Data Structures Lab (CSC204) **Session: Monsoon 2021-22**
III BTech (CSE) **Date: 17.08.2021**

Assignment-1 (Introduction to Data Structures)

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1. Consider a one dimensional array of *n* integers. Write a C programme to find how many different elements are duplicated (i.e., at least more than one occurrence). If at least half the different elements get duplicated, then declare "it's a duplicity-bound array"; otherwise, print how many different elements are duplicated.

   Sample input:

   Array: 2 2 34 5 -7 34 8 2 2 89 34 19 23 -4 57 19

   Sample output:

   Number of different elements: 10
   Number of different elements get repeated: 3
   As 3 $\ngeq$ 10/2, So the O/P: 3

2. Write a C program to read a sequence of positive integers (data stream) stored in a one-dimensional array. The number of integers in the data stream is not known prior to the user. The end of the data stream is marked by the digit "-1". It prints the count (frequency) of different odd digits present in the data stream.

   Sample input:

   Data stream: 23 37 117 28 553

   Sample output:

   Odd digits : 1 3 5 7 9
   Frequency : 2 3 2 2 0

3. Write a file-oriented C program using command line argument that counts the vowels and letters (written in lowercase form) in text given as standard input. Read text as one character at a time until you encounter end-of-file. Then print out the number of occurrences of each of the vowels 'a', 'e', 'i', 'o', and 'u' in the text, the total number of letters excluding vowels, and each of the vowels as an integer percentage of the letter total.

   Suggested output format is:

   'a' = 3; 'e' = 2; 'i' = 0; 'o' = 1; 'u' = 0; rest 17

   Percentage of total:

   'a' = 13%; 'e' = 8%; 'i' = 0%; 'o' = 4%; 'u' = 0%

4. Write a C program to create an employee database using array of structure with five fields (employee ID, employee name, mobile number, date of joining and salary). In this program include a menu driven option to add new employee, delete existing employee, and to view employee. Take input for at least five employees from user and store the records in file. Also make sure that if the maximum size of the database is not allowing to add new employee, then automatically all the existing records need be shifted to a new database with double capacity than earlier.

Suggested output:

Enter how many employees' record need to be stored: 10

Database created with the capacity to hold the details of 10 employees

Main Menu

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1. Add Employee
2. Delete Employee by Employee ID
3. View Employee Details
4. Exit

Enter the choice: **1**

Follow the Add Employee window below

Add Employee

Enter the employee details:

Enter ID:	E001
Enter name:	A
Enter mobile number:	70554
Enter DOJ:	12/5/2012
Enter salary:	50000

Employee Details added successfully

Press **Y** to add more employee and **N** to go back to main menu (Y\N): **Y**

Keep adding until N is not pressed by user. In case the maximum capacity of the database has reached shift the entire database to a new database with double capacity than the existing database, and then add the new record.

View employee details

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1. View employee by Employee ID
2. List all employee

Enter the choice: **1**
Enter the employee ID: **E001**

Record of employee with employee ID E001

Name: A
Mobile number: 70554
DOJ: 12/5/2012
Salary: 50000

Press **Y** to view more record and **N** to go back to main menu (Y\N): **Y**

If the Choice was 2 then show the records in the following format

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E_ID	E_Name	E_Mobile	DOJ	Salary
E001	A	70554	12/5/2012	50000
E002	B	85666	28/8/2019	35000
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Press **N** to go back to main menu: **N**

Delete employee by employee ID

Enter the employee id to delete the record: **E001**

Record of employee id E001 has been deleted