

National University of Computer and Emerging Sciences



Lab Manual 10 Programming Fundamentals

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Section	E
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Objectives

After performing this lab, students shall be able to:

- ✓ Have an improved problem-solving ability
- ✓ Design algorithm for basic problems
- ✓ Understanding of 2D arrays and filing.

Note: Implement generic logics.

Problem Introduction: [File I/O and Array]

This lab description comes with a file named **QuizMarks.txt** containing student marks in a single quiz of a course. A detailed description of this file structure is as follows.

The file contains one record per line with each line has the following format

StudentID QuizMarks

The **studentID** and the **Quizmarks** is a real (int, double) numbers containing marks of student in the quiz.

Problem:

In this problem we are going to use a one-dimensional array to store marks of students in the given quiz. You are required to create the following functions given in Task 4.

Task 1:

Write a program which asks a user about his name, address, DOB and employment status. Prompt the user to enter employed or unemployed as employment status and then write all these details in a file named “user info.txt”. The details must be written in the file with their labels. For example:

Sample File:

Name: User name

Address: 209 test block, test city, Pakistan

DOB: 20/1/1990 (dd/mm/yyyy)

Employment status: Unemployed/Employed

Task 2:

Write a program which reads the data from file of **Task1** and then asks the user which of the detail he wants to see. Then outputs that specific detail.

Sample Input:

Which detail do you want to see? DOB

Sample Output:

DOB: 20/1/1990 (dd/mm/yyyy)

Task 3:

Write a program which asks an admin about details of other users such as name, address and phone number. The phone number must be of 11 digits (03xx-xxxxxxx) otherwise don't store the input. Take the details until admin enters "no" upon asking about more user data. These details of all the users must be stored in a file. Then ask the admin to enter a phone number to search the user from a file. As phone numbers are unique so users will be searched on the basis of phone numbers. If the phone number entered is found in the file, then show all details of the person otherwise just tell admin that this user phone number doesn't exist.

Task 4:

Write a function named **ReadQuizData** that takes as arguments an **ifstream object reference**, an **array of double precision numbers** and the **size** of the array (maximum number of elements that can be stored). The function must read marks of students from the file and store these marks in the **Array**. The function must return the count of numbers actually read from the file. Please note that the total numbers stored in the file might be different from the size of the array

A suggested prototype of the function is

int ReadQuizData (ifstream& FILE, double Array[], int S);

Then Write a function named **ShowArray** that takes as one of its arguments an array of double precision numbers and as second parameter the number of elements of the array to be shown. The function must then show the marks stored in the array on console.

A suggested prototype of the function is **void ShowArray(double Array[], int N);**

Task 5:

Take an array of name **A** of size 4 X 4. Take input and then take **B** with size 4 X 4. Add them. And show result after taking transpose.

Formally, the i th row, j th column element of \mathbf{C}^T is the j th row, i th column element of \mathbf{C} :

- write the rows of \mathbf{C} as the columns of \mathbf{C}^T
- write the columns of \mathbf{C} as the rows of \mathbf{C}^T

\mathbf{C} is an $m \times n$ matrix then \mathbf{C}^T is an $n \times m$ matrix.

Then save the result in a file named "**result.txt**", according the matrix spaces and new line.

Task 6:

Finding Upper triangular Matrix:

A square matrix is called upper triangular if all the entries below the main diagonal are zero. For example:

$$\begin{bmatrix} 1 & 7 & -8 & 0 \\ 0 & 8 & 10 & 9 \\ 0 & 0 & 7 & 3 \\ 0 & 0 & 0 & -9 \end{bmatrix}$$

Write a function to find whether the matrix is upper triangular matrix or not. A suggested Function header will be.

bool UpperTriangularMatrix(int Arr[][4], int totalRows)

Elements are written in a file name “**matrix.txt**”.