

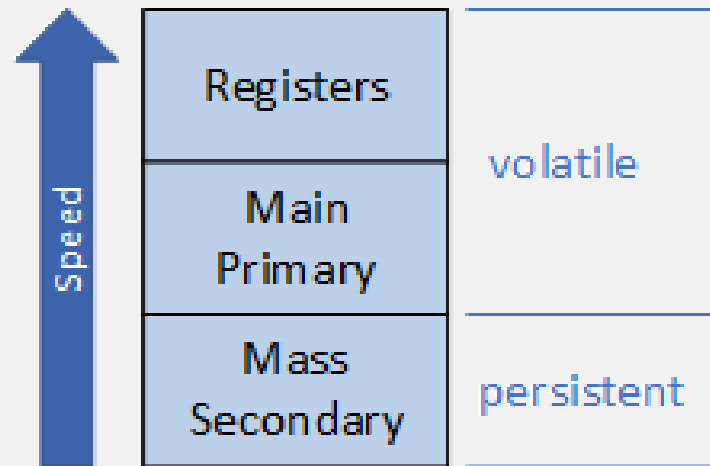


INTRODUCTION TO FILES AND STREAMS

File I/O



MEMORY HIERARCHY



- Registers are part of the CPU
 - Accessible with assembly code but not C++
- Main/Primary/RAM is where variables “live”
- Mass/Secondary is the topic of this chapter



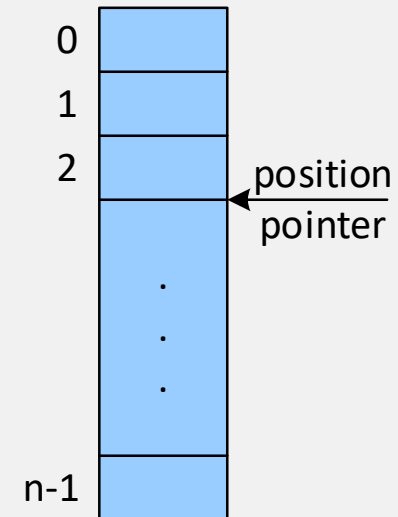
FILES

- “A file is a named collection of related information that is recorded on secondary storage.
- “A file is the smallest allotment of logical secondary storage; the OS can only store data in secondary storage as a file.”
 - Silberschatz, Galvin, & Gagne, *Operating System Concepts Essentials*, John Wiley & Sons, Inc., 2011
- Files consist of a sequence of bytes representing a variety of data types.
- Programs determine the meaning of the data.



FILE PROPERTIES

- *Physically*, the contents of a file may be scattered across secondary memory
- *Logically*, the contents of a file may be viewed as an array
 - Each byte in a file is like one array element
 - Each byte is addressable by an offset from the beginning of the file
 - The OS maintains a position in an open file that is updated by read or write operations



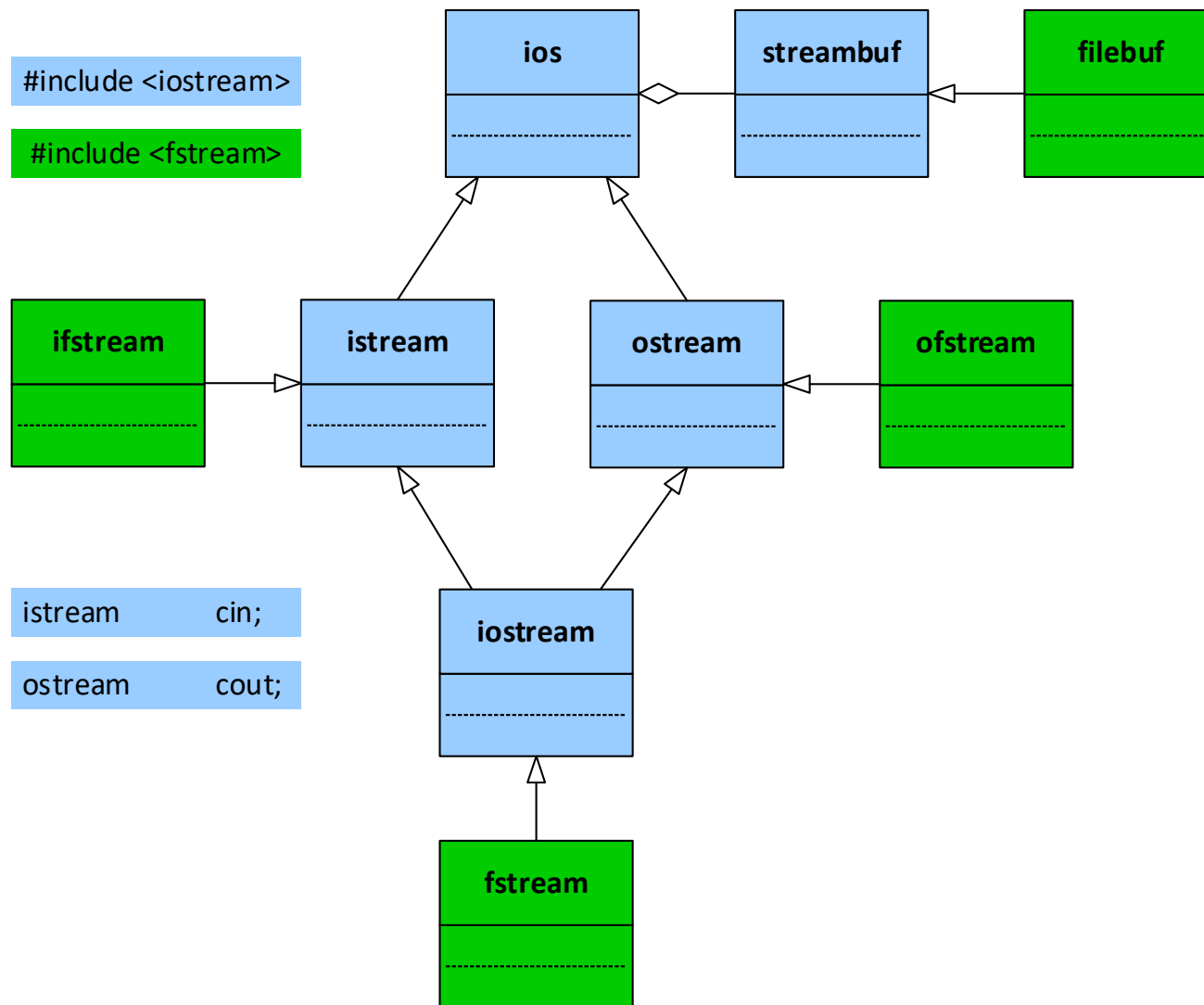
STREAM CLASSES

```
#include <iostream>
```

```
#include <fstream>
```

```
istream cin;
```

```
ostream cout;
```





USING STREAMS

CONSOLE I/O

```
int      i;  
double   d;  
  
cin >> i;  
cout << d << endl;
```

FILE I/O

```
ifstream input("data1.txt");  
ofstream output("data2.txt");  
  
input >> i;  
output << d << endl;
```