CS 304 Homework Assignment 1

Due: 11:59pm, Thursday, September 8th

This assignment is scored out of 65. It consists of 6 questions. When you submit, you are required to create a folder with your name (Last name first, then First name), CS304, HW1, e.g., LastName_FirstName_CS304_HW1. Type your answers into a text file (**only `.txt`, `.doc`, and `.pdf` file formats are accepted**) and save it in this folder. Put all your Java programs (`*.java`) as well as output files in the same folder. Zip this folder, and submit it as one file to Desire2Learn. Do not hand in any printouts. Triple check your assignment before you submit. **If you submit multiple times, only your latest version will be graded and its timestamp will be used to determine whether a late penalty should be applied.**

Short Answers

P1. (7pts, 1pt each) Q28 on page 57

P2. (4pts) Q40 on page 59

P3. (3pts) Q42 on page 59-60

P4. (5pts) Q48 on page 61

P5. (6pts, 2pts each) Multiple choices

(1) Inheritance is
- A. an organizational mechanism
- B. a reuse mechanism
- C. a means to create a new class from an existing class
- D. a way to define an “is-a” hierarchy of classes
- E. all of the above

(2) Which of the following represents “quadratic” time?
- A. $3n+5n^2+1$
- B. $n\log n+2n+n^3$
- C. n^9+n^5+1
- D. 2^n+n^2+5
- E. $10n+100$

(3) Objects can represent both
- A. space and time efficiency
- B. variables and constants
- C. information and behavior
- D. classes and inheritance
- E. methods and constructors

Programming Questions

P6. (40pts) Read Q29 on page 57. You are provided with a **`Date`** class and an incomplete **`IncDate`** class. The **`IncDate`** class inherits from the **`Date`** class and it is supposed to increment a date. This task is done by first creating an object of the **`IncDate`** class in the test driver with an initial date and then calling the **`increment()`** method on this object. For example, if the current **`IncDate`** object, say **`myDate`**, contains the date 1/31/2016, then after the **`increment()`** method is called on **`myDate`**, the date in it would be 2/1/2016. This is not a simple addition because you need to take care of different months as well as leap years.

a. Completing the `IncDate` class

Your task is to implement the **`increment()`** method in the **`IncDate`** class so that calling this method would increment the date contained in the current object. **Note that you are only supposed to touch this method. You are NOT allowed to create any other methods, instance variables, or make any changes to methods other than `increment()` or files other than "`IncDate.java`". Points will be taken off if you fail to follow this rule.**

b. Code Testing

You are provided with a test driver implemented by "**`TestIncDate.java`**" (**Do not make any changes to this file!**) so there is no need to write your own. You are also given a data file "**`testDates.dat`**" that contains 35 test dates. **This is a binary file and you will not be able to view its content using a text editor. We have not covered how to read and write this type of files so do not worry if you have no idea how it works. We will introduce the topic later this semester.**

Depending on your programming environment, the data file might need to be placed in different folders so that you test driver can read it. For jGRASP, you can leave the data file in the same folder as your java files. For NetBeans, you should place it in your project folder in which you see directories like **`build`**, **`nbproject`**, and **`src`**, etc.

Once you have completed the **`increment()`** method, you can run the test. You should create a plain text file named "**`output.txt`**", copy and paste the output (if your code crashes or does not compile, copy and paste the error messages) to this file and save it.

Grading Rubrics:

Code does not compile: -10
Code compiles but crashes when executed: -5
Changes were made to things other than the **`increment`** method: -5
Has output file: 5
Code passes 35 test cases: 35 (each test case worth 1 point)

Sample Output:

```
The current date is 1/30/2004
The correct next day is 1/31/2004 and the one calculated by your
program is 1/31/2004.
Correct!

The current date is 1/31/2004
The correct next day is 2/1/2004 and the one calculated by your
program is 2/1/2004.
Correct!

The current date is 1/30/2013
The correct next day is 1/31/2013 and the one calculated by your
program is 1/31/2013.
Correct!

...

The current date is 2/29/2000
The correct next day is 3/1/2000 and the one calculated by your
program is 3/1/2000.
Correct!

Total test cases: 35
Correct: 35
Wrong: 0
```