###### Assignment List -2019-2020

Subject: Advanced Data Structures Lab Class: SE (Comp), SEM: II Academic Year: 2019-2020

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| **No** | **Assignment statement** |
|  | **GROUP A** |
| 1 | Given binary tree with n nodes, do following operations  a. Insert a node  b. All traversals (recursive and iterative)  c. Find the height of a tree.  d. Assign this tree to another [operator=] and then erase all nodes in a binary tree.  e. Create a Mirror image of a tree.  f. Check if two trees are identical or not  g. construct tree from given inorder and preorder traversals. |
| 2 | Write a C Program to read any string from the keyboard and convert it to your Huffman Code. Include a function that converts Huffman code back to text. Use it to verify that the code entered from the keyboard was converted correctly. (Output of your code should be in the following format)  e.g Huffman coding is a data compression algorithm  h 111110  f 11110  i 1110  t 11011  Original string was :  Huffman coding is a data compression algorithm.  Encoded string is :  00001000001111011110100001010110110011110000101110101100010111110100101101001100100101101101001100111100100010100101011101011001100111101100101101101011010000011100101011110110111111101000111111  Decoded string is:  Huffman coding is a data compression algorithm.  Storage requirement Using ASCII:  Storage requirement Using Huffman code: |
| 3 | Create inorder threaded binary search tree and implement following operations  1.Insert a new node 2. Inorder, preorder and postorder traversal 3.Convert given binary search tree into threaded binary search tree. 4. Delete a node. Analyze time and space complexity of the algorithm. |
|  | **GROUP B** |
| 4 | You have a business with several offices; you want to lease phone lines to connect them up  with each other; and the phone company charges different amounts of money to connect  different pairs of cities. You want a set of lines that connects all your offices with a minimum  total cost. Solve the problem by suggesting appropriate data structures. |
| 5 | Tour operator organizes guided bus trips across the Maharashtra. Tourists may have different preferences. Tour operator offers a choice from many different routes. Every day the bus moves from starting city S to another city F as chosen by client. On this way, the tourists can see the sights alongside the route travelled from S to F. Client may have preference to choose route. There is a restriction on the routes that the tourists may choose from, the bus has to take a short route from S to F or a route having one distance unit longer than the minimal distance. Two routes from S to F are considered different if there is at least one road from a city A to a city B which is part of one route, but not of the other route. |
| 6. | Students have various activities to be done every day. Such activities range from studying to eating to napping and so on. The major problem; How can all these activities be achieved, along with time management and also organization and optimization of the activities. Use topological sort to sort the students activities. |
|  | **GROUP C** |
| 7 | Consider telephone book database of N clients. Make use of a hash table implementation to quickly look up client‘s telephone number. |
|  | **GROUP D** |
| 8 | Given sequence k = k1 <k2 < ... < kn of n sorted keys, with a search probability pi for each key ki . Build the Binary search tree that has the least search cost given the access probability  for each key. |
| 9 | A Dictionary stores keywords & its meanings. Provide facility for adding new keywords, deleting keywords, updating values of any entry. Provide facility to display whole data sorted in ascending/ Descending order. Also find how many maximum comparisons may require for finding any keyword. Use Height balance tree and find the complexity for finding a keyword. |
| 10 | Suppose that we are designing a program to simulate the storage and search in a dictionary. Words appear with different frequencies, however, and it may be the case that a frequently used word such as "the" appears far from the root while a rarely used word such as "conscientiousness" appears near the root. We want words that occur frequently in the text to be placed nearer to the root. Moreover, there may be words in the dictionary for which there is no definition. Organize an optimal binary search tree that simulates the storage and search of words in a dictionary. |
|  | **GROUP E** |
| 11 | To create ADT that implement the "set" concept.  a. Add (new Element) -Place a value into the set b. Remove (element) Remove the value  c. Contains (element) Return true if element is in collection  d. Size () Return number of values in collection Iterator () Return an iterator used to loop over collection  e. Intersection of two sets f. Union of two sets g. Difference between two sets h.Subset |
|  | **GROUP F** |
| 12 | Department maintains a student information. The file contains roll number, name, division and address. Allow user to add, delete information of student. Display information of particular student. If record of student does not exist an appropriate message is displayed. If it is, then the system displays the student details. Use sequential file to maintain the data. |
| 13 | Assume we have two input and two output tapes to perform the sorting. The internal memory can hold and sort m records at a time. Write a program in java for external sorting. Find out time complexity. |
| 14 | Company maintains employee information as employee ID, name, designation and salary. Allow user to add, delete information of employee. Display information of particular employee. If employee does not exist an appropriate message is displayed. If it is, then the system displays the employee details. Use index sequential file to maintain the data. |
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