## II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018 DATA STRUCTURES THROUGH C++

(Com to CSE & IT)

Tiı	me: 3	B hours Max. M	Marks: 70
		Note: 1. Question Paper consists of two parts (Part-A and Part-B)  2. Answer ALL the question in Part-A  3. Answer any THREE Questions from Part-B	
		<u>PART -A</u>	
1.	a)	What is an array? Explain array types.	(3M)
	b)	Give real world example of stack? Define linear probing?	(2M)
	c)	Define sparse matrix with example?	(2M)
	d)	Write about internal external nodes and siblings with example.	(3M)
	e)	Elaborate connected components of a graph?	(2M)
	f)	Write down complexity of bubble sort and in which situation bubble sort should be preferred	(2M)
		PART -B	
2.	a)	Write in detail about polynomial representation using Abstract Data Type?	(7M)
	b)	Explain any one method to calculate memory location for different position in two - Dimensional array?	(7M)
3.	a)	Explain in detail about representation of Queues using Array implementation?	(7M)
	b)	Write Recursive Algorithms for Pre-order, In-order and Post-order traversals? Explain.	(7M)
4.	a)	Write a program to insert an element in between two nodes in a double linked	(7M)
	b)	list? Explain the mechanism of Deleting an element from front, rare and any of the Single Linked list?	(7M)
5.	a)	With the help of diagrams construct a Binary Search Tree (BST) with the following keys: 86, 12, 42, 69, 38, 57, 74, 6, 49, and 71. Also delete 42 from the Constructed BST?	(7M)
	b)	Write a function to find an element and its position in a Binary Tree.	(7M)
6.	a)	Write the advantages of using BFS over DFS or using DFS over BFS? What are	(7M)
	b)	the Applications and downsides of each? Explain with an example how to insert an element to maxheap?	(7M)
7.	a)	Sort the sequence 8, 1, 4, 1, 5, 9, 2, 6, 5 by using Insertion sort. And also explain	(7M)
	b)	the program.  Write about linear probing and quadratic probing? Discuss what are the merits and demerits of each technique.	(7M)
		1 of 1	

Code No: R1621055 (R16) (SET - 2)

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(Com to CSE & IT)

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		Note: 1. Question Paper consists of two parts (Part-A and Part-B)  2. Answer ALL the question in Part-A  3. Answer any THREE Questions from Part-B			
PART –A					
1.	a)	Which operation is supported by an array ADT?	(2M)		
	b)	Elaborate the application on stack?	(2M)		
	c)	What do you mean by amortized analysis?	(2M)		
	d)	What is the maximum number of nodes in a binary tree of depth k?	(3M)		
	e)	Write down complexity of selection sort and in which situation bubble sort should be used?	(3M)		
	f)	What is Graph? Give Adjacency list representation of graph?	(2M)		
		<u>PART -B</u>			
2.	a)	Describe how an array can be effectively used to store a sparse matrix.	(7M)		
	b)	Explain about polynomial representation with a suitable example?	(7M)		
3.	a)	What is priority Queue? Explain the implementation of Priority queue? Write an algorithm for operations Priority queues with an example?	(7M)		
	b)	Perform enqueue and dequeue operations in a queue? How do they differ from circular queue operations? Explain.	(7M)		
4.	a)	Write pseudo code to add node at the end and middle positions in circular linked list?	(7M)		
	b)	Write a C++ Program for Circular Linked List Traversal?	(7M)		
5.	a)	Describe the following terms with suitable examples  i) Binary Tree  ii) Complete Binary Tree  iii) Strictly Binary Tree  iv) Almost Complete Binary Tree	(7M)		
	b)	Write a short note on various operations of the threaded binary tree?	(7M)		
6.	a)	Explain with an example how to delete an element to maxheap?	(7M)		
	b)	How to solve All pairs shortest path algorithm with help of optimization function? Write the program and explain.	(7M)		

- 7. a) An array contains N numbers and you want to determine whether two of the numbers sum to a given number K. For example, if the input is 8, 4, 1, 6 and K is 10, the answer is yes (4 and 6). A number may be used twice.

  i) Give an O(N <sup>2</sup>) algorithm to solve this problem

  ii) Give an O(N logN) algorithm to solve this problem.
  - (Hint: first sort the array and then solve the problem in linear time.)b) What is Transitive Closure? Explain

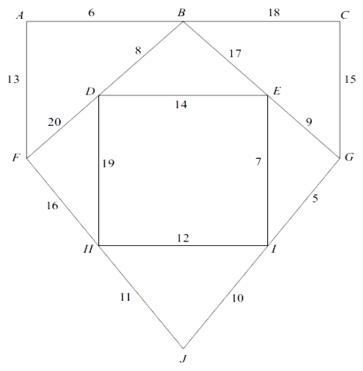
(5M)

## II B. Tech I Semester Regular/Supplementary Examinations, October/November - 2018 DATA STRUCTURES THROUGH C++

(Com to CSE & IT)

Tir	Time: 3 hours		Max. Marks: 70	
		Note: 1. Question Paper consists of two parts (Part-A and Part-B)  2. Answer ALL the question in Part-A  3. Answer any THREE Questions from Part-B		
		PART -A		
1.	a)	Write formula to calculate address of elements in one-dimensional array?	(2M)	
	b)	Define Circular Queue? Write algorithm to insert element into circular queue	? (3M)	
	c)	What is the difference between circular linked list and linear linked list?	(2M)	
	d)	Trace the binary tree of in-order traversal: BFGPRSTWYZ?	(3M)	
	e)	What are the applications of Graphs?	(2M)	
	f)	What are the merits and demerits of binary search?	(2M)	
		PART -B		
2.	a)	Differentiate array and linked list representation of Stack?	(7M)	
	b)	Explain about different kinds of ADTs with suitable examples?	(7M)	
3.	a)	Evaluate following expression. i) 10+3-2-8/2*6-7 ii) (12-(2-3)+10/2+4*2	(7M)	
	b)	Write a C++ program to evaluate postfix expressions for the above.	(7M)	
4.	a)	Write an algorithm to delete duplicates in a linked list?	(7M)	
	b)	Explain how linked list can be used for representing polynomials using suitable example?	a (7M)	
5.	a)	Describe the following terms used in binary trees  i) Siblings  ii) Height  iii) Level	(7M)	
	b)	What is a threaded binary tree? Explain insertion and deletion operations on with an example.	it (7M)	

- 6. a) A) The following network has 10 vertices A, B,......J. the numbers on each edge represents the distances in miles between pairs of vertices.
  - i) Use Kruskal's algorithm to find the minimum spanning tree for the network?
  - ii) State the length of the spanning tree?



- b) Write an algorithm to traverse a graph using Depth first search? (7M)
- 7. a) How prim's algorithm is efficient on sorting data? Explain with an example? (7M)
  - b) Rearrange the following numbers using quick sort procedure 42, 12, 18, 98, (7M) 67, 83, 8, 10, 71.

**SET - 4 R16** Code No: R1621055

## II B. Tech I Semester Regular Examinations, - October/November 2018. DATA STRUCTURES THROUGH C++ (Com. to CSE, IT)

Time: 3 hours Max. Marks: 70 Note: 1. Question Paper consists of two parts (Part-A and Part-B) 2. Answer ALL the question in Part-A

3. Answer any THREE Ouestions from Part-B

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		PART –A	
1.	a)	How to pass array as an argument to function?	(2M)
	b)	Convert following infix expression to postfix expression: i) ((a+b)/d-((e-f)+g)	(3M)
	c)	What is the node structure for circular linked list?	(2M)
	d)	Differentiate full binary tree & complete binary tree.	(3M)
	e)	What is Graph? Give Adjacency list representation of graph?	(2M)
	f)	Write down procedure for bubble sort?	(2M)
		PART -B	
2.	a)	Explain order-list matrix. What are the benefits of the order -list matrix?	(7M)
	b)	Distinguish between the row major and column major ordering of an array?	(7M)
3.	a)	Represent container class using templates and give example C++ program for The container class?	(7M)
	b)	How to convert infix expression to postfix expression? Explain the program with example.	(7M)
4.	a)	Explain Array and linked representation of Sparx matrix?	(7M)
	b)	Compare the performance of linked lists, stack and queues with their sequential counterparts.	(7M)
5.	a)	Write a C++ Program for Write a recursive function to print reverse of a Linked List?	(7M)
	b)	Write a C++ Program for Quick sort on Singly Linked List with an example.	(7M)
6.	a)	Define Graph and Explain how Graphs can be represented in Adjacency matrix and Adjacency list?	(7M)
	b)	What is Graph? Explain two representation methods of graph? Brief Insertion and deletion of vertices and edges to the graph?	(7M)
7.	a)	Explain the algorithm for QUICK sort (partition exchange sort) and give a Suitable example?	(7M)
	b)	Explain the HEAP SORT algorithm by tracing the following elements stepwise 3,5,9,7,1,4,6,8,2	(7M)