

Spring 2025 Programming Fundamentals

Worksheets # 1



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Please note that you will need to attempt the following exercise (HANDWRITTEN) and show me during my office hours, starting Mon April 28. These Problems gradually become complex from simple and should be done in sequence. If You are comfortable with a problem, then skip to next one. If you are not able to do some problems, please make a note and discuss with me, so we make sure that you have full command over these problems.

Set One: Simple, No Arrays

Problem 1: (**NO FUNCTIONS**) Write Complete C++ Program that Reads 3 decimals from a user and display on screen the 3 decimals, their sum and average, maximum and minimum value

Problem 2: Now Do the above problem using following functions (**ALL PARAMETERS PASS BY VALUES**)

- Function "**read**" that reads a decimal from the user
- Function "**sum**" that calculates sum of 3 decimals
- Function "**average**" that calculates average of 3 decimals
- Function "**maximum**" that finds maximum of the 3 decimals
- Function "**minimum**" that finds minimum of the 3 decimals
- Function "**display**" that displays 3 decimals, their sum and average, maximum and minimum value

Problem 3: (NO FUNCTIONS) Write Complete C++ Program that Reads 3 characters from a user and display on screen the 3 characters, 3 characters in UPPERCASE and lowercase

Problem 4: Now Do the above problem using following functions (ALL PARAMETERS PASS BY VALUES)

- Function “read” that reads a character from the user
- Function “toUPPER” that converts a character into UPPERCASE
- Function “toLower” that converts a character into lowercase
- Function “display” that displays 3 characters

Problem 5: (NO FUNCTIONS) Write Complete C++ Program that Reads an English word from a user and display on screen the word, word in UPPERCASE and lowercase

Problem 6: Now Do the above problem using following functions (ALL PARAMETERS PASS BY VALUES)

- Function “read” that reads a word from the user
- Function “toUPPER” that converts a word into UPPERCASE
- Function “toLower” that converts a word into lowercase
- Function “display” that displays a word

Set Two: Using Simple Arrays

Problem 1: (NO FUNCTIONS) Write Complete C++ Program that Reads 100 decimals from a user in to an array, First display the 100 decimal values in reverse, then calculates sum and average and display on screen.

Problem 2: Now Do the above problem using following functions (ALL PARAMETERS PASS BY VALUES OTHER THAN ARRAY)

- Function “Read” that reads 100 decimals from the user in to the array
- Function “reverseDisplay” that Displays the values of the array in reverse order
- Function “sum” that calculates the sum of decimals stored in the array
- Function “average” that calculates the average of decimals stored in the array
- Function “display” that displays the sum and average on screen

Problem 3: Now Do the above problem using the same functions as above but (ALL PARAMETERS PASS BY REFERENCE)

Set Three: Using CStrings

Problem 1: (NO FUNCTIONS) Write Complete C++ Program that reads First Name and Last Name from a user and display on screen, then it compares the 2 names, if the 2 names are the same then display just one name otherwise display both names.

Problem 2: Now Do the above problem using following functions (ALL PARAMETERS PASS BY VALUES OTHER THAN ARRAY)

- Function “Read” that reads First Name and Last Name from the user
- Function “display” that Displays First Name and Last Name on Screen
- Function “length” that calculates the length of a CString
- Function “isEqual” that compares 2 CStrings for Equality

- Function “[copy](#)” that copies a CString in to another CString (this function is not needed for the above problem but you will need to write this function)

Problem 4: Now Do the above problem using the same functions as above but [\(ALL PARAMETERS PASS BY REFERENCE\)](#)

Set Four: File Handling

Problem 1: [\(NO FUNCTIONS NO ARRAYS\)](#) Write Complete C++ Program that reads 10 values from a file “values.txt”, calculates sum, average, maximum and minimum value and display on screen

Problem 2: Do problem 1 above using the following Functions: [\(ALL PARAMETERS PASS BY VALUES OTHER THAN ARRAY\)](#)

- Function “[Read](#)” that reads a value from user
- Function “[sum](#)” that adds two values and returns the result
- Function “[sum](#)” that adds two values and returns the result
- Function “[average](#)” that calculates average from total and number and returns the result
- Function “[smaller](#)” that compares two values and returns the smaller value
- Function “[display](#)” that displays sum, average, maximum and minimum value on screen

Problem 3: Now Do the above problem 2 using the same functions as above but [\(ALL PARAMETERS PASS BY REFERENCE\)](#)

Problem 4: [\(NO FUNCTIONS and NO ARRAYS\)](#) Write Complete C++ Program that reads 10 values from a file “v.txt”, calculates sum, average, maximum and minimum value and display on screen.

If you are having problem read from file then Take Code of Problem 1 and do the following changes:

1. Add #include <fstream>
2. Add this line as the first line in main: ifstream rd(“v.txt”)
3. Replace “cin” with rd
4. After the loop, close file: rd.close();

Problem 5: [\(NO FUNCTIONS\)](#) do the above problem 4, but this time save the values in an array and do the calculations on the array

Problem 6: Do problem 5 above using the following Functions: [\(ALL PARAMETERS PASS BY VALUES OTHER THAN ARRAY\)](#)

- Function “[Read](#)” that reads 10 values from file “values.txt”
- Function “[sum](#)” that adds two values and returns the result
- Function “[sum](#)” that adds two values and returns the result
- Function “[average](#)” that calculates average from total and number and returns the result
- Function “[smaller](#)” that compares two values and returns the smaller value
- Function “[display](#)” that displays sum, average, maximum and minimum value on screen

Problem 7: Do problem 6 above : [\(ALL PARAMETERS PASS BY REFERENCE\)](#)

Problem 8: Do problem 7 and this time also write the results in a file "results.txt" and use one more function:

- Function "[write](#)" that writes sum, average, maximum and minimum value to a file "results.txt"

Set Five: File Handling

In this do all the problems of Set Four and this time read all the values present in the file "values.txt"

Set Six: File Handling

In this do all the problems of Set Five and this time read all the values present in the file "values.csv" and write to file results.csv

Set Seven: File Handling on Cstrings

Problem 1: (**NO FUNCTIONS and No File**) Write Complete C++ Program that reads first, middle and last name from the user and display on screen all 3 names all in UPERCASE and lowercase

Problem 2: Do problem 1 above using the following Functions:

- Function "[read](#)" that reads First, Middle and Last Name from the user
- Function "[display](#)" that display 3 Cstrings
- Function "[toUPPER](#)" that converts a Cstring All to UPPERCASE
- Function "[toLower](#)" that converts a Cstring All to lowercase

Problem 3: (**NO FUNCTIONS**) Write Complete C++ Program that reads first, middle and last name from a file "names.txt" and display on screen all 3 names all in UPERCASE AND lowercase

Problem 4: Do problem 3 above using the same Functions as that of problem 2, other than the following function:

- Function "[read](#)" that reads First, Middle and Last Name from a file "names.txt"

Problem 5: (**NO FUNCTIONS**) Write Complete C++ Program that reads first, middle and last name from a file "names.csv" (names are separated by comma) and display on screen all 3 names all in UPERCASE AND lowercase

Problem 6: Do problem 5 above using the same Functions as that of problem 4, other than the following function:

- Function "[read](#)" that reads First, Middle and Last Name from a file "names.csv"

Problem 7: (**NO FUNCTIONS and no Files**) Write Complete C++ Program that reads 5 words from a user and display on screen the 5 words all in UPERCASE AND lowercase

Problem 8: Do problem 7 above using the following function:

- Function "[read](#)" that reads 5 words from a user
- Function "[display](#)" that display 5 Cstrings
- Function "[toUPPER](#)" that converts a Cstring All to UPPERCASE
- Function "[toLower](#)" that converts a Cstring All to lowercase

Problem 9: (**NO FUNCTIONS**) Write Complete C++ Program that reads 5 words from a file "words.txt" and display on screen the 5 words all in UPERCASE and lowercase

Problem 10: Do problem 9 above using the following functions:

- Function “[read](#)” that reads 5 words from a file “words.txt”
- Function “[display](#)” that display 5 Cstrings
- Function “[toUPPER](#)” that converts a Cstring All to UPPERCASE
- Function “[toLower](#)” that converts a Cstring All to lowercase

Problem 11: Do the problem 10, but this time user “words.csv” and modify the “[read](#)” function accordingly

Problem 12: Do the problem 11, but this time display as well as write to file “results.csv” using a suitable function “write”

Set Eight: File Handling on Text

Problem 1: (**NO FUNCTIONS and No File**) Write Complete C++ Program that reads an English Sentence (last word ends in a full stop ‘.’) from the user and display on screen the count of words in the Sentence, length of each word, each word in all UPPERCASE and each word in all lowercase.

Problem 2: Do problem 1 above using the following Functions:

- Function “[read](#)” that reads a Cstring from user
- Function “[isFound](#)” that checks is a Cstring has given charcater
- Function “[display](#)” that display a Cstring
- Function “[toUPPER](#)” that converts a Cstring All to UPPERCASE
- Function “[toLower](#)” that converts a Cstring All to lowercase
- Function “[length](#)” that calculates the length of a Cstring

Problem 3: (**NO FUNCTIONS**) Write Complete C++ Program that reads an English Sentence (last word ends in a full stop ‘.’) from a file “sentence.txt” and display on screen as well as write to file “results.txt” the count of words in the Sentence, length of each word, each word in all UPPERCASE and each word in all lowercase.

Problem 4: Do problem 3 using functions on problem 2 with suitable modification and more functions for file reading and file writing

Problem 5: (**NO FUNCTIONS**) Write Complete C++ Program that reads an English Paragraph from a file “para.txt” and display on screen as well as write to file “results.txt”, for the paragraph, the number of characters, count of words, length of each word, each word in all UPPERCASE and each word in all lowercase.

Problem 6: Do problem 5 above using Functions of problem 2 (may need to modify function read other functions too)

Set Nine: File Handling on Text

For previous Set Eight, one Single Cstring can be used, now you will need to stored the words in a single Cstring, before processing. Therefore some additional skill and functions will be required

Problem 1: (**NO FUNCTIONS and No File**) Write Complete C++ Program that reads first, middle and last name from the user and stores in a single Cstring. Then saves the cstring all in UPPERCASE in a 2nd Cstring and all in lowercase to a 3rd cstring. Display all 3 Cstrings on screen.

Problem 2(**No File**): Do problem 1 above using the following Functions:

- Function “[copy](#)” that copies one cstring to another

- Function “[append](#)” that appends one cstring to another
- Function “[read](#)” that reads First, Middle and Last Name from the user and stored in a single Cstring (needs the function append)
- Function “[display](#)” that display a Cstrings
- Function “[toUPPER](#)” that converts a Cstring All to UPPERCASE
- Function “[toLower](#)” that converts a Cstring All to lowercase

Problem 3: (NO FUNCTIONS and No File) Write Complete C++ Program that reads a sentence from the user and stores in a single Cstring. Then saves the cstring all in UPPERCASE in a 2nd Cstring and all in lowercase to a 3rd cstring. Display all 3 Cstrings on screen.

Problem 4: Do problem 3 but this time read the sentence from file “sentence.txt”

Problem 5: Use the functions (also need function write that writes a cstring to file) of problem 2 and write Complete C++ Program that reads a paragraph from file “para.txt” and stores in a single Cstring. Then saves the cstring all in UPPERCASE in a 2nd Cstring and all in lowercase to a 3rd cstring. Display all 3 Cstrings on screen as well as writes to file “para_result.txt”