

National University of Computer and Emerging Sciences



Laboratory Manual
for
Programming Fundamentals
(CS 1002)

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Section	B
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Continue working with files and 2D arrays

Objectives

Objectives of this lab are:

- Revise and enhance the concepts of 2D arrays and files

Problems

Problem 1: Declare and initialize a 2D array

Declare and initialize a 2D array:

```
int arr[3][4] = {{1,2,3,2},{5,9,1,2},{5,1,7,9}};
```

Note how this array is initialized. Print this array using the output function.

Initialize another array as:

```
int arr[3][4] = {{1,2},{5,9,1}};
```

Call the same function for its output and note what this initialization does for items that you have not specified in the initializer list.

Problem 2: Write a function that computes the average of all columns of a 2D matrix.

As an example if the 2D array is:

```
7 0 -9 9
0 5 0 3
4 0 6 1
```

Then the average of all columns is: $\{11/3, 5/3, -1, 13/3\}$

Which parameters would this function require? Note that the average of all columns of an array requires a 1D array for its storage. What should be the size of this array?

Problem 3: Write a function that finds the sum of each row of a 2D array

As an example if the 2D array is:

```
7 0 -9 9
0 5 0 3
4 0 6 1
```

Then the sum of all rows is: $\{7, 8, 11\}$

Which parameters would this function require? Note that the average of all columns of an array requires a 1D array for its storage. What should be the size of this array?

Problem 4: Write a function to write two numbers to a file

The two numbers and the file name should be a parameter to this function.

Problem 5: Write a function to read two numbers to a file

The two numbers and the file name should be a parameter to this function.

Problem 6: Write a 1D array to a file

The 1D array and the filename should be a parameter to this function.

Problem 7: Read a 1D array from a file

The 1D array and the filename should be a parameter to this function. Here you can read the file till EOF if encountered. Also, large array should be allocated and you will have to keep track of its maximum size and current used size in two different variables.

Problem 8: Write a function to read lines of text from a text file and display them

Your function should take the name of the file as input. You can use `getline` to read one line from the text file. For example you can read the first line as:

```
char str[30];  
ifstream strm("first.cpp");  
strm.getline(str,12); //str should have the first line of text.
```

Problem 9: Write a function to read lines of text from a text file and write them to another text file

Your function should take the name of the input and output files as input.