**DEPARTMENT OF INFORMATION TECHNOLOGY::VRSEC**

**DATA STRUCTURES QUESTION BANK FOR ASSIGNMENT-1**

**AY: 2021-22 25-11-2021**

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| **Q.No** | | **Question** | **Course Outcome** | **BTL** |
| 1 | a | Explain the phases of system life cycle. | CO1 | Understand |
| b | Assume that you are given a scenario/project in which employ numbers are to be stored along with their other details. Employees are assigned with employ numbers at the joining randomly. Now in the project your task is to sort the employ numbers using bubble sort after storing all the data for efficient processing. So before going to start your task, Prepare a draft inline with system life cycle to complete your task which is a part of the project. | CO1 | Apply |
| 2 | a | What is Searching. Explain the process of linear search with an example and also advantage & limitations of it. | CO1 | Understand |
| b | Rithick gets a lottery ticket and checks each number in the list to see whether he has won the lottery or not. Since there are many numbers, he finds it tedious to check each ticket number manually. So he decides to write a code to check whether he has won the lottery or not. Help rithick write a code to find his lottery ticket number from the given ticket numbers. Test the code with a sample input. | CO1 | Apply |
| 3 | a | What Binary Search. Write the algorithm/pseudocode for binary search. Analyze linear and binary search in terms of time complexity. | CO1 | Understand and Analyze |
| b | Once there lived a king and a queen. They were very rich and led a happy life. The King's brother Humayun was jealous of him and he wanted to become the King. So in order to become the King, Humayun carries the Queen away and keeps her in a jail, which are numbered in sorted sequence.  Humayun informs the King that he took away the Queen and if the King agrees him to become the King, he would leave the Queen. The King has a special power of flying. He flies and reaches the place where Humayun has hidden the Queen and Humayun has given clue to King about the jail number of the Queen. Luckily the King got the key of the jail where the Queen is locked. But Humayun might have tried to fool the King by saying wrong jail number of Queen. The King already knew how many jails were there. He reaches the centre jail and checks whether the jail number and the key number are equal. He also carries a small machine with him to find the next jail to be visited by him. The machine initially contains the low (low=1) and the high value(high=total number of jails), and calculates the mid value (the jail which is to be visited). If the mid value and key value are equal, the King opens the lock and takes the Queen away with him. If the key number is greater than the mid value, the King increases the mid value by 1 in the machine and assigns it to the low value. If the key number is less than the mid value, the King decreases the mid value by 1 in the machine and assigns it to the high value. The King does this until he finds that the key value and the mid value to be equal.  Sample Input and Output:  Enter the total number of jails in Humayun's Place: 5  Enter the jail number 1 to 5: 6, 89, 91, 105, 200  Enter the clue given by Humayun: 105  Show the step by step process how the king has done his searching process to locate the jail in order to rescue the queen. | CO1 | Apply |
| 4 | a | Given Given group of unordered elements. Design an algorithm/pseudocode based on divide and conquer to make the elements in to sorted. Write all your observations. | CO1 | Understand |
| b | Apply the process of merge sort and sort the following list of elements :  Mar, May, Nov, Aug, Apr, Jan, Dec, Jul, Feb, Jun, Oct, Sep  Describe all the test cases and discuss time complexity. | CO1 | Apply |
| 5 | a | Given group of unordered elements. Design an algorithm/pseudocode based on random number to make the elements in to sorted. Write all your observations. | CO1 | Understand |
| b | Apply the process of quick sort and sort the following list of elements :  14, 17, 24, 26,39, 16, 45, 11, 55, 18, 43, 88  Describe all the test cases and discuss time complexity. | CO1 | Apply |

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**HOD:IT**