the remaining nodes in a separate linked list.

Q3: (6 Marks)

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

- (i) Add both the matrices and display the resultant matrix.
- (ii) Find the sum of the main diagonal elements of the resultant matrix, computed in (i)

Q4: (6 Marks)

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: (6 Marks)

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

(i) Post order: J K I H D F G E C B A
In order: H J I K A D C F E G B

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

Q6:

(6 Marks)

Define an 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.

3, 10, 15, 5, 25, 12, 2, 30, 22, 24, 29, 8, 40, 14, 11

Further delete 3, 22, 8, and 11 from the above AVL tree.

Q7:

(6 Marks)

Define a B-tree and its properties. Create a B-tree of order-5, if the data items are inserted into an empty B-tree in the following sequence:

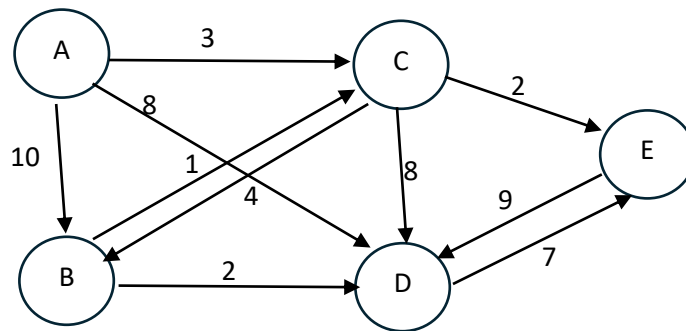
10, 2, 15, 25, 60, 45, 35, 80, 20, 8, 4, 55, 50, 68, 62, 40

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

Q8:

(7 Marks)

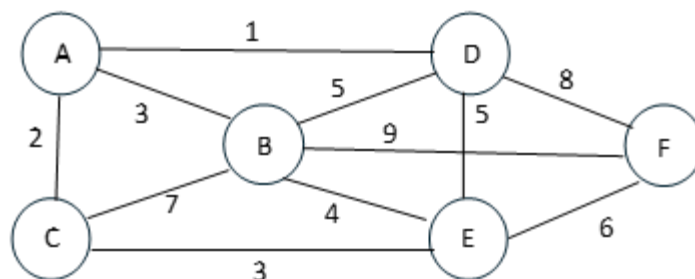
Apply Bellman-Ford's algorithm to find the shortest path from the vertex 'S' to all other vertices for the following graph:



Q9:

(7 Marks)

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



Q10:

(6 Marks)

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 methods.

2, 12, 14, 16, 25, 30, 45, 55, 42, 50, 9, 6, 1

Q11:

(6 Marks)

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

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

Q12:

(6 Marks)

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

Q13:

(6 Marks)

Explain Sequential, Direct, and Indexed File Organization.