	B.M.S. COLLEGE OF ENGINEERING, BANGALORE-19 **Computer Science & Engineering**

INTERNALS-1

Course Code: 20CS5PEADS	**Course Title: Advanced Data Structures**	
Semester: 5	**Maximum Marks: 40**	**Date:23-10-2020**
Faculty Handling the Course:	**Namratha M**	

Instructions: Internal choice provided in Part C.

PART-A

Total 5 Marks (No Choice)

No.	Question	Marks
1	What is an unrolled linked list? Explain with an example.	**5**

PART-B

Total 15 Marks (No Choice)

No.	Question	Marks
2 a)	Compare move to front method and transpose method for self-organizing list and analyze which method gives better results.	**5**

2 b)	Analyze the code given below for a B-tree and complete the functions for traverse and search:
	
	class BTreeNode
	{
	int *keys;
	int t;
	BTreeNode **C;
	int n;
	bool leaf;
	public:
	BTreeNode(int _t, bool _leaf);
	void traverse();
	BTreeNode *search(int k);
	friend class BTree;
	};
	class BTree
	{
	BTreeNode *root;
	int t;
	public:
	BTree(int _t)
	{ root = NULL; t = _t; }
	void traverse()
	{ if (root != NULL) root->traverse(); }
	BTreeNode* search(int k)
	{ return (root == NULL)? NULL : root->search(k); }
	};
	BTreeNode::BTreeNode(int _t, bool _leaf)
	{
	t = _t;
	leaf = _leaf;
	keys = new int[2*t-1];
	C = new BTreeNode *[2*t];
	n = 0;
	}
	void BTreeNode::traverse()
	{
	
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	}
	BTreeNode *BTreeNode::search(int k)
	{
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	}
		5

2 c)	Consider the following self-organizing list implemented using count method. Input list: 1, 2, 3, 4, 5 Value searched: 4 Output list: 4, 1, 2, 3, 5 Modified input list now: 4, 1, 2, 3, 5 Value searched: 5 Value searched: 5 Value searched: 2 Analyze the input given and draw the output list and justify your answer.	

PART- C

Total 20 Marks

No.	Question	Marks
3 a)	Construct AVL tree by inserting the following elements successively from an empty tree 100, 200, 300, 250, 270, 70, 40.	**10**
	OR	
3 b)	Create a B-tree of order 5 for the following: 8, 9, 10, 11, 15, 16, 17, 18, 20, 23	**10**
4a)	Given a tree and weights of nodes where weights are non-negative integers, write a program using disjoint sets to find maximum size of a subtree of a given tree such that all nodes are even in weights. Sample Input: Number of nodes = 7 Weights of nodes = 1 2 6 4 2 0 3 Edges = (1, 2), (1, 3), (2, 4), (2, 5), (4, 6), (6, 7) Output: Maximum size of the subtree with even weighted nodes = 4 Explanation: Subtree of nodes {2, 4, 5, 6} gives the maximum size.	**10**
	OR	
4b)	Write a program to implement the following operations on a memory efficient linked list: (a) A function to insert a new node at the beginning of the list (b) A function to traverse the list in forward direction	**10**

*****ALL THE BEST*****