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File Input/Output (File I/O)

Comp Sci 1570 Introduction to C++



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Advising appointments will eclipse office hours this week, so no guarantees about availability during normal times. With 130 appointments at 15 minutes each, the whole week is booked.

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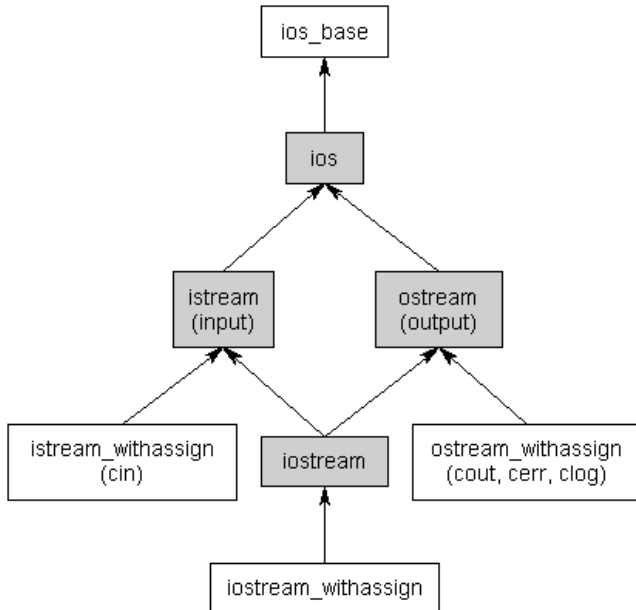
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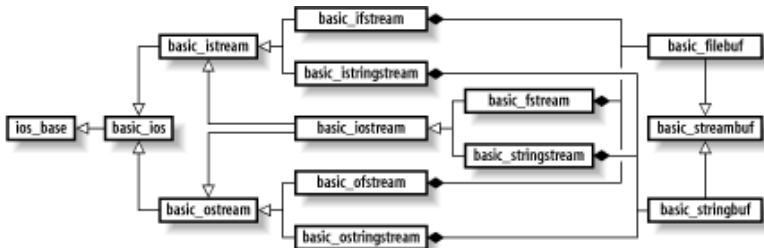
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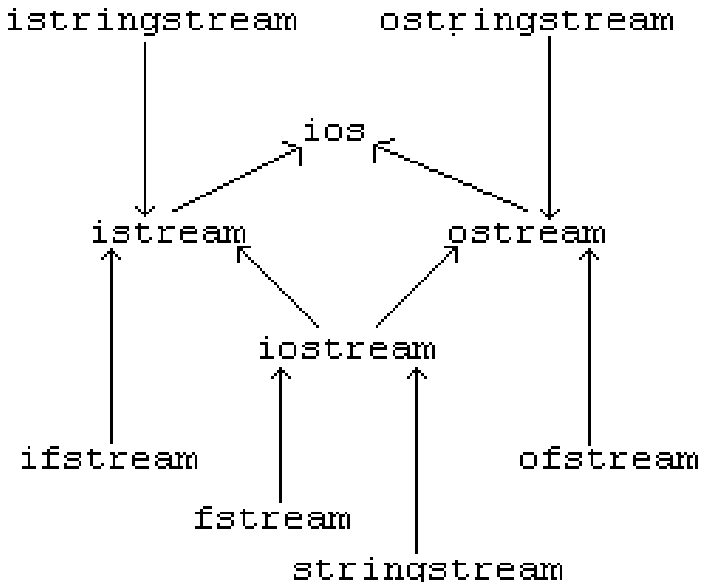
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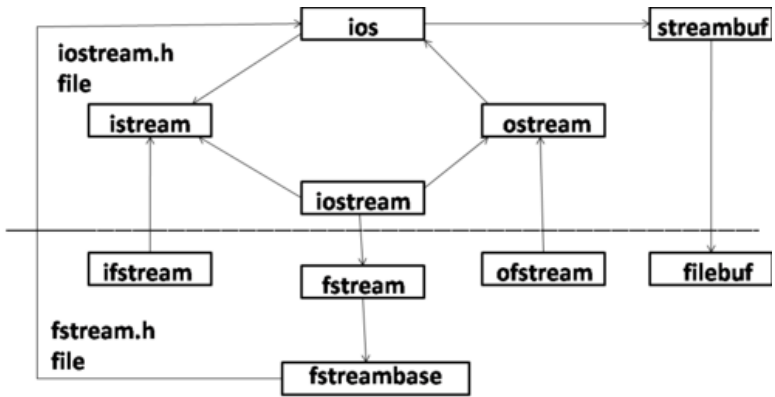
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When the program opens a file for input, the program is reading from the file. When the program opens a file for output, the program is writing to the file. C++ provides us with the `ifstream`, `ofstream`, and `fstream` classes for reading from and writing to files. All of these classes are available through the `fstream` library, which means we must `#include` it in our code in order to use them:

```
#include <fstream>
```

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```
ofstream writetothisfile;
ifstream readthisfile;
fstream readorwritetothisfile;
```

- When the program opens a file for **input**, the program is **reading** from the file.
- When the program opens a file for **output**, the program is **writing** to the file.
- ifstream, ofstream, and fstream classes are for reading from and writing to files, available through the fstream library, which means we must: # include <fstream>
- ofstream type (read that as “output file stream”) is used to write data to files.
- ifstream type (“input file stream”) is used to read data from files.
- fstream (“file stream”) can combine the behavior of ifstream and ofstream and allow us to both read from and write to files

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Member functions of the fstream objects

```
ifstream inFile("myfile.txt");
inFile.is_open(); // for example
```

The following member functions exist to check and manage specific states of a stream:

- `is_open()` returns true if opened correctly
- `good()` Returns true if the goodbit is set (the stream is ok)
- `bad()` Returns true if the badbit is set (a fatal error occurred)
- `eof()` Returns true if the eofbit is set (the stream is at the end of a file)
- `fail()` Returns true if the failbit is set (a non-fatal error occurred)
- `clear()` Clears all flags and restores the stream to the goodbit state
- `clear(state)` Clears all flags and sets the state flag passed in
- `rdstate()` Returns the currently set flags
- `setstate(state)` Sets the state flag passed in

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```
ofstream outFile;
outFile.open("sample.txt", MODE);
```

```
ifstream inFile;
inFile.open("sample.txt", MODE);
```

Where

- ios::app – append to end of file
- ios::ate – go to end of file on opening (default beginning)
- ios::binary – file open in binary mode
- ios::in – open file for reading only
- ios::out – open file for writing only
- ios::nocreate – open fails if the file does not exist
- ios::noreplace – open fails if the file already exist
- ios::trunc – delete the contents of the file if it exist

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```

ifstream infile("myfile.txt");
infile.seekp(-10, ios::end) // start at end-10
  
```

- seekg() moves get pointer(input) to a specified location
- seekp() moves put pointer (output) to a specified location
- tellg() gives the current position of the get pointer
- tellp() gives the current position of the put pointer

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Stream objects can be passed to functions like any other kind of object, but they must always be reference parameters.

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Check out the code for overloading the operator `<<` with a struct, and passing in a stream object