**Course Name: Fundamentals of Data Structures** **Course Code: CET1043B**

A.Y. 2022-23 S.Y.B.Tech Semester III

CSF Panel A

Name of Component: Theory Assignment 1

(Total marks 10)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No** | **Question** | **Marks** | **Mapped CO** | **Bloom’s Level** |
| Q.1 | Write a program to represent a polynomial using an array of structures. Write an algorithm for polynomial multiplication. | 3M |  |  |
| Q.2 | Sort the following employee records using insertion sort in descending order, considering keys as salary. Show all passes. Is this soring method stable?   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Salary | 9000 | 8915 | 8800 | 9130 | 8000 | | Student Name | Arjun | Savita | Mihir | Ruchir | Anvi | | 3 M |  |  |
| Q.3  Batch A1 | There are 9 keys placed in an array which is sorted using some sorting method. The sorted array is displayed below:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 10 | 20 | 22 | 26 | 89 | 90 | 99 | 100 | 120 |   A key = 25 is to be placed in the above array maintaining sorted order, design algorithm for the same.  What will be the time complexity of the above algorithm?  (Assume the array size is sufficiently large to hold additional keys) | 4M |  |  |
| Q.3  Batch A2 | There are 9 keys placed in an array which is displayed below:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 10 | 20 | 22 | 26 | 89 | 90 | 99 | 100 | 120 |   A key = 26 is to be deleted from the above array, maintaining empty positions at the end. Design algorithm for the same.  What will be the time complexity of the above algorithm? | 4M |  |  |
| Q.3  Batch A3 | There are 9 keys placed in an array which is sorted in descending order using some sorting method. The sorted array is displayed below:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 100 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 10 |   A key = 65 is to be placed in the above array maintaining sorted order, design algorithm for the same.  What will be the time complexity of the above algorithm?  (Assume the array size is sufficiently large to hold additional keys) | 4M |  |  |
| Q.3  Batch A4 | Consider the following scenario: Mahimna wants to arrange the chocolate based on the length. To sort chocolate Mahimna first compares the first and second chocolate if the first chocolate is bigger than the second chocolate, Mahimna swaps the chocolates. Then Mahimna compares the second and third chocolate and swaps if the first chocolate is bigger and makes sure that at the last largest height chocolate is placed at its position. Identify the algorithm used by Mahimna to sort chocolates and computes the running time complexity for the same. Also, write a program to help him sort chocolate according to the height of the chocolate. | 4M |  |  |
| Q.3  Batch A5 | Consider the following scenario: Kirti wants to sort the cake based on the weight. Kirti finds the cake with minimum weight and swaps it with the first cake and makes sure that at the minimum weight cake is placed at its position. Identify the algorithm used by Kirti to sort cakes and computes the running time complexity for the same. Also, write a program to help her sort cakes according to the weight of the cake. | 4M |  |  |

Date of Assignment: Date of Submission:

Name of Course Teacher: Pratvina Talele

Sign: