

# Chapter 23 – Output to Text Files

## 1. What is a Data File?

In actuality, a computer file is a list of data stored as binary digits, with each item of data having its own location or address within the file. In practice, computer files are treated very much like the more traditional paper files of information. While several ways of organizing data fit this definition, the term file is reserved for those that are stored on more permanent types of storage, such as hard drives, tape, CD-ROM disks, etc., rather than those held in volatile types of storage such as RAM.

## 2. Text Files

Text files are one of the most common types of data files. They are so named because, when viewed in a text editing program such as MS Notepad or a programming editor, the contents of text files appear as a text document, i.e. as characters (letters, numbers, punctuation, etc.) organized on horizontal rows.

Output to a text file is almost identical to text output to a monitor screen performed with the *cout* object.

## 3. Output to a Text File

Output to a text file requires use of an object of class *ofstream*, which can be accessed by including in program the header file *fstream*. When declared, a path is associated with the *ofstream* object. The *ofstream* class object is then used in an identical manner to the *cout* object. Output streamed through a *ofstream* object is written to the path. (*The more familiar cout object has the path to the program window or monitor associated with it.*) Information written to a text file is usually appended to the end of the file.

Unlike the *cout* object, when a program is finished writing to a file, the *close()* member function of the *ofstream* class object is called to safely cut the connection between the file and the program. (*Programmers neglect this at their peril, for the length of the file can be recorded as 0 in the file table on the drive by some operating systems, preventing normal access to the files contents.*)

## 4. Declaring and Using an ofstream Object

An *ofstream* object is declared as follows:

*ofstream* object-name;

where *object-name* is the *ofstream* object

A path to a file to be opened for writing must then be associated with the *ofstream* object. This is done with the *ofstream member function open*. This has the form

```
ofstream-object.open(string-of-path-to-use-for-output, ios::out);
```

where *ofstream-object* is the *ofstream* object  
*string-of-path-to-use-for-output* is a valid path in the  
operating system of the computer or workstation in a string  
literal or variable  
*ios::out* is the open mode of the file

Here is an example *ofstream* object declaration and file opening for output.

```
ofstream outfile;  
outfile.open("a:\\data.dat", ios::out);
```

In this example, the *ofstream* object *outfile* is created. *outfile* can then be used in the manner that *cout* is used. **Important Information: When *outfile* is declared, the file *data.dat* in the root directory of the A: drive is created if it did not previously exist. If *data.dat* already existed, its length is set to 0 bytes, i.e. the file is erased. Also, notice the use of the double slash to achieve a single slash in the string.**

To send output to the file that was just created, the *ofstream* object *outfile* just as *cout* is used to send output to the screen. To extend the example:

```
outfile << "All of this will output to the file, not the screen." << endl;
```

Once the program has finished its output to the file, the program's connection to the file should be terminated. This is done with the *close* member function of the *ofstream* class. For example:

```
outfile.close( );
```

## 5. An Example of Output to a Text File

The following program acquires and outputs basic personal information to a text file. Notice that *cout* still outputs to the monitor screen and *cin* still acquires input from the keyboard.

```
#include <iostream>
#include <fstream>
using namespace std;

void main( ) {
    char fname[15], lname[15], phone[15];
    cout << "Enter your first name: ";
    cin >> fname;
    cout << "Enter your last name: ";
    cin >> lname;
    cout << "Enter your phone number: ";
    cin >> phone;

    ofstream phoneFile;
    phoneFile.open("a:\\pnum.dat", ios::out);           // change the path to one that
                                                        // is correct for your system
    phoneFile << lname << endl << fname << endl << phone << endl;
    phoneFile.close( );

}
```

When run with the data Hypolite, Hebert, and 235-9456, this example program produces the following output:

```
As appears on the monitor screen:  Enter your first name: Hypolite
                                   Enter your last name: Hebert
                                   Enter your phone number: 235-9456
```

```
In the file pnum.dat:  Hebert
                       Hypolite
                       235-9456
```

**Programming Assignment 23.1**

Create and run a program to output your name to a file. Verify that the contents of the file are correct by opening the file with a text editor (such as a programming editor).

**Programming Assignment 23.2**

Change the program from 23.1 so that your name is output to the file 200 times. The file should contain 200 lines.

**Programming Assignment 23.3**

Create a program that collects the heights of an unknown number of people, storing them in a data file. Each height must be separated by a space or an end-of-line. (*This file will be used in the next chapter!*)

**Programming Assignment 23.4**

Alter the program from programming assignment 22.1 so that the information about CDs (certificates of deposit) purchased are stored in a file named for the purchaser's customer ID. Note: This will require additional input.