Lab 4

Containers

In this workshop, you code a container class that holds notifications and a class that holds separate messages.

**LEARNING OUTCOMES**

Upon successful completion of this workshop, you will have demonstrated the abilities to

* design and code a composition of objects
* read records from a file into a **string** object
* parse a string object into components based on simple rules

**SPECIFICATIONS**

Overview

This workshop retrieves messages from a data file and collects them in a notification.  Each record in the data file contains a single message and ends with the same delimiting character.

The test data file (w4\_test.dat) contains the following and should be passed into your program on the command line:

jim Workshop 5 is cool

harry @jim working on workshop 5 now

chris

dave what the ^#$%!

john @harry I'm done

The first message consists of a user name followed by a tweet.  The second message consists of a user name, a reply name prefaced by an **@**, and followed by a tweet.  Your solution ignores incomplete messages, such as the third message here.

Solution

Your complete solution to this workshop consists of two modules:

* **Notifications** - the module that holds and manages messages
* **Message** - the module that manages the retrieval and display of a single message

The classes for this workshop are defined in the **w5** namespace.

Notifications Module

A **Notifications** object manages access to a set of 10 **Message** objects through a 1D array of pointers (**Message**\* messages[10]).  The **Notifications** object collects ***copies*** of the **Message** objects, owns those copies and destroys them once they are no longer needed.

Your design of the **Notifications** class includes the following member functions:

* **Notifications()** - default constructor - empty
* **Notifications(const Notifications&)** - copy constructor
* **Notifications& operator=(const Notifications&)** - copy assignment operator
* **Notifications(Notifications&&)** - move constructor
* **Notifications& operator=(Notifications&&)** - move assignment operator
* **~Notifications()** - destructor
* **void operator+=(const Message& msg)** - adds **msg** to the set
* **void display(std::ostream& os) const** - inserts the **Message** objects to the **os** output stream

Store the code for your **Notifications** module in two source files:

* **Notifications.h** - defines the **Notifications** class
* **Notifications.cpp** - implements the member functions for the **Notifications** class

Message Module

A **Message** object holds nothing or a single message that has been successfully retrieved from an **std::ifstream** file object and parsed into **user**, **reply** and **tweet std::string** variables.  An object that holds nothing is in a safe empty state.

Your design of the **Message** class includes the following member functions:

* **Message(std::ifstream& in, char c)** - constructor retrieves a record from the **in** file object, parses the record (as described above) and stores its components in the **Message** object.  **c** is the character that delimits each record
* **bool empty() const** - returns true if the object is in a safe empty state
* **void display(std::ostream&) const** - displays the **Message** objects within the container

Store the code for your **Message** module in two source files:

* **Message.h** - defines the **Message** class
* **Message.cpp** - implements the member functions for the class.

Output

The results generated by the application using your solution and the test data file are listed below:

Message

User : jim

Tweet : Workshop 5 is cool

Message

User : harry

Reply : jim

Tweet : working on workshop 5 now

Message

User : dave

Tweet : what the ^#$%!

Message

User : john

Reply : harry

Tweet : I'm done