

Chapter 10 - Data Files

At a Glance

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Chapter Notes

Overview

Chapter 10 provides an overview of the use of data files in C. You learn to declare, open and close file streams, as well as read and write to text files. You also learn how to work with random access files and how to pass and return filenames from and to functions. In the case study, you develop a program that creates and uses a table of constants. You also learn to write and read binary files. Finally, several common programming and compiler errors are reviewed.

Chapter Objectives

- Declaring, opening, and closing file streams
- Reading from and writing to text files
- Random file access
- Passing and returning filenames
- Case study: Creating and using a table of constants
- Writing and reading binary files (optional)
- Common programming and compiler errors

Declaring, Opening, and Closing File Streams

Topic Tip	When opening a file, the filename must not only exist, but you should also have permission to read and/or write to the file.
Topic Tip	The Programming Note on pages 488 and 489 describe in detail the role of each of the mode indicators available when opening a file. It is important to be aware that you can open a file for both input and output at the same time.
Topic Tip	Note the importance of checking <code>fopen()</code> 's return value (for more information see the Programming Note on page 492).
Topic Tip	Remember that when using strings for filenames, you should make sure that the string is long enough to include the end-of-string marker.

Quick Quiz 1

1. What is a file?
2. What is a file stream?
3. Each file stream name, when it is declared, is preceded by a(n) _____.
4. If a file opened for reading does not exist, the `fopen()` function returns the _____ address value.

Reading from and Writing to Text Files

Topic Tip	The Programming Note on page 499 describes the issues involved in using full path names when opening a file.
Topic Tip	Practice by writing a short program that writes some output to <code>stderr</code> . Where is the output displayed?

Random File Access

Topic Tip

It may be a good idea if you try to write a short program in which you test reading and writing to a file using random file access. It is important that you get a good understanding of how these functions work.

Quick Quiz 2

1. The_____function resets the current position to the start of the file.
2. What is the role of the `fseek()` function?
3. The function prototype for `ftell()` is contained in_____.
4. What happens if a file is opened for output and the file already exists?

Writing and Reading Binary Files

Topic Tip

You may wish to explore how to use `fwrite()` to write all the elements of an array to a file at once. For an example, see www.cprogramming.com/tutorial/cfileio.html.

Quick Quiz 3

1. What are binary files?
2. What is a disadvantage of using binary files (instead of text files)?
3. The specification for explicitly creating and writing to a binary file is made by appending a(n)_____to the mode indicator when the file is opened.
4. When using `fwrite()` to write to a binary file, the first method argument is always the_____operator and a variable name.

Additional Resources

1. C Tutorial : File I/O :
https://www.tutorialspoint.com/cprogramming/c_file_io.htm
2. How C Programming Works: Text Files:
<http://computer.howstuffworks.com/c17.htm>
3. How C Programming Works: Binary Files:
<http://computer.howstuffworks.com/c39.htm>

4. C File I/O and Binary File I/O:
www.cprogramming.com/tutorial/cfileio.html

Key Terms

- **Binary files**二进制文件 use the same code as your computer processor uses internally for C's primitive data types.
- Text files are also known as **character-based files**基于字符的文件.
- Data that is stored together under a common name on a storage medium other than the computer's main memory is called a **data file**数据文件.
- Each file has a unique filename referred to as the file's **external name**外部名.
- A **file**文件 is a collection of data that is stored together under a common name, usually on a disk, magnetic tape, or CD-ROM.
- A **holiday table**假日表 consists of legal holiday dates that have been previously stored in a file.
- A file stream that receives (that is, reads) data from a file into a program is referred to as an **input file stream**输入文件流.
- A file stream that sends (that is, writes) data to a file is referred to as an **output file stream**输出文件流.
- **Text files**文本文件 store each individual character, such as a letter, digit, dollar sign, decimal point and so on, using an individual character code (typically ASCII).

