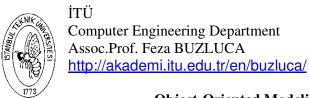
İTÜ 8.05.2024



Object-Oriented Modeling and Design 4th Assignment Design with GoF 2

Problem:

We will design a part of the **company's payroll system**.

Requirements:

- The company has different types of employees, i.e., workers and researchers.
- The salaries of employees are calculated differently depending on their types. For example, the monthly salary of a worker is calculated by multiplying the hourly wage of that worker by the total number of hours worked in the month.

 The monthly salary of a researcher is calculated based on their active projects. For example, it is 30000TL for one project, 50000 for two projects, and 65000TL for three or more projects.
- A company can have departments that have employees and other sub-departments.
- Depending on certain conditions, a class Accounting sometimes gets the *total* monthly salaries of all company employees and sometimes the *maximum* or *minimum* salaries.
- A new employee type may be added to the system in the future with a different method for calculating the monthly salary. For example, the *managers* can have a fixed base salary plus a promotion based on the profit.
- In the future, the class Accounting may need the *average* of all salaries in the company.

To Do:

- a) **Design the system** using GoF software design patterns to achieve the required flexibility and draw **the UML class diagram**. Show all necessary members of the classes and the parameters of the methods. Mention the GoF design patterns used in your solution. For this part, create a file class diagram.pdf.
- b) Write the program oomd2324h4.cpp based on your design using the C++ programming language.
 - Your program may contain two employee types, i.e., Worker and Researcher.
 - You can initialize objects using the necessary data for salary calculation. Examples:

```
// Worker object: hourly wage = 200TL, total of worked hours = 160
Worker worker1{200, 160};
```

```
// Researcher object: the number of active projects = 2
Researcher researcher1{2};
```

- The getSalary methods of the classes can calculate and return the salaries of the related employees.
- You do not need to develop a factory class for this assignment. You may create required objects in your main function as hard-coded data.

• For testing, create the following structure:

Company:

```
worker1 hourly wage = 500TL, total of worked hours = 100
Department1:
  worker2, hourly wage = 200TL, total of worked hours = 160
  worker3, hourly wage = 300TL, total of worked hours = 160
  Department1.1: (Sub-department in the Department1)
    worker4, hourly wage = 100TL, worked hours = 120
    researcher1, the number of active projects = 2
    researcher2, the number of active projects = 3
```

- Perform the following operations in your main function:
 - o Create the given structure of the company.
 - o An Accounting object gets the total of salaries and prints it.
 - o The same Accounting object gets the average of the salaries of the employees in the company and prints it.

SUBMISSION:

- Upload the files class_diagram.pdf and oomd2324h4.cpp to Ninova by **Saturday**, **23:00 May 18**, **2024**.
- Late submitted assignments are not accepted. Do not send your solutions by e-mail. We will only accept files uploaded to the official Ninova e-learning system before the deadline. Do not risk leaving your submission to the last few minutes.
- **Cheating** will not be tolerated. Any cheating is 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.