

1 Classes and Data Abstraction V, Programming Challenges II

Create a class **Date**, which has attributes **month**, **day** and **year**. It has *set* and *get* functions for **month**, **day** and **year**. It has the member function **isLeapYear** that tests whether the year is leap or not. It has the member function **monthDays** that returns the maximum day of the current month. It has default values 1 for **day**, 1 for **month** and 1900 for **year**. The set functions should verify that the value of the **month** is between 1 and 12, the value of the **day** is between 1 and the maximum day of the current month, the value of the **year** is between 1900 and 2010.

Hints:

- To be able to use *get* functions of the **birthDate** and **regDate** objects in the next step, they must be defined as **const** methods.

Create a class **Student**, which has attributes **firstName**, **lastName**, **number**, **birthDate**, **regDate** and **count**. The types and contents of data members should be as follows:

```
char *firstName;           // first name of the student
char *lastName;           // last name of the student
double number;            // id number of the student
const Date birthDate;     // birth date of the student
const Date regDate;       // registration date of the student
static int count          // number of objects instantiated
```

When a new object of the class **Student** is created the value of the **count** must be incremented by 1 and when an object of the class **Student** is terminated the value of the **count** must be decremented by 1. It has *set* and *get* functions for **firstName**, **lastName** and **number**. It has *get* function for **count**. It has the member function **print** for listing the information of a student in the following format:

```
200220020      lastName, firstName
Registration date: 12/12/2002      Birth date: 12/12/2002
```

Hints:

- You will use dynamic memory allocation for the data members **firstName** and **lastName**.
- The const object data members **birthDate** and **regDate** must be initialized in the member initializer part of the constructor.

Questions:

1. If we define the **print** function of the **Student** class as a **friend** function, what are the changes in the class definition and function definition?