



Object Oriented Modeling and Design 4th Assignment

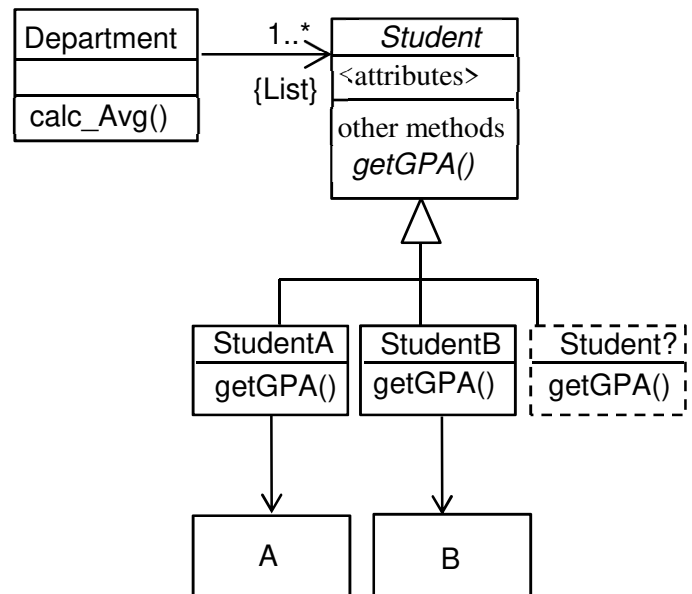
We design a student administration software system for a university. In this university, grade point averages (GPA) of different students will be calculated using some existing **external systems**. For example, the GPA of the students that have entered the university before 2000 are calculated over 100 using the external program A. On the other hand, the GPAs of the students after 2000 can vary between 0-4 and they are calculated using the external program B.

The method `calc_Avg()` in the `Department` class starts the calculation of the GPAs of all students in the department.

In the future, a new external program C for GPA calculation (for example between 0-5) can be added to the system, an existing program can be removed or replaced.

Instead of using an external program, the algorithm for GPA calculation can be inserted into the new system.

The regulation of the university may change and the algorithm for the GPA calculation of an existing student may also change.



The software architect decides to use inheritance and constructs the given design. The `Department` maintains a list of students. At the end of each semester the GPAs of all students in this list are calculated by calling the `calc_Avg()` method.

- What are the possible drawbacks of the given design? List and explain them shortly.
- To overcome these problems construct a better design and draw the UML class diagram. Mention all the design patterns used in your solution.

SUBMISSION:

- Prepare your solution as a file(s) only **in pdf format**. If you create more than one files, combine them into a zip file.
- Upload the file (pdf, zip) to Ninova until **23.00 on 29 April 2018, Sunday**. Late submitted assignments are not accepted.
- Cheating** will not be tolerated. If cheating is discovered, all responsible students will be subject to the University disciplinary proceedings.

It is allowed to discuss how to solve a problem with your classmates; however, **this assignment is not group homework. The actual solution should be an independent effort.**