

FILES with FSTREAM

Short Answer

1. * What header file do you need to include in a program that performs file operations?
What data type do you use when you create a file stream object that can write data to a file?
How about creating a file stream object that can read data from a file?
2. * Why should a program close a file when it has finished using it?
3. * What are the differences among these classes, `ifstream`, `ofstream` and `fstream`?
4. ** Show your experience when manipulating files with C++ `fstream` and C `FILE` class.
5. ** What task does each of the following code segments perform?
 - ```
ofstream ofile("file.txt");
ofile << "goodmorning" << endl;
cout << "Data written to file" << endl;
ofile.close();
```
  - ```
char data[100];
ifstream ifile("file.txt");
while ( !ifile.eof() ) {
    ifile.getline (data, 100);
    cout << data << endl;
}
ifile.close();
```
6. ** What is the content of the file "file.txt" after each of the following code segment executes?
 - ```
ofstream ofile("file.txt");
ofile << "hello new day", 13;
ofile.seekp(9);
ofile << " month", 6;
ofile.close();
```
  - ```
ofstream outfile("file.txt");
outfile.write ("This is an apple",16);
long pos = outfile.tellp();
outfile.seekp (pos - 7);
outfile.write (" sam", 4);
outfile.close();
```
7. ** The file `expenses.txt` contains the line: Hotel, 3 nights, \$ 1750.25
Are the results of the two code segments below the same? If not, point out the difference(s).

```
ifstream in("expenses.txt");
char c;
while (in.get(c)){
    if (isdigit(c)) {
        in.unget();
        double n;
        in >> n;
        cout << n << 'x';
    }
}
```

```
ifstream in("expenses.txt");
char c;
while (in.get(c)){
    if (isdigit(c)) {
        in.unget();
        int n;
        in >> n;
        cout << n << 'x';
    }
}
```

8. ** Are the three following code segments the same? If not, point out the difference(s).

```
ifstream in("file.txt");
char x;
int i{0};
while (in.get(x))
    i++;
cout << i << endl;
```

```
ifstream in("file.txt");
string x;
int i{0};
while (getline(in, x))
    i++;
cout << i << endl;
```

```
ifstream in("file.txt");
string x;
int i{0};
while (in >> x)
    i++;
cout << i << endl;
```

9. ** There may be compile/runtime errors in the following code segment. Identify them.

- `ifstream myStream;`
`ifstream.Open("file.txt", ios::out);`
- `int l;`
`char* b;`
`ifstream i;`
`i.open ("find.txt", ios :: binary);`
`i.seekg (0, ios :: end);`
`l = i.tellg();`
`i.seekg (0, ios :: beg);`
`b = new char [1];`
`i.read (b, l);`
`i.close();`
`cout.write (b, l);`
`delete[] b;`

10.*** What screen output does each of the following code segments produce, and why?

- `char character;`
`int integer;`
`ofstream out_stream;`
`ifstream in_stream;`
`/* Create a file containing two integers */`
`out_stream.open("Integers");`
`out_stream << 123 << ' ' << 456;`
`out_stream.close();`
`/* Attempt to read a character, then an integer, then a character`
`again, then an integer again, from the file "Integers". */`
`in_stream.open("Integers");`

```

in_stream >> character >> integer;
cout << "character: '" << character << "'\n";
cout << "integer: " << integer << "\n";
in_stream >> character >> integer;
cout << "character: '" << character << "'\n";
cout << "integer: " << integer << "\n";
in_stream.close();

```

- ofstream output;


```

output.open("scores.txt");

// Write two lines
output << "John" << " " << "T" << " " << "Smith" << " " << 90<<endl;
output << "Eric" << " " << "K" << " " << "Jones" << " " << 85;
output.close();

ifstream input;
// Open a file
input.open("scores.txt");

// Read data
char firstName[80], lastName[80];
char mi;
int score;
input >> firstName >> mi >> lastName >> score;
double sum = score;
input >> firstName >> mi >> lastName >> score;
sum += score;
cout << "Total score is " << sum << endl;
input.close();

```

Fill-in-the-Blank

1. * Fill in each of the following blanks with an appropriate terminology
- _____ marks the location of the next byte that will be read from the file.
 - This file access method is similar to the way cassette tape players work: _____. Meanwhile, this method is similar to the way a CD/MP3 player works: _____.
 - The statement, _____, reads a single word from the `ifstream` named `in` into the string variable `word`.
 - You can use the _____ function to move the file pointer for output and the _____ function to move the file pointer for input. In these functions, the first argument indicates the _____ and the second argument indicates the _____.
2. ** For each of the following cases, identify what the code segment will print out, given the content of the input file.
- ```
ifstream ifile("file.txt");
char last;
ifile.ignore (256, ' ');
last = ifile.get();
cout << "Your initial is " << last << '\n';
ifile.close();
```

The content of the file "file.txt" is "programming techniques"

What printed out is \_\_\_\_\_
  - ```
ifstream in("file.txt");
char c;
int i = 0;
while (in.get(c)){
    if (tolower(c) == 'a') i++;
}
cout << i << endl;
```

The content of the file "file.txt" is "If I saw an Aardvark, I would scream!"

What printed out is _____
 - ```
ifstream in("file.txt");
char c;
while (in.get(c)){
 if (isupper(c))
 cout << toupper(c);
}
in.close();
```

The content of the file "file.txt" is "Orange Coast College"

What printed out is \_\_\_\_\_

- ```
string word;
int i = 0;
ifstream read("file.txt");
while(read >> word){
    if(i < word.length())
        cout << word[i];
        ++i;
}
cout << endl;
```

The content of the file "file.txt" is

"The whole thing starts about twelve, fourteen or seventeen"

What printed out is _____

3. ** Consider the following statement,

```
ofstream ofs;
ofs.open ("file.txt", _____);
```

What should be filled in the blank so that the writing position starts at the end of the file?

4. ** The file `grades.txt` contains lines of text that look like this:

```
Smith 94
Jones 75
. . .
```

Each line of text contains the student's name (a single word) and an integer score.

Consider the following code segment,

```
string name;
int score;
ifstream in("grades.txt");
```

What is the legal way of reading one student's information? _____

5. *** The file `grades.txt` contains lines of text that look like this:

```
1 student1 3.5
2 student2 0.6
3 student3 4.0
4 student4 2.2
5 student5 2.3
. . .
```

Each line of text contains the student's ID, name (a single word) and score.

Fill in the blanks in the following C++ code segment so that the code will read the text file above to find a student with a specific ID and then print his/her name and GPA.

```

string idToLookFor, id, name, gpa;
cout << "Enter student ID: ";
cin >> _____;
_____ din;
din.open( _____ );
if ( _____ )
    cout << "Error. Unable to open file.\n";
else{
    while((din >> id) && (id != idToLookFor))
        din >> name >> gpa;
    if ( _____ == idToLookFor ){
        din >> _____ ;
        cout << "Student name: " << name << " GPA: " << gpa;
    }
    else
        cout << "The student was not found." << endl;
    din._____;
}

```

True or False

Choose T (True) or F (False) for each of the following statements and then briefly explain in one or two sentences.

1. T F There is no way to jump directly to the desired data in a text file.
2. T F The function `eof` is used for appending data to the end of a file.
3. T F It is possible to open several files for access at the same time.
4. T F If a file you are opening for appending does not exist, the operating system will detect the missing file and terminate the operation.
5. T F If you create a file with the same name as an existing file, you will be always prompted to rename your new file by the file creation function.
6. T F When you call an `ofstream` object's `open` member function, the specified file will be erased if it already exists.
7. T F The return value of the `getline` function is an input stream object
8. T F The return value of the `getline` function is a string object.
9. T F If an input stream's file is missing when you try to open it, its member function `fail` returns false.
10. T F If an output stream's file is missing when you try to open it, its member function `fail` returns false.

Algorithm Workbench

1. * Write a single statement to complete each of the following requirements
 - Create an input file stream object named `in` and open the text file `tuba.txt`.
 - Assume the text file `tuba.txt` contains several lines of text. Read one line from this file using the input file stream object `in`
 - Create an output file stream object named `out` and open the text file `expenses.dat`.
 - Output the string “Hello Word” to the text file `expenses.dat` using the output file stream object `out`.
2. ** Assume that the text file named `Numbers.txt` contains integers from 1 to 100 and these numbers are separated by white blanks. Write code to read integers from the text file `Numbers.txt` and output only prime numbers.
3. ** Write code to loop from 1 to 100 and write the i^{th} Fibonacci numbers to the text file named `Fibonacci.txt`.

Consider the following children poem as demonstration of text input data for Question 4 to 8.

```
i made myself a snowball
as perfect as could be
i thought i would keep it as a pet
and let it sleep with me
i made it some pajamas
and a pillow for its head
then last night it ran away
but first it wet the bed
```

Source: <https://www.familyfriendpoems.com/poem/snowball-by-shel-silverstein>

4. ** Write code to write the above content to the text file named `Snowball.txt`.
5. ** Write code to count the frequency of every distinct word in the text file `Snowball.txt` and store these words (along with their frequencies), one per line, to a new text file named `Freq.txt`.
6. ** Write code to replace every instance of the word “it” in the text file `Snowball.txt` by the word “snowball” and write the new content to the text file named `newSnowball.txt`.
7. ** Write code to receive a positive integer that is no larger than the number of lines in the text file `Snowball.txt` and delete the corresponding line.
8. ** Write code to receive a positive integer that is no larger than the number of lines in the text file `Snowball.txt` and insert the line “i love snowball” to the corresponding line.

9. ** Consider the following two text files, [FileA](#) and [FileB](#).

i never saw a purple cow	the forest is the town of trees
i never hope to see one	where they live quite at their ease
but i can tell you, anyhow	with their neighbors at their side
i would rather see than be one	just as we in cities wide

Merge these two files into a single file such that their lines come in an alternative fashion, that is, the first line of [FileA](#) goes first and it is followed by the first line of [FileB](#), and then the second line of [FileA](#) and [FileB](#), respectively, and so on.

- 10.*** Use some encryption algorithm to encrypt the file [Snowball.txt](#) and store the encrypted content to the file [Snowball.enc](#). After that, decrypt the previously encrypted file and store the decrypted content to the file [Snowball.dec](#).