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CSE117 Problem Solving with C

Handout - Lab Session - 11
Files

Objective:

- To write programs that read and write text files using the formatting functions.
- To write programs that read and write test files using the C character I/O functions.

Pre-Lab: Go through the concepts of files.

During Lab: Solve all the exercise problems. You should work on the additional set of programs only after completing this week's tasks.

Read Chapter 7

Lab Exercises

Exercise 1: Display from a File

Write a program to open a file in read mode, read the file's contents, and display them on the terminal.

Sample Test Cases	Input	Output
Test Case 1	file.txt (contents: "Hello World !")	Hello World !
Test Case 2	xyz.txt (there is no file named xyz.txt)	File not found or could not be opened.

Exercise 2: Write to a File

Write a program to open a file in write mode, read input from the user, and write that to the file.

Sample Test Cases	Input	Output
Test Case 1	Hello World !	file.txt (contents: Hello World !)
Test Case 2	Enter first string: CSM Enter second string:CSD	Concatenated String: CSM CSD

Exercise 3: Append to a File.

Write a program to open a file in append mode, read input from the user, and append that to the end of the file.

Exercise 4: Count Characters in a File

Write a program to open a file in read mode, count the number of characters in the file, and display the count on the terminal.

Exercise 5: File Copy

Open two files, fr.txt in read mode and fw.txt in write mode. Copy the contents of fr.txt into fw.txt. Display the contents of fw.txt on the terminal.

Exercise 6: Collecting Area for Solar Heated House

PROBLEM STATEMENT :An architect needs a program that can estimate the appropriate size for the collecting area of a solar-heated house. Determining collecting area size requires consideration of several factors, including the average number of heating degree days for the coldest month of a year (the product of the average difference between inside and outside temperatures and the number of days in the month), the heating requirement per square foot of floor space, the floor space, and the efficiency of the collection method. The program will have access to two data files. File hdd.txt contains numbers representing the average heating degree days in the construction location for each of 12 months. File solar.txt contains the average solar insolation(rate in BTU/day at which solar radiation falls on one square foot of a given location)for each month. The first entry in each file represents data for January, the second, data for February, and so on.

Problem Inputs

Average heating degree days file Average
solar insolation file

```
heat_deg_days /* average heating degree days for coldest month */
coldest_mon /* coldest month (number 1 .. 12) */
solar_insol /* average daily solar insolation (BTU/ft^2)for coldest month */
heating_req /* BTU/degree day ft^2 for planned type construction*/
efficiency /* % of solar insolation converted to usable heat */
floor_space /* square feet */
```

Program Variables

```
energy_resrc /* usable solar energy available in coldest month (BTUs obtained from 1 ft^2 of
collecting area) */
```

Problem Outputs

```
heat_loss /* BTUs of heat lost by structure in coldest month */
collect_area /* approximate size (ft^2) of collecting area needed*/
```

The formula for approximating the desired collecting area (A) is:

$$A = \text{heat loss} / \text{energy resource}$$

Design algorithm , flow chart ,program using the above data requirements for the given problem Try

Sample Test Cases	Input	Output
Test Case 1	<p>What is the approximate heating requirement (BTU / degree day ft^2) of this type of construction? =>9</p> <p>What percent of solar insolation will be converted to usable heat? => 60</p> <p>What is the floor space (ft^2)? => 1200</p>	<p>To replace heat loss of 11350800 BTU in the coldest month (month 12) with available solar insolation of 500 BTU / ft^2 / day, and an efficiency of 60 percent, use a solar collecting area of 1221 ft^2.</p>

Test Case 2	What is the approximate heating requirement (BTU / degree day ft ²) of this type of construction? =>10 What percent of solar insolation will be converted to usable heat? => 60 What is the floor space (ft ²)? => 1200	To replace heat loss of 12612000 BTU in the coldest month (month 12) with available solar insolation of 500 BTU / ft ² / day, and an efficiency of 60 percent, use a solar collecting area of 1221 ft ² .
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***Textbook** : B. A. Forouzan and R. F. Gilberg —Cengage Learning , Computer Science: A Structured Programming Approach Using C++ Third Edition.

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