

Chapter 16

Advanced I/O Concepts

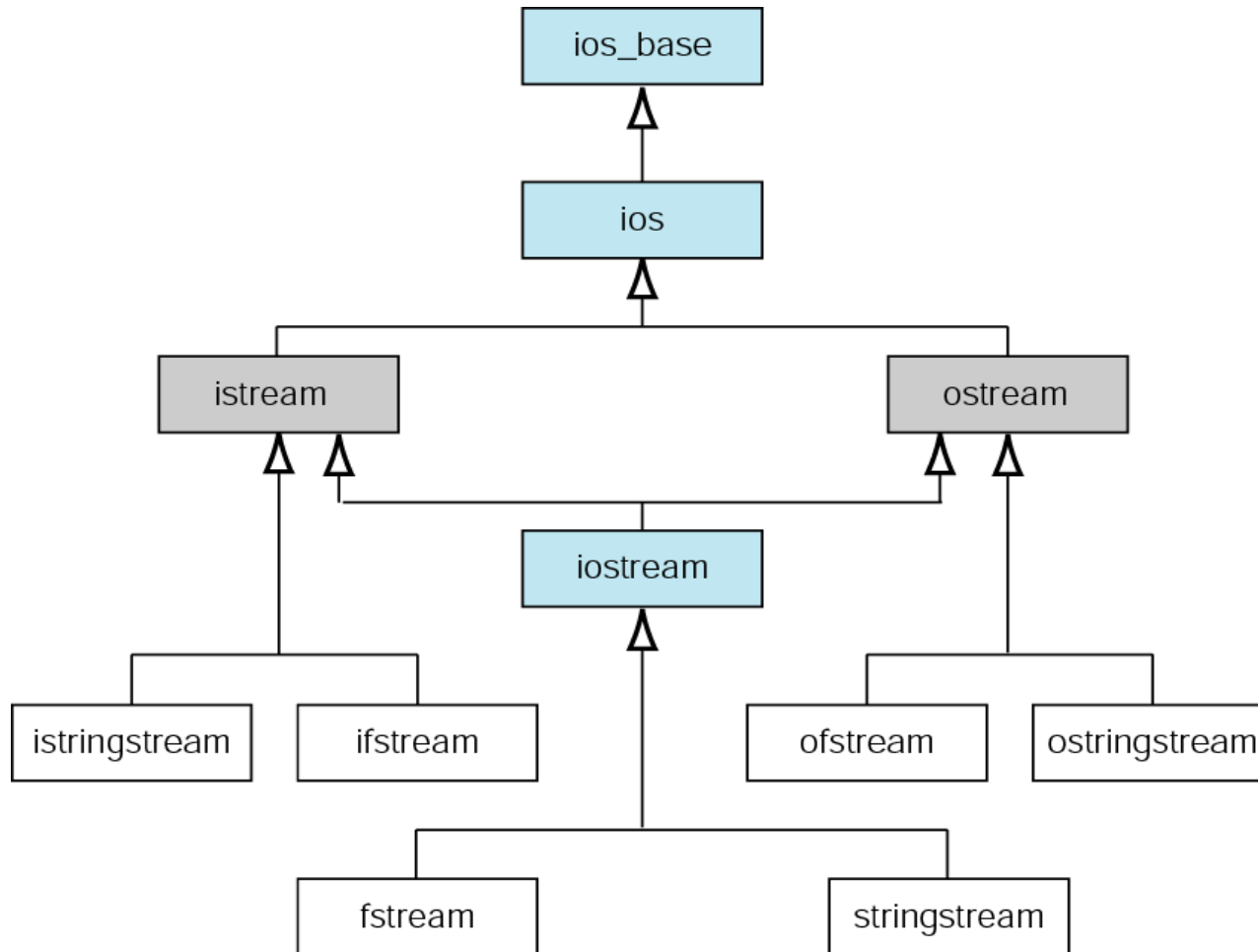
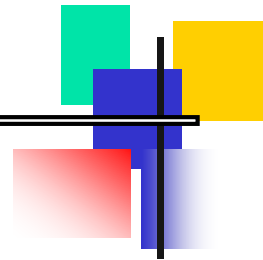
OBJECTIVES

After studying this chapter you will be able to:

- ☐ Understand and explain the differences between text and binary files.
- ☐ Understand and explain the three file states (read, write, error).
- ☐ Read and write binary files.
- ☐ Use a seek function to set the file position to a specified location.
- ☐ Describe the basic file update concept.
- ☐ Write a program to update a sequential file.

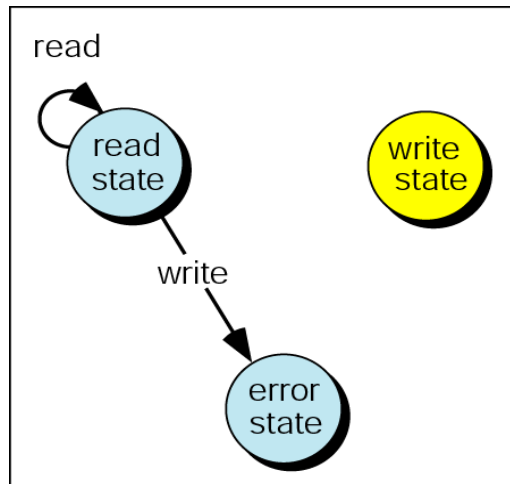
INPUT/OUTPUT CLASSES

Figure 16-1 Input/output classes

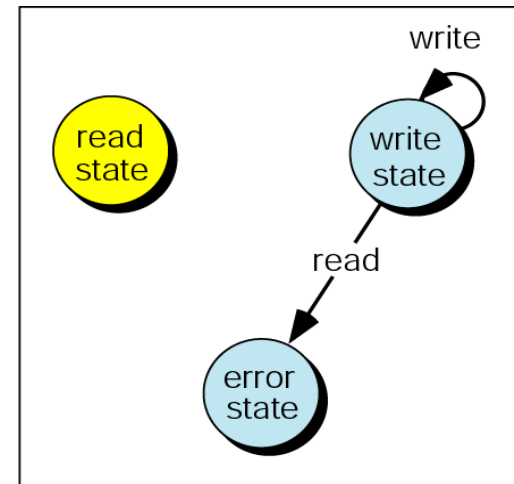


FILE STATES

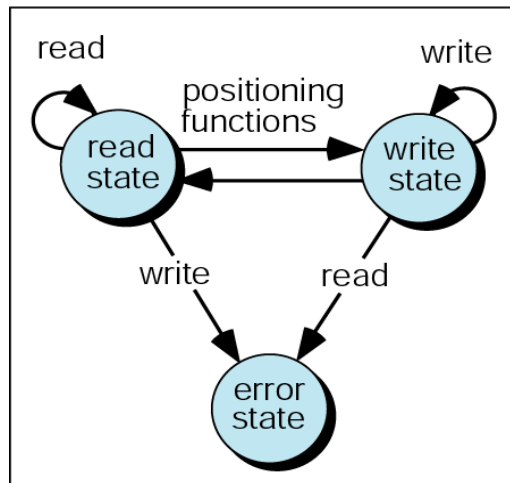
Figure 16-2 File states



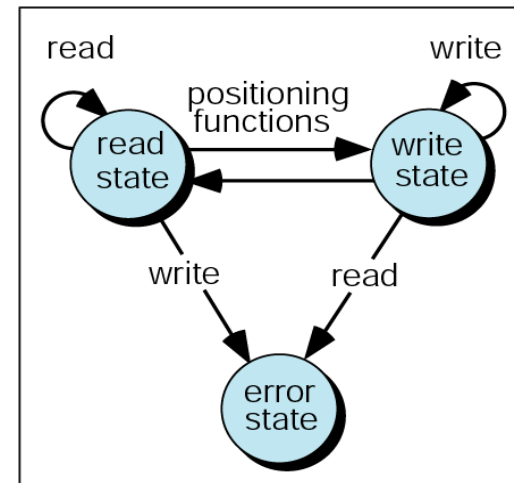
read state



write state



update/read state



update/write state



Figure 16-3 Open file in read state

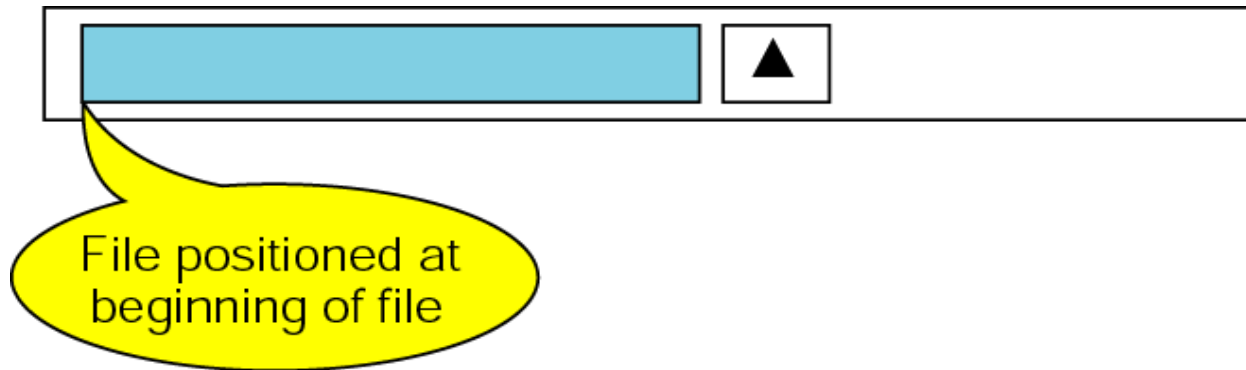
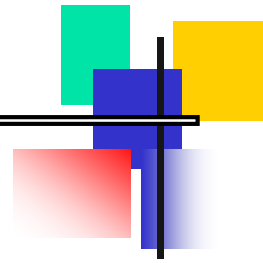


Figure 16-4 File open in write state

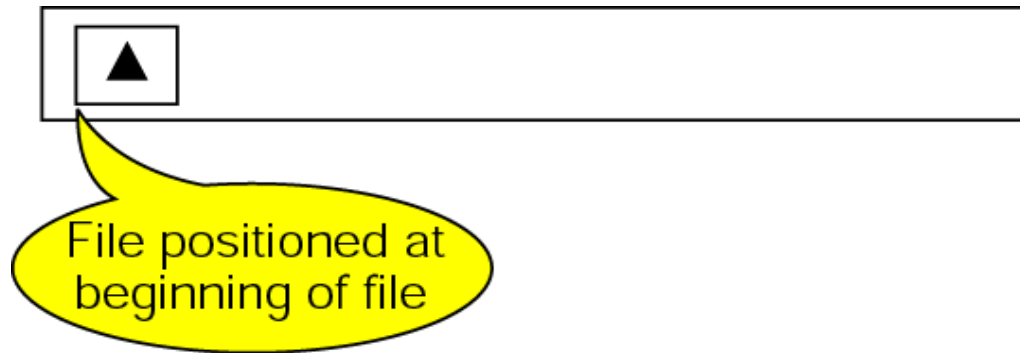
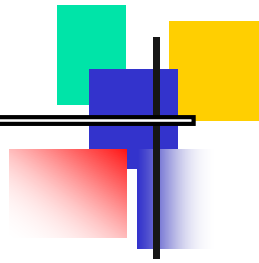
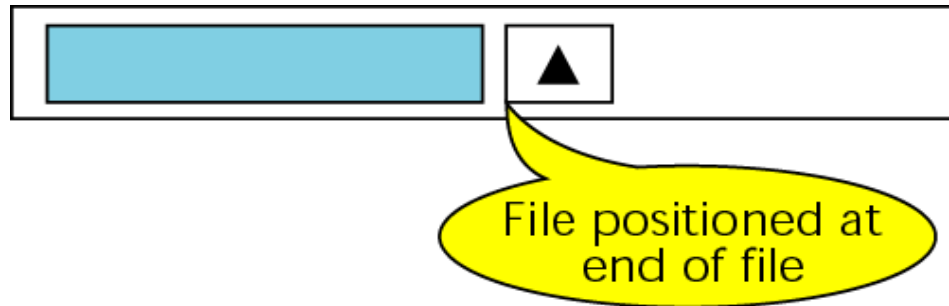
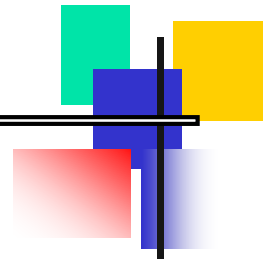
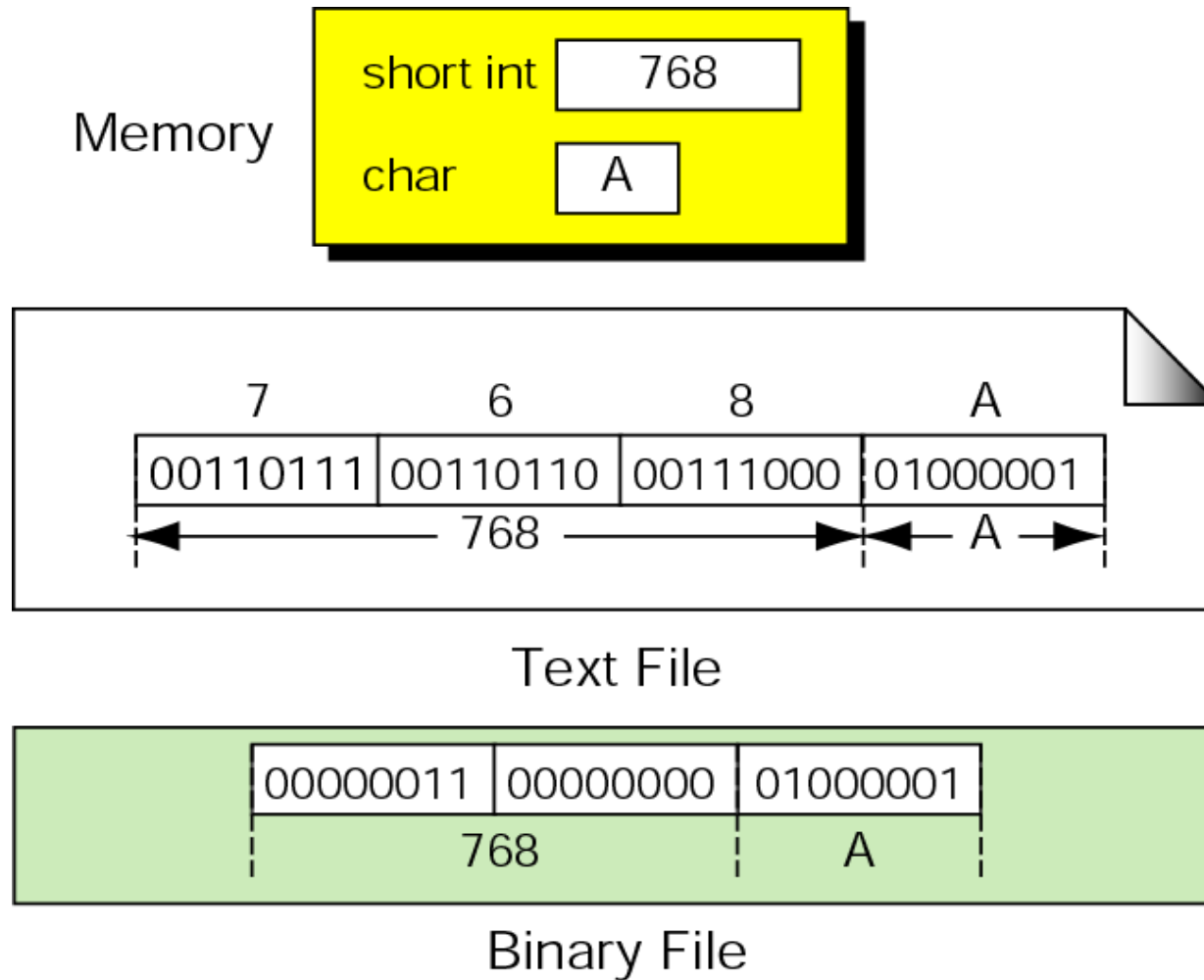
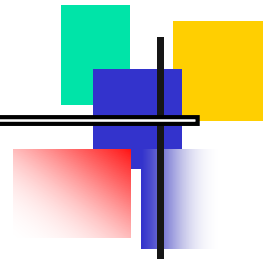


Figure 16-5 File open in write/append state



TEXT AND BINARY FILES

Figure 16-6 Binary and text files



STANDARD LIBRARY FUNCTIONS FOR FILES

Figure 16-7 Types of standard input/output functions

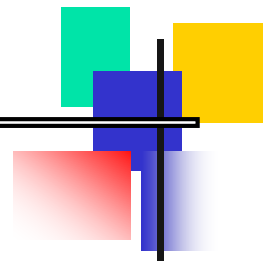
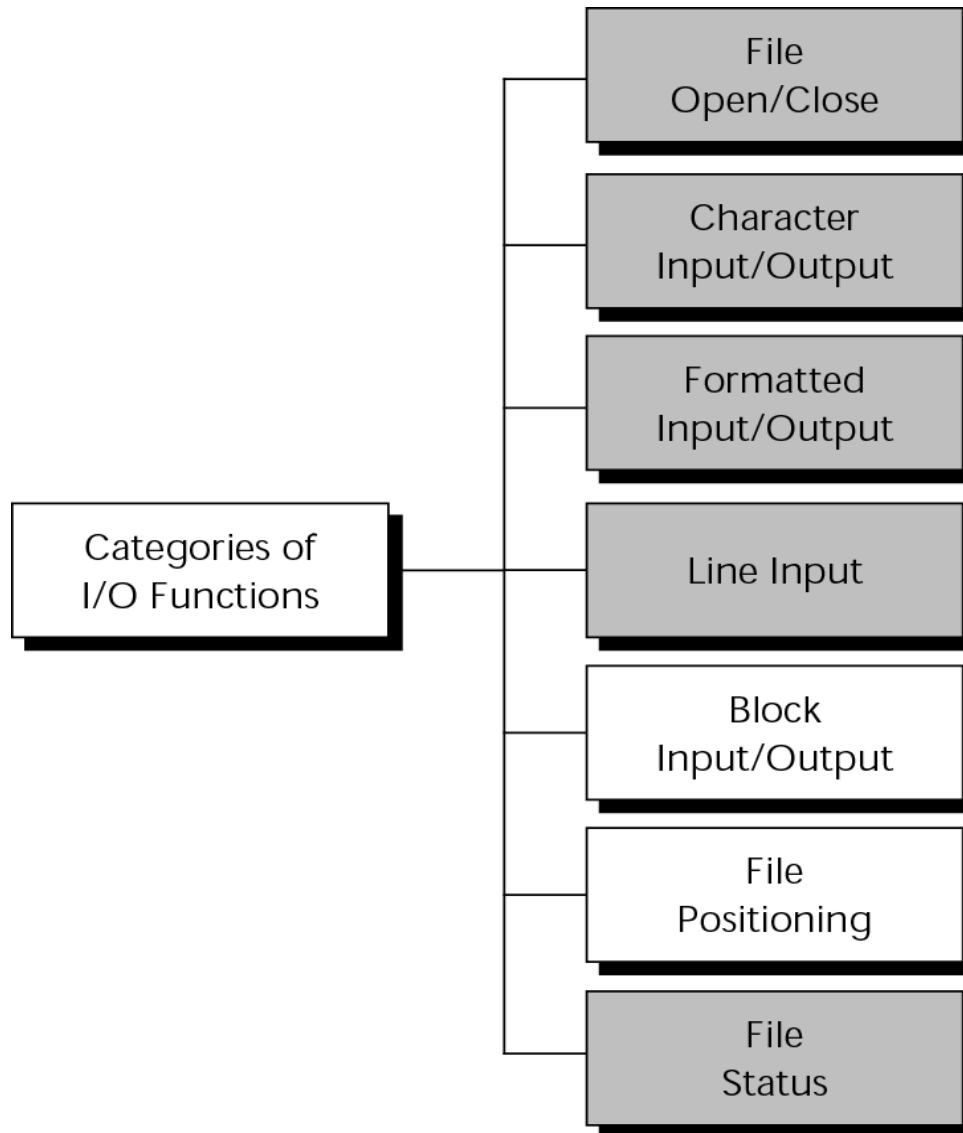
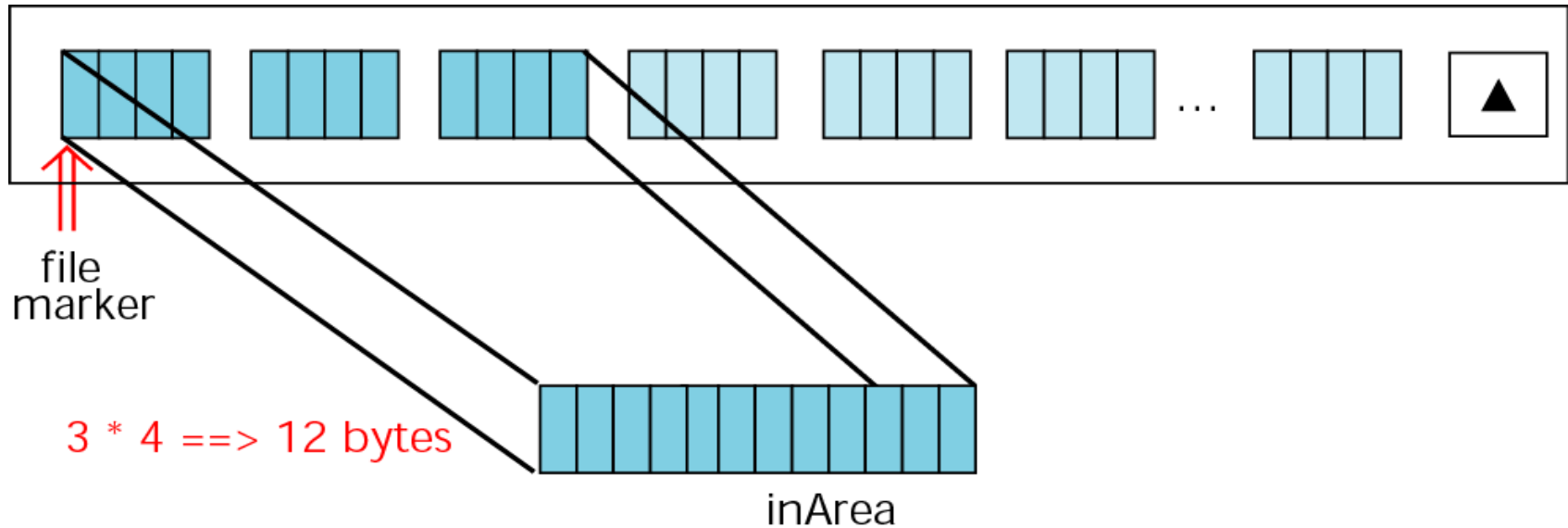
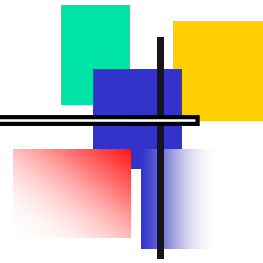


Figure 16-8 read operation



`read ((char *) inArea, 3 * sizeof (int)) ;`



Figure 16-9

Reading a structure

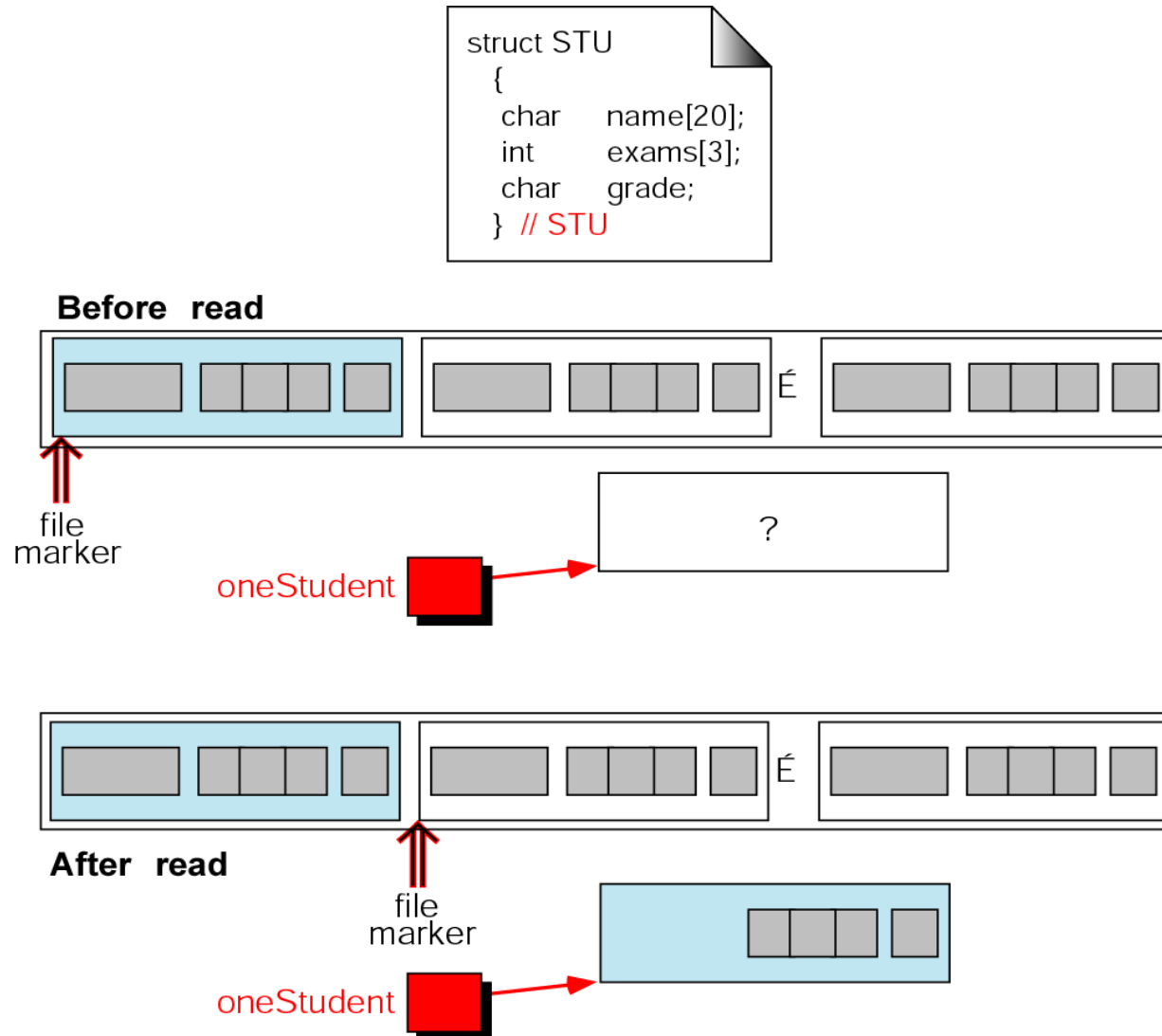
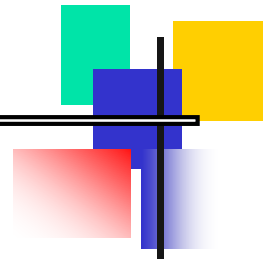
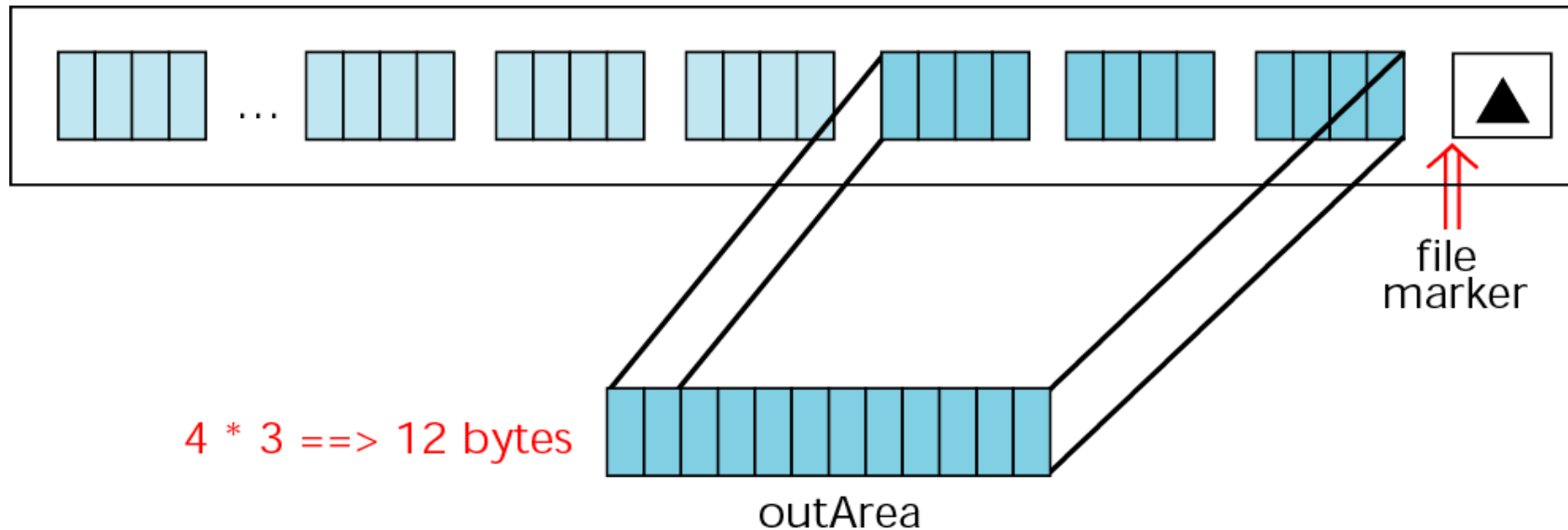
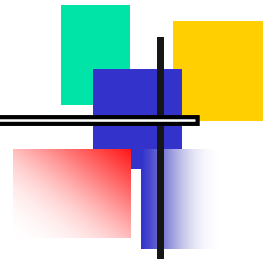


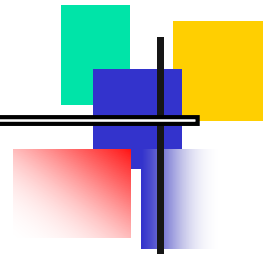
Figure 16-10 write operation



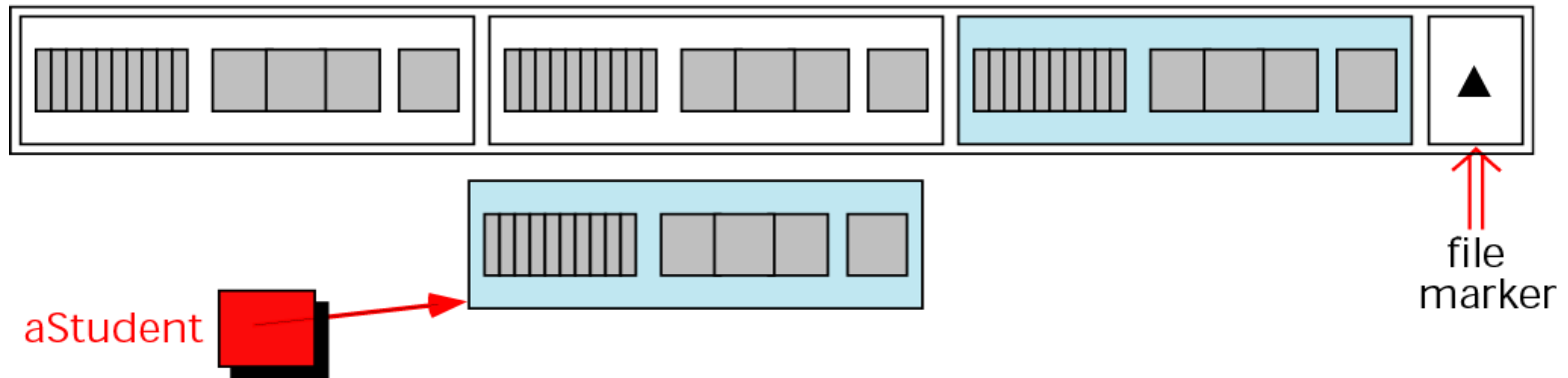
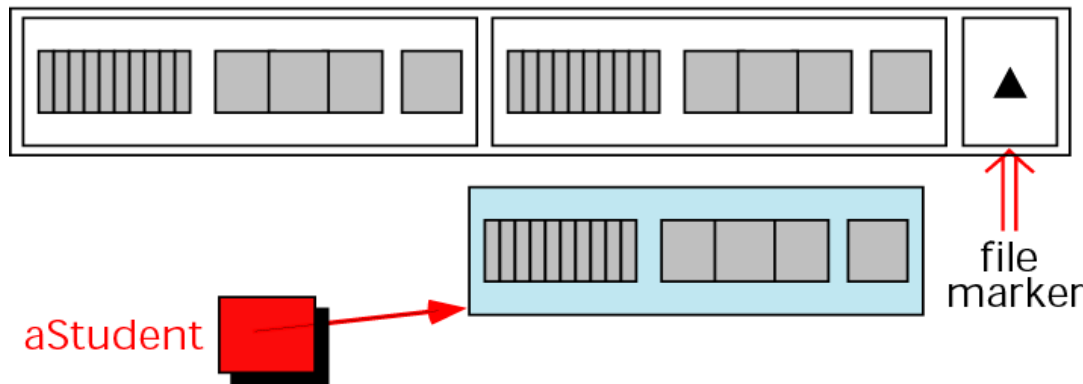
```
fsOut.write ( (char *) outArea, 3 * sizeof (int)) ;
```



Figure 16-11 Writing a structure



Before write



After write

Figure 16-12 tell operation

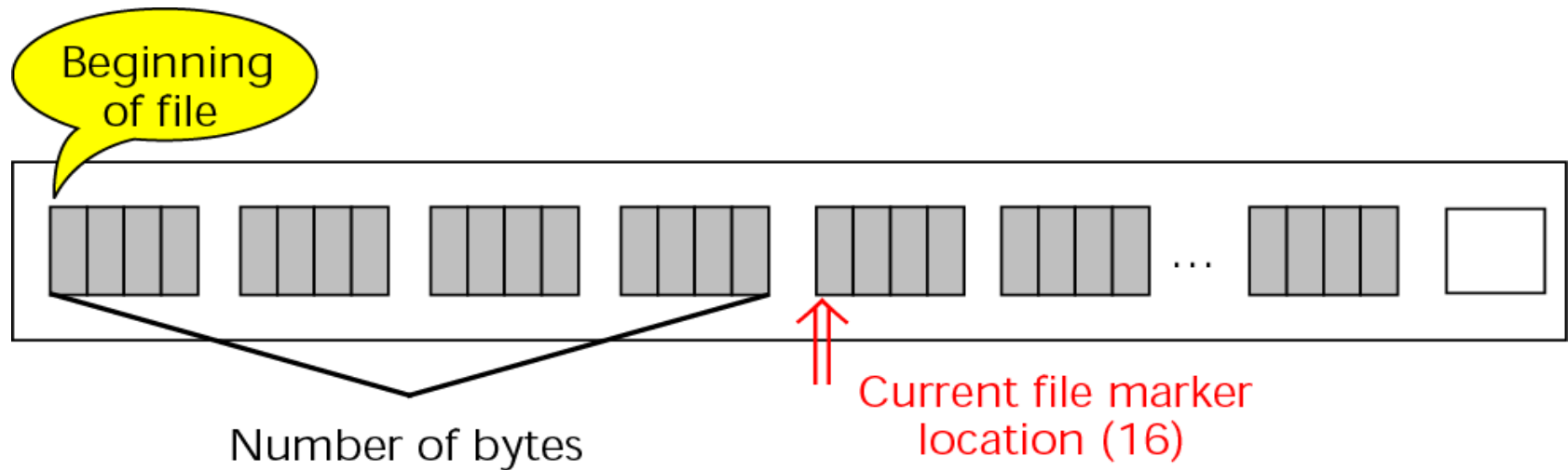
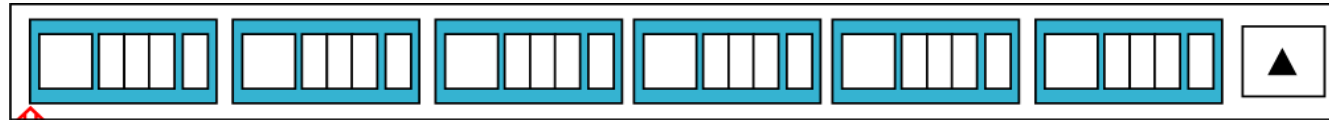
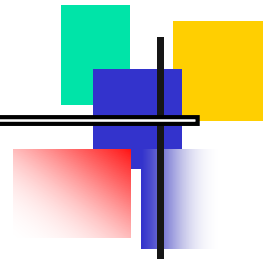
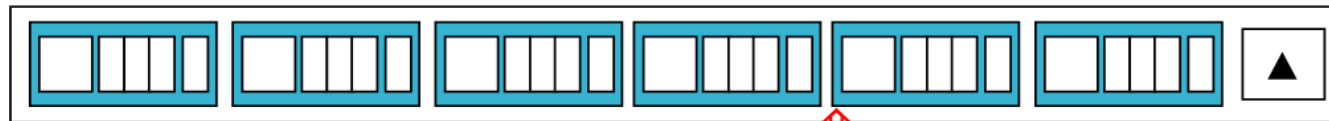


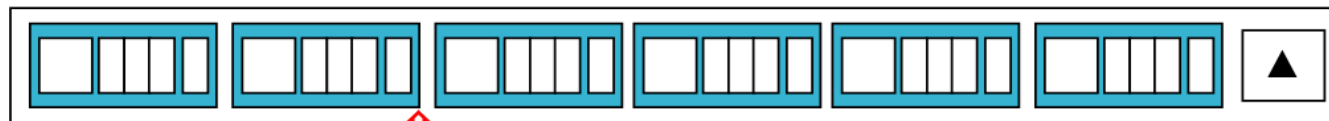
Figure 16-13 seek operation



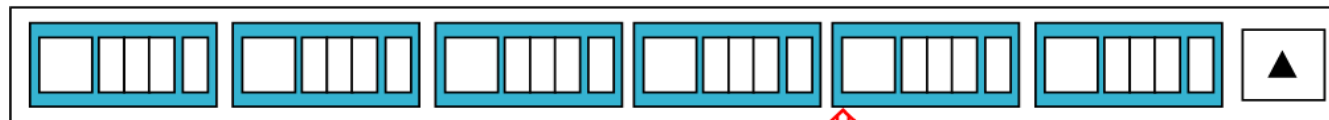
`fsFileName.open (...)`



`fsFileName.seekg (4 * sizeof (STRUCTURE_TYPE), ios::beg) ;`



`fsFileName.seekg (-4 * sizeof (STRUCTURE_TYPE), ios::end) ;`



`fsFileName.seekg (2 * sizeof (STRUCTURE_TYPE), ios::cur) ;`

CONVERTING FILE TYPES

Figure 16-14 Create binary file structure chart

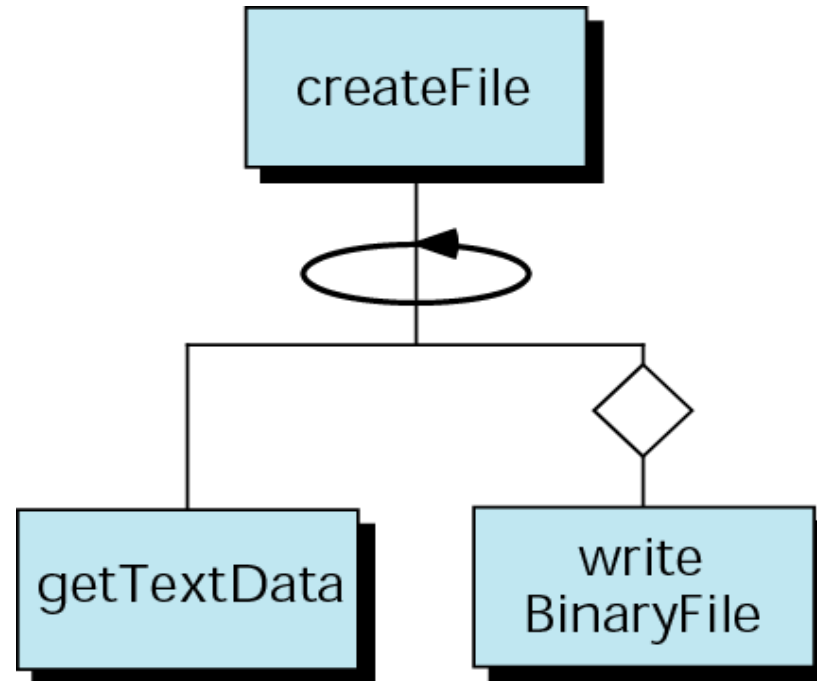
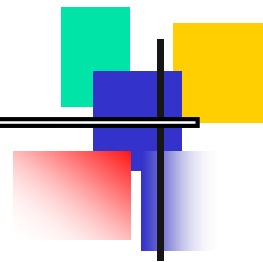
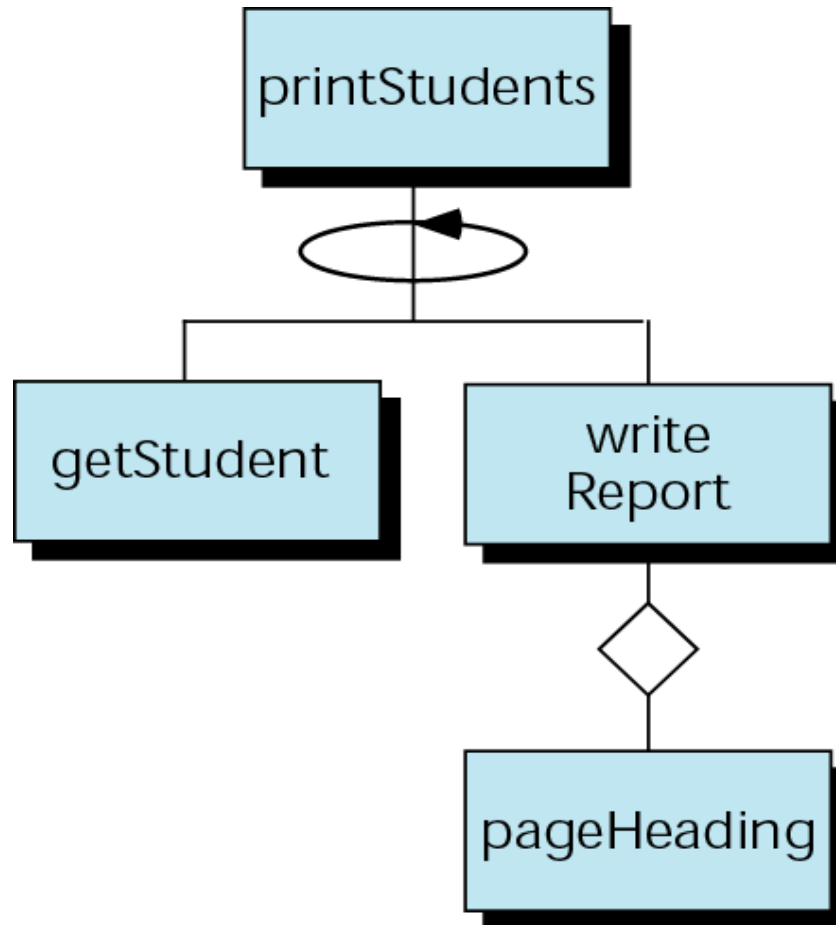
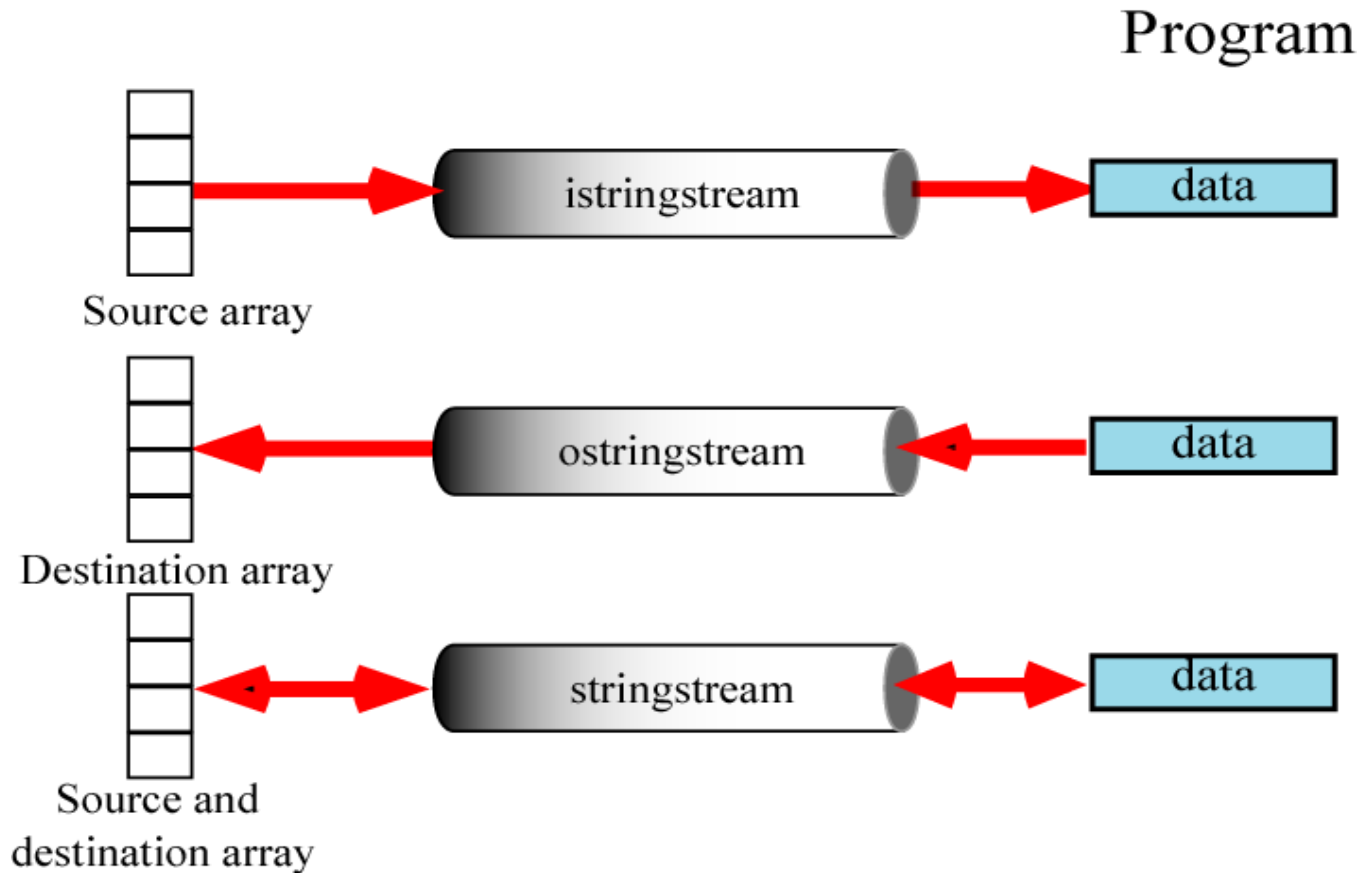


Figure 16-15 Design for print student data



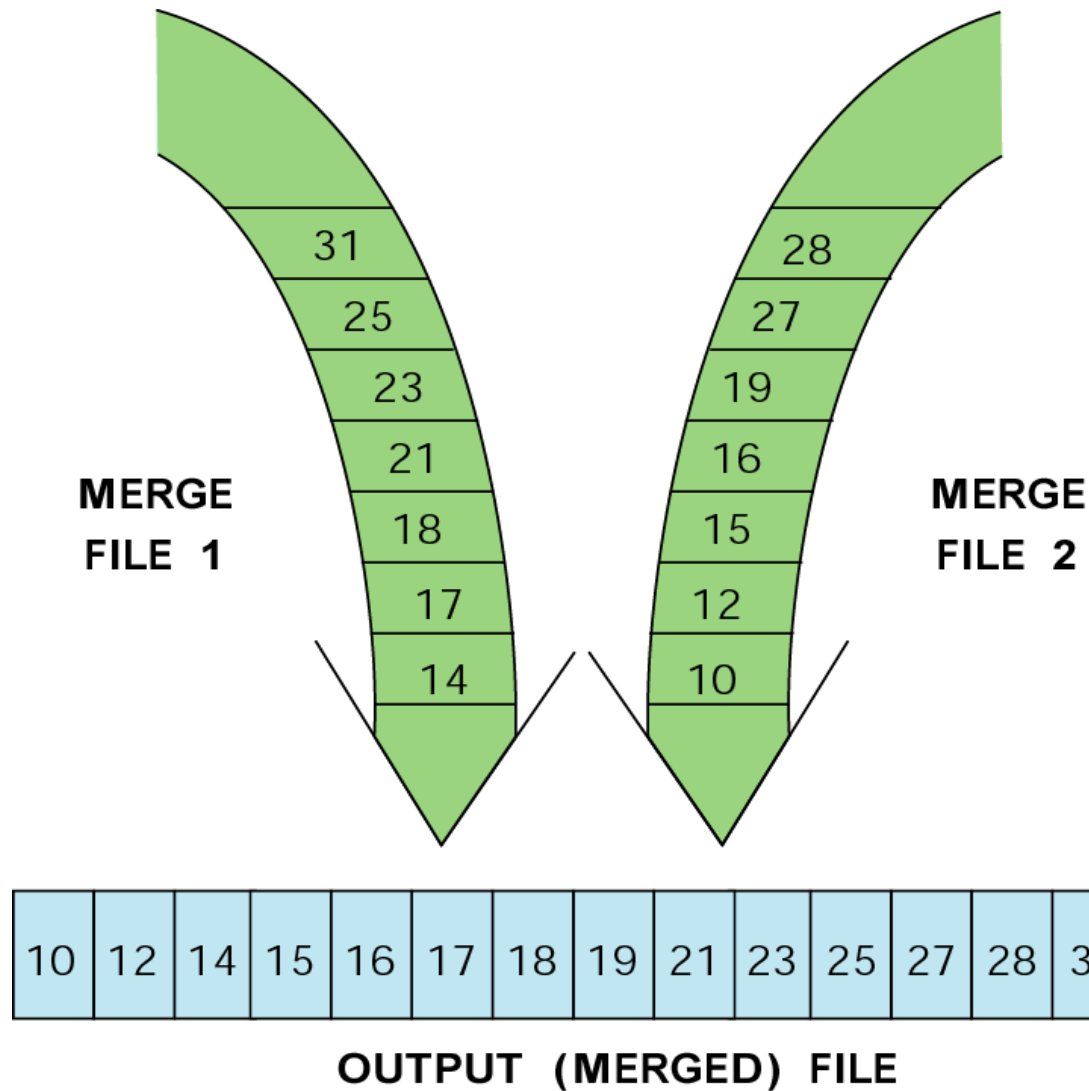
STRING STREAMS

Figure 16-16 Stringstream objects



FILE PROGRAM EXAMPLES

Figure 16-17 File merge concept



SOFTWARE ENGINEERING AND PROGRAMMING STYLE



Figure 16-18 Sequential file update environment

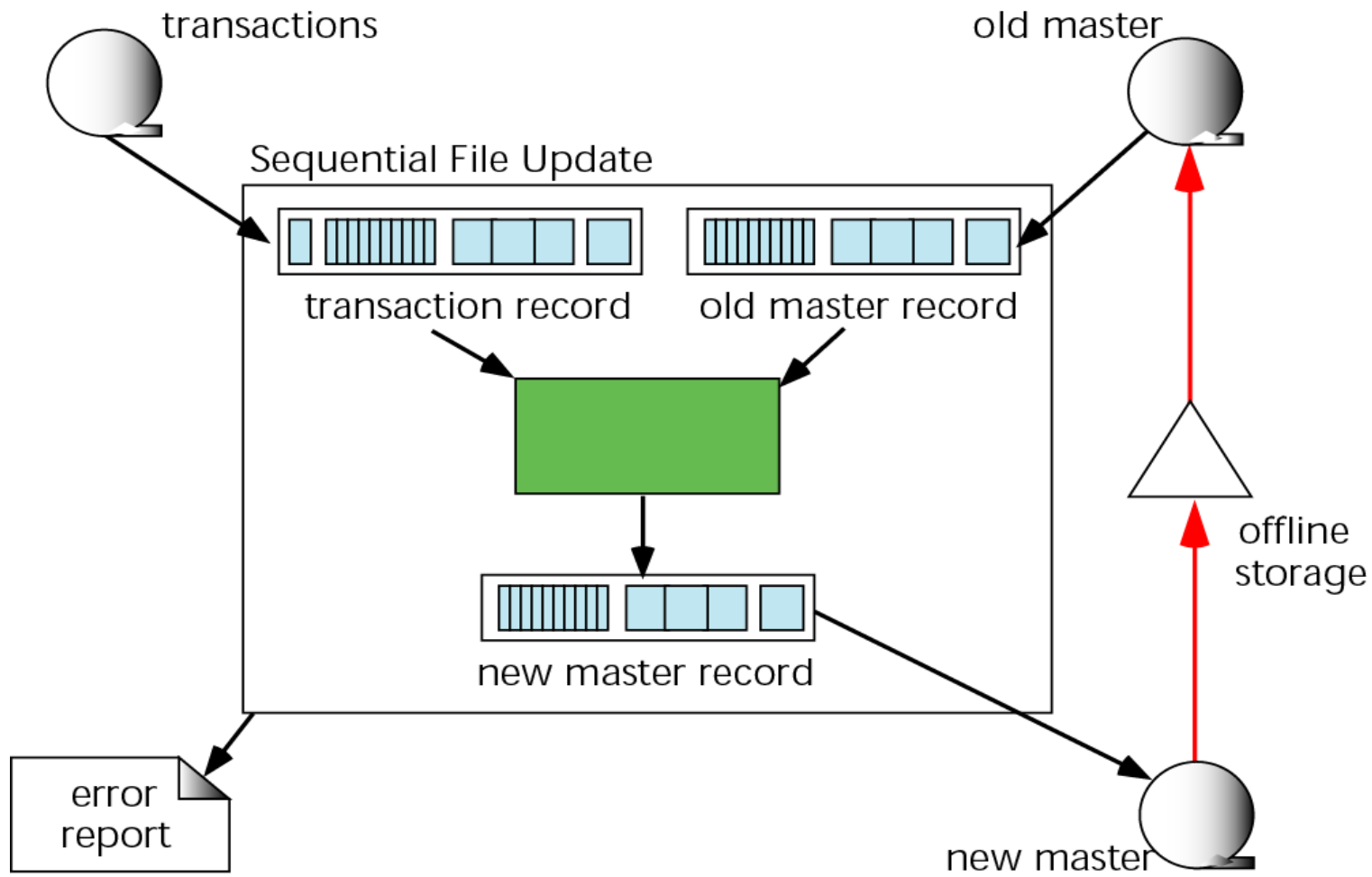
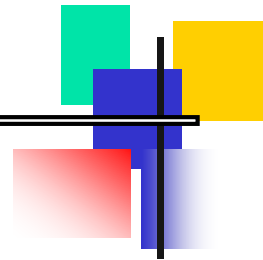


Figure 16-19 File updating example

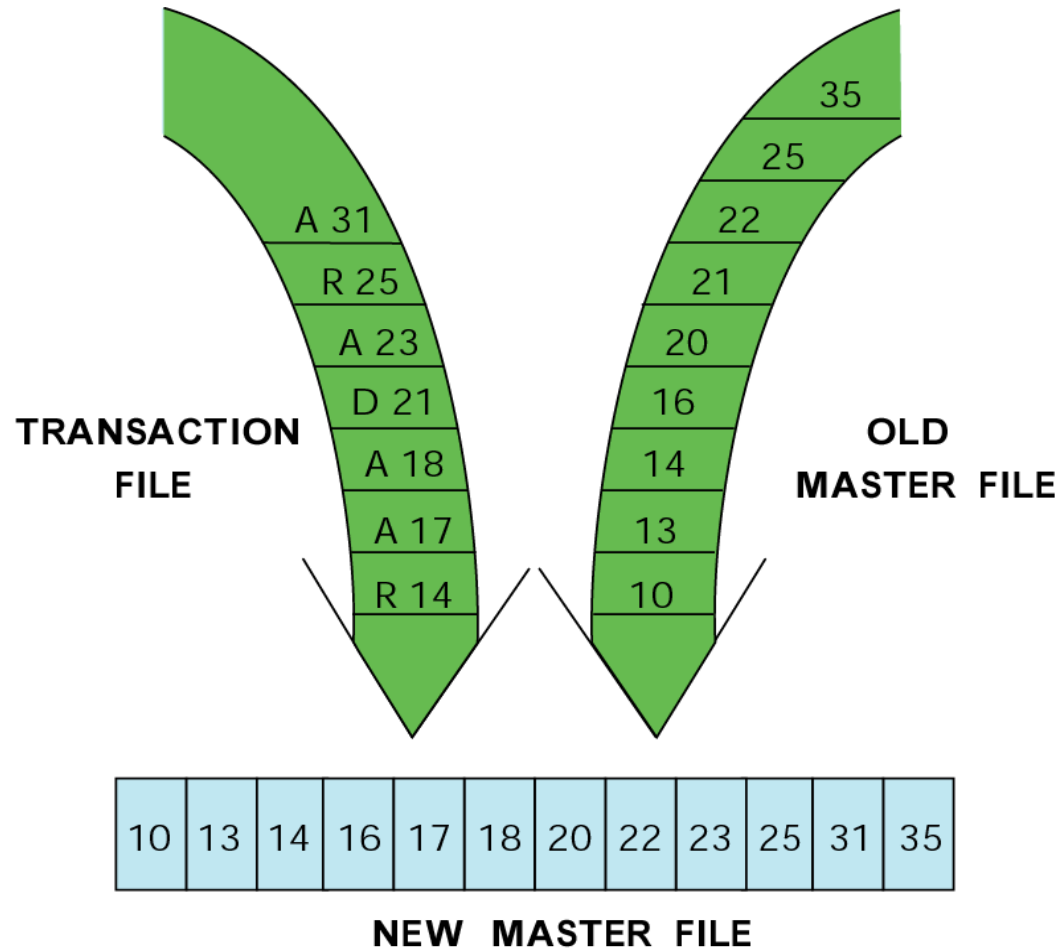


Figure 16-20 Update structure chart

