PRN:		Course Code :	P72PC102

First Year **M. C. A.** Semester End Examination Winter 2024

Data Structures using C++ 000384

Day and Date: Mon ⊵ 2 DEC 2024

Time : 10:30AM To 12:30PM

Max Marks: **50**

Duration: **02** hrs

Instructions: All questions are compulsory.

Q.1	**Attempt the following.**	Marks	Bloom 's Level	CO
a)	What is a data structure a) A programming language b) A collection of algorithms c) A way to store and organize data d) A type of computer hardware	01	L2	CO1
b)	Which of these best describes an array a) A data structure that shows a hierarchical behavior b) Container of objects of similar types c) Arrays are immutable once initialized d) Array is not a data structure	01	L2	CO1
c)	Which of the following is not the application of stack? a) Data Transfer between two asynchronous process b) Compiler Syntax Analyzer c) Tracking of local variables at run time d) A parentheses balancing program	01	L3	CO2
d)	Which of the following is not the type of queue a) Priority queue b) Circular queue c) Single ended queue d) Ordinary queue	01	L3	CO2
e)	Efficiency of finding the next record in B+ tree is ____ a) O(n) b) O(log n) c) O(nlog n) d) O(1)	01	L4	CO2
f)	Which of the following is false a) Compared to B-tree, B+ -tree has larger fanout b) Deletion in B-tree is more complicated than in B+ -tree c) B+ -tree has greater depth than corresponding B-tree d) Both B-tree and B+ -tree have same search and insertion efficiencies	01	L3	CO3

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	g)	Which of the following properties does a simple graph not hold? a) Must be connected b) Must be unweighted c) Must have no loops or multiple edges d) Must have no multiple edges	01	L2	CO1
	h)	For a given graph G having v vertices and e edges which is connected and has no cycles, which of the following statements is true? a) v=e b) v = e+1 c) v + 1 = e d) v = e-1	01	L2	CO2
	i)	What is the time complexity of Dijikstra's algorithm? a) O(N) b) $O(N^3)$ c) $O(N^2)$ d) O(logN)	01	L5	CO3
	j)	The first step in the naïve greedy algorithm is? a) adding flows with higher values b) reversing flow if required c) analyzing the zero flow d) calculating the maximum flow using trial and error	01	L4	CO2
Q.2		**Attempt the following.**			
	a)	Define Binary Discuss search algorithm with an example.	05	L2	CO1
	b)	Explain the operations of singly linked lists	05	L2	CO2
		OR			
	b)	Explain ADT of a queue with an example. Implement queue using C++.	05	L2	CO2
Q.3		**Attempt any two.**			
	a)	Explain about B+Tree with suitable example.	05	L2	CO3
	b)	Discuss about Heaps and heaps as priority Queues	05	L3	CO4
	c)	Explain the tree traversal techniques with an example.	05	L2	CO2
Q.4		**Attempt any two.**			
	a)	Explain BFS algorithm with example.	05	L2	CO2
	b)	Define graph. Explain various operations on graphs.	05	L2	CO3
	c)	With an example discuss Wars hall's algorithm.	05	L6	CO2
Q.5		**Attempt any two.**			
	a)	Explain in brief Knapsack problem	05	L2	CO1
	b)	Explain Omega Notation. With example	05	L4	CO1
	c)	Discuss greedy algorithm with an example	05	L5	CO2

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