

Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS
FARMAGUDI, PONDA, GOA.

B.C.A. UGC-CCFUP (SEMESTER-III) REGULAR EXAMINATION OCTOBER/NOVEMBER 2024

CSA-200 - DATA STRUCTURES

Duration: 2 hours

Marks: 60

Instructions:

- i. Please check that question paper is printed on both the sides.
- ii. All questions are compulsory.
- iii. Marks are mention at the right of each questions.

- Q1) Define the following: (6*2mks)
- i. Show the steps to reverse the string using stack? [BL1,CO2]
 - ii. Why is balancing important when it comes to Binary Trees? [BL1,CO2]
 - iii. What is the ADT of Queue data structure? [BL1,CO1]
 - iv. Define space and time complexity? [BL1,CO1]
 - v. What is Pseudocode? [BL1,CO1]
 - vi. What are the benefits of circular queue? [BL1,CO2]

- Q2 A) (i) Compare between data type and data structure. (3) [BL2, CO1]
(ii) Compare between complete and strict binary tree. (2) [BL2, CO2]

OR

- Q2 A) (iii) Explain the three level approach of ADT. (3) [BL2, CO1]
(iv) Show the time complexity of the following code: (2) [BL2, CO2]

i.)
a = 0
b = 0
for i in range(N):
 a = a + random()
for i in range(M):
 b = b + random()
ii.)
for(x=1;x<=n;x++)
 for(y=1;y<=n;y++)
 print x & y;

- Q2 B) (i) Explain the 5 main characteristics of algorithm. (5) [BL2, CO1]
(ii) Demonstrate deletion of an array using an appropriate example. (2) [BL2, CO3]

P.T.O.

- Q3 A) (i) Give stepwise explanation of bubble sort algorithm. (3) [BL2, CO2]
(ii) Demonstrate the following: an array x[-15....10, 15.....40] requires 2 byte (2) [BL2, CO2]
of storage for each element & beginning location is 150 so determine the
location of x[15][20].

OR

- Q3 A) (iii) Give stepwise explanation of selection sort algorithm. (3) [BL2, CO2]
(iv) Explain the concept of linear array. (2) [BL2, CO2]

- Q3 B) (i) Develop a c program to insert an element in an array. (5) [BL3, CO3]
(ii) Construct below expression to equivalent its Prefix and Postfix notations. (2) [BL3, CO2]
 $((A + B) * C - (D - E) ^ (F + G))$

- Q4 A) (i) Explain the working of stack data structure. (3) [BL2, CO2]
(ii) Explain the difference between working of BFS and DFS graph traversal. (2) [BL2, CO3]

OR

- Q4 A) (iii) Convert the following infix expression to postfix expression using stack (3) [BL2, CO2]
 $((A + B) - C * (D / E)) + F$
 (iv) Illustrate any two applications of queue. (2) [BL2, CO2]

- Q4 B) (i) a) Construct a binary tree for the given sequence (5) [BL3, CO2]
32, 10, 77, 93, 22, 64, 11, 9, 80
b) After constructing a binary tree insert a new node 50
(ii) Compare between linear and non linear-data structure. (2) [BL4, CO2]

- Q5 A) (i) Write a short note on any two different types of deques. (4) [BL2, CO2]
(ii) Demonstrate representation of linked list in memory. (2) [BL2, CO2]

OR

- Q5 A) (iii) With the help of an example illustrate the insertion of node at the beginning of the linked list. (4) [BL2, CO2]
- (iv) Summarize the multigraph and pseudograph. (2) [BL2, CO2]

- Q5 B) (i) Construct the binary tree from the following inorder and preorder sequence (3) [BL3, CO2]
Inorder: 43, 22, 36, 92, 27, 16, 56, 15, 20, 19, 10, 77, 65
Preorder: 56, 27, 92, 43, 22, 36, 16, 77, 19, 20, 15, 10, 65

- (ii) Construct a graph represented for the following adjacency matrix, assume that the name of the vertices are V1, V2, V3, V4 and V5 respectively. (3) [BL2, CO2]

5	9	7	8	11
7	3	8	5	13
11	5	3	10	9
5	4	5	7	4
9	2	3	1	7

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