

INFSCI 0020 Program Design and Software Tools

Homework 4

Due June 25, Friday Midnight

Program 1

(50 Points + Extra credit)

In this example, you will implement the `SavingsAccount` class as described in exercise 7.8 (read carefully). Note the following:

- `annualInterestRate` is a *static* variable
- `modifyInterestRate` member function has to be *static* –it is supposed to modify a *static* variable.
- You have to also include a function to print out the balances. To print out the balances, you might want to use some stream manipulators. You may want to read on how to use `fixed`, `setprecision` and `setw` that are used in several examples. They are further described in
- Make your constructor such that if you enter invalid initial amount then it sets the value of `savingBalance` to 0;

Use the driver program provided to test your implementation first. Then change the driver program as follows:

- Ask the user to input the new balance for a new `savingsAccount` object
- Ask the user to update the current interest rate.
- Print out the balances as the provided client program did.

For Extra Credit (upto 20):

You will receive some bonus points for making any component of the implementation better. Some of the things you can try include but does not exclude:

- Better interactive menus
- Counting the number of existing savings accounts
- Providing features for printing out balances of any particular account
- Providing special interest rates to individual accounts

You will need to think creatively. These may involve augmenting your class definitions by introducing new member functions and variables.

Program 2

(50 Points + Extra credit)

In this assignment, you will implement the member function of class `IntegerSet` as described in Exercise 7.9 – read carefully exercise 7.9 (page 545). You are given both the class definition and the driver client program. In file `integerSet.cpp`, insert the code as described in the

comments. The code to insert is quite simple but you will have to first understand the class and what each function is supposed to do. So first get the overall picture.

For Extra Credit (upto 20):

Augment the class with member variables and/or functions for the following features:

- To test if a set is a subset of another. For example, if a is a set $\{1, 3, 6\}$ and b is a set $\{1, 3, 6, 8\}$ then a is a subset of b ; **(5 Points)**
- Class variable(s) (static variable) to indicate how many sets currently exist that have more than 10 elements, 20 elements, 30 elements, ... , 80 elements and 90 elements. **(5 Points)**
- To allow users to also specify the range of elements in the set – note that currently the elements should be between 0 and 100. Each set would then also include the information as to what the minimum and maximum values are that can be in the set. For example, one set may allow elements between -8 and 5 – eg. $\{-2, 3, 5\}$. You may need to add new members and modify existing members **(10 Points)**