Chapter 6: I/O and Streams

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File I/O

- Thus far, we have either printed to the screen or gotten input directly from the user
- What if we could read data from files and save data to files?
- This would enable us to save information beyond the current program execution and use the data later
- Your program *reads* from a file when it takes input from a file
- Your program writes to a file when it sends information to a file
- This chapter examines streams to accomplish I/O

Streams

- Streams will serve as our first introduction to objects
- A stream is a flow of characters
 - If the flow is into your program, the stream is called an input stream
 - If the flow is out of your program, the stream is called an **output stream**
- The data in the stream can come from a file or from a keyboard the stream does not care
- cin and cout are both special stream *objects* included from the iostream header
- Suppose your program defines an input stream in_stream that comes from a file (this does not show how to create in_stream):

1 int some_number; 2 instream >> some_number

• This **int** is filled with a number from this file.

1 out_stream << some_number << endl;</pre>

- This will output the value stored in some_number to the file.
 - This effectively saves some_number to the file
- Input streams are created with:

1 ifstream in_stream

• Output streams are created with:

1 ofstream out_stream;

- Both types are provided by fstream, which can be included with #include <fstream>
- Important functions:
 - open() opens a file
 - close() close a file
- See documentation at
 - http://www.cplusplus.com/reference/fstream/ifstream/
 - http://www.cplusplus.com/reference/fstream/ofstream/

Example: simple_io.cpp

```
1 // Reads three numbers from the file infile.dat, sums the numbers, and
      writes
2 // the sum to the file outfile.dat. (A better version of this program
      will be
3 // given in Display 6.2.)
4
5 #include <fstream>
6
7 int main()
8 {
9
     using namespace std;
10
11
     ifstream in_stream;
12
     ofstream out_stream;
13
     in_stream.open("infile.dat");
14
15
     out_stream.open("outfile.dat");
16
     int first, second, third;
17
18
     in_stream >> first >> second >> third;
     out_stream << "The sum of the first 3\n"</pre>
19
                 << "numbers in infile.dat\n"
20
                 << "is " << (first + second + third) << endl;
21
22
23
     in_stream.close();
24
     out_stream.close();
25
```

I/O and Streams

26 return 0; 27 }