CST209

Object-oriented Programming C++

(Week 14)

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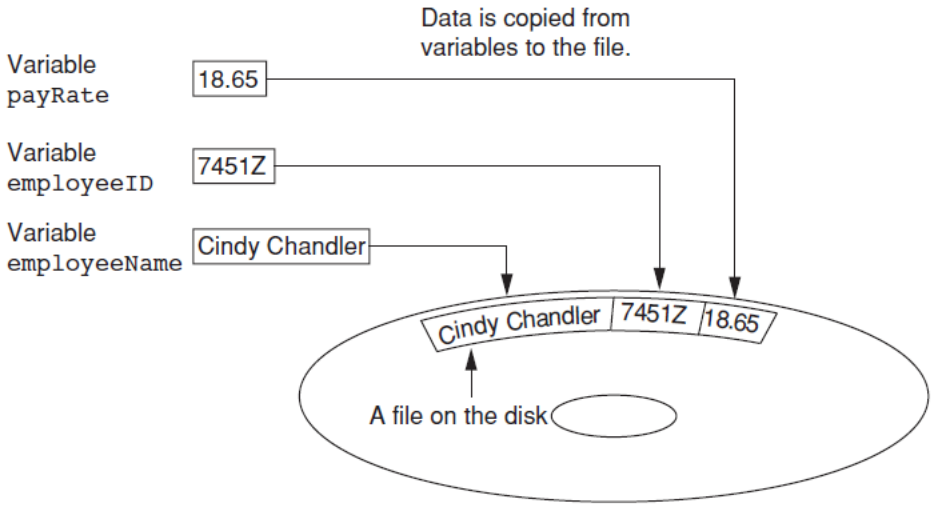
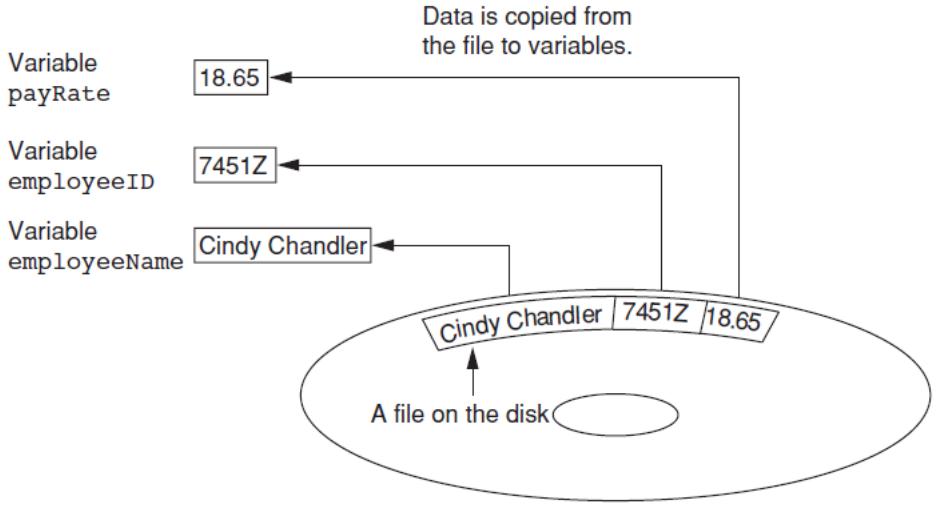
Content

- File Handling

Using Files for Data Storage

- When a program needs to save data for later use, it writes the data in a file.
- The data can then be read from the file at a later time.





Using Files for Data Storage

- When a file is used by a program, three steps must be taken.
  a. Open the file— Opening a file creates a connection between the file and the program.

  b. Process the file— Data is either written to the file (if it is an output file) or read from the file (if it is an input file).

  c. Close the file— After the program is finished using the file, the file must be closed. Closing a file disconnects the file from the program.

Setting Up a Program for File Input/Output

- Just as cin and cout require the iostream file to be included in the program, C++ file access requires another header file.

- The file fstream contains all the declarations necessary for file operations.

- It is included with the following statement:

```
#include <fstream>
```

Setting Up a Program for File Input/Output

File Stream Data Type	Description
`ofstream`	Output file stream. You create an object of this data type when you want to create a file and write data to it.
`ifstream`	Input file stream. You create an object of this data type when you want to open an existing file and read data from it.
`fstream`	File stream. Objects of this data type can be used to open files for reading, writing, or both.

In-class Practice: Example_1, Example_2

Write Data to a File

- You already know how to use the stream insertion operator (<<) with the cout object to write data to the screen.

- It can also be used with ofstream objects to write data to a file.

In-class Practice: Example_1, Example_2

Exercise 1

Write a program that read three person's name and output it to a file named "Persons.txt".

Read Data from a File

- The >> operator not only reads user input from the cin object, but also data from a file.

- Assuming input File is an if stream object, the following statement shows the >> operator reading data from the file into the variable name:

```
inputFile >> name;
```

In-class Practice: Example_3

Using Loops to Process Files

- Although some programs use files to store only small amounts of data, files are typically used to hold large collections of data.

- When a program uses a file to write or read a large amount of data, a loop is typically involved.

In-class Practice: Example 4, 5

Exercise 3

Write a program to read a series of number from a text file and calculate the average of the numbers.

Testing for File Open Errors

- Under certain circumstances, the open member function will not work.
- There is a way to determine whether the open member function successfully opened the file.
- After you call the open member function, you can test the file stream object as if it were a Boolean expression.

In-class Practice: Example 6

Exercise 4

Extend your code from Exercise 3 by adding a file testing feature. If a file doesn’t exist, the program should display an error message.

See you next class