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| **TERM END EXAMINATIONS (TEE) – August - September 2021** | | | | | | | | | | |
| **Programme** | | | **:** | **B.Tech – Computer Science & Engineering** | | **Semester** | | **:** | **Interim 2021-2022** | |
| **Course Name** | | | **:** | **Data Structures and Algorithms** | | **Course Code** | | **:** | **CSE2002** | |
| **Faculty Name** | | | **:** | **Dr. S. Rajasoundaran** | | **Slot / Class No** | | **:** | **B11+DB1/0060** | |
| **Time** | | | **:** | **1½ hours** | | **Max. Marks** | | **:** | **50** | |
| **Answer ALL the Questions** | | | | | | | | | | |
| **Q. No.** | **Question Description** | | | | | | | | | **Marks** |
| **PART - A ( 30 Marks)** | | | | | | | | | | |
| 1 | (a) | Write down the algorithm and program for calculating the multiplication of numbers using iterative procedure. Change the values like, , and Count the number of operations required by algorithm for each iteration. Does it affect time complexity and space complexity for varying values ? Analyze the observations. | | | | | | | | 10 |
| OR | | | | | | | | | |
| (b) | A sequence of data is stored in two separate lists. Implement brute force search algorithm to find the data, ‘12’, ‘14’ and ‘45’ in a single search. Show the appropriate locations of the data and analyze the searching time complexities. Also, mention the possibilities of using binary search in this condition to reduce the time complexities.  Numbers\_1 = [12, 10, 1, 8, 34, 6, 8, 9,14]  Numbers\_2 = [3,4,66,13,5,22,7,11,45] | | | | | | | | 10 |
| 2 | (a) | Draw different types of binary tree and mention various terminologies. Implement a simple binary search tree and execute the insert and find operations in it. Show proper inputs and outputs. | | | | | | | | 10 |
| OR | | | | | | | | | |
| (b) | Implement a doubly circular linked list structure for executing the following operations.  i. Insert the data at the end of the list  ii. Insert the data in the middle of the list  iii. Insert the data as the head of the list  iv. Display the list for each operation | | | | | | | | 10 |
| 3 | (a) | How can you state the importance of hashing in data structure and information security? Create a hash table for the following sequence of data. Construct a simple hash function to check the existence of collision. Modify your existing hash function to avoid collisions and store the data properly in the hash table.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 4 | 12 | 11 | 6 | 8 | 9 | 5 | | | | | | | | | 10 |
| OR | | | | | | | | | |
| (b) | Do the followings.  i. Find the adjacency matrix for the given graph.    ii. Draw any three spanning trees for the graph given below.    iii. Draw cyclic graph, acyclic graph and directional graph. | | | | | | | | 10 |
| **PART - B (20 Marks)** | | | | | | | | | | |
| 4 | | Implement circular queue with following ADTs.  i. Create a Queue (Size=4)  ii. Enqueue at least four elements  iii. Dequeue at least five elements  iv. Display the elements of the queue and queue empty status | | | | | | | | 10 |
| 5 | | Write the algorithms for breadth first traversal and depth first traversal techniques. Show the stepwise traversal for both techniques (Status Table) and draw appropriate spanning trees.  Take the following graph for finding the solution. | | | | | | | | 10 |
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