OBJECT ORIENTED PROGRAMMING

LABORATORIES 5 AND 6

OBJECTIVES

In these laboratory sessions, you will apply two of the most important OOP concepts: inheritance and polymorphism. You will design and implement some basic class hierarchies, use virtual methods and polymorphic containers.

PROPOSED PROBLEM

In your spare time you decided to work as a freelance tutor to help other computer science students master the concepts that you know so well. As you are pretty good at this, you started to have a lot of requests and you decided to write a C++ application to help you manage all the requests that you get.

Each request has (at least) an id, a due date, a price, a subject and a status. You normally give two types of lessons: online lessons (where you explain a concept to a student) and homework help (where you give feedback or perform code review for a student).

1. Discuss and create a class hierarchy for storing the tutoring requests. You should have at least a base class *Request,* with two subclasses *OnlineSession* and *OfflineSession*. The *OnlineSession* should also have an *url* for the meeting and the duration of the meeting. The *OfflineSession* should have an *url* with the deliverable of that session. Think about the class members and methods that should be in the base class, and what new members and methods should each subclass have.

2. In computing, *logging* refers to the process of recording every event that occurs in an operating system or a program in general; usually all these data are written into a file (*log file).* Design an interface for a generic *Logger* class and then create two subclasses: one subclass should display the logs on the screen and another one should write the logs to a file. Use different logging formats for these two classes.

3. Create a *polymorphic* container to store all of the tutoring requests that you performed. You can reuse the *DynamicArray* class that you wrote in *Laboratory 4*.

4. Create a menu-based application that will help the user interact with the application. The application should allow (at least) the following operations:
    a. Add/remove a lesson.
    b. Change the status of a lesson.
    c. Display all the tasks; display all the tasks from a given time frame. Optionally, you can choose to display the tasks with different colors based on their status. https://docs.microsoft.com/en-us/windows/console/setconsoletextattribute
    d. Compute the amount of money you earned in a given time frame.

5. Use these classes you wrote at exercise 2 to log all the operations the user performs.