Lab2 Introduction to Classes and Objects

Objectivities
1. How to define a class and use it to create an object
2. How to define member functions in a class to implement the class’s behaviors.
3. How to declare data members in a class to implement the class’s attributes.
4. How to call a member function of an object to make that member function perform its task.
5. The differences between data members of a class and local variables of a function.
6. How to use a constructor to ensure that an object’s data is initialized when the object is created.
7. How to engineer a class to separate its interface from its implementation and encourage reuse.

Experiments
- Ex1(p.99–3.11)

Description of the Problem
Modify class GradeBook (Figs. 3.11 and Figs. 3.12). Include a second string data member that represents the name of the course’s instructor. Provide a set function to change the instructor’s name and a get function to retrieve it. Modify the constructor to specify two parameters—one for the course name and one for the instructor’s name. Modify member function displayMessage such that it first outputs the welcome message and course name, then outputs "This course is presented by: " followed by the instructor’s name. Modify the test application to demonstrate the class’s new capabilities.

Sample Output
Welcome to the grade book for
CS101 Introduction to C++ Programming!
This course is presented by: Sam Smith
Changing instructor name to Judy Jones
Welcome to the grade book for
CS101 Introduction to C++ Programming!
This course is presented by: Judy Jones

Problem-Solving Tips
1. In class GradeBook, declare a string data member to represent the instructor’s name.
2. Declare a public set function for the instructor’s name that does not return a value and takes a string as a parameter. In the body of the set function, assign the parameter’s value to the data member that represents the instructor’s name.
3. Declare a public get function that returns a string and takes no parameters. This member function should return the instructor’s name.
4. Modify the constructor to take two string parameters. Assign the parameter that represents the instructor’s name to the appropriate data member.
5. Add a cout statement to member function displayMessage to output the value of the data member you declared earlier.
6. Be sure to follow the spacing and indentation conventions mentioned in the text.
7. If you have any questions as you proceed, ask your lab instructor for help.
Ex2(p.100–3.14)

(Employee Class) Create a class called Employee that includes three pieces of information as data members—a first name (type string), a last name (type string) and a monthly salary (type int).

[Note: In subsequent chapters, we’ll use numbers that contain decimal points (e.g., 2.75)—called floating-point values—to represent dollar amounts.] Your class should have a constructor that initializes the three data members. Provide a set and a get function for each data member. If the monthly salary is not positive, set it to 0. Write a test program that demonstrates class Employee’s capabilities. Create two Employee objects and display each object’s yearly salary. Then give each Employee a 10 percent raise and display each Employee’s yearly salary again.

Sample Output

<table>
<thead>
<tr>
<th>Employee 1: Bob Jones; Yearly Salary: 34500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee 2: Susan Baker; Yearly Salary: 37800</td>
</tr>
<tr>
<td>Increasing employee salaries by 10%</td>
</tr>
<tr>
<td>Employee 1: Bob Jones; Yearly Salary: 37944</td>
</tr>
<tr>
<td>Employee 2: Susan Baker; Yearly Salary: 41580</td>
</tr>
</tbody>
</table>

Problem-Solving Tips

1. Class Employee should declare three data members.

2. The constructor must declare three parameters, one for each data member. The value for the salary should be validated to ensure it is not negative.

3. Declare a public set and get functions for each data member. The set functions should not return values and should each specify a parameter of a type that matches the corresponding data member (string for first name and last name, int for the salary). The get functions should receive no parameters and should specify a return type that matches the corresponding data member.

4. When you call the constructor from the main function, you must pass it three arguments that match the parameters declared by the constructor.

5. Giving each employee a raise will require a call to the get function for the salary to obtain the current salary and a call to the set function for the salary to specify the new salary.

6. Be sure to follow the spacing and indentation conventions mentioned in the text.

7. If you have any questions as you proceed, ask your lab instructor for help.