

# Object Oriented Programming - Exercise 3

These exercises are a complement to lecture 3

**Solutions to this exercises should be shown on-line to the teaching assistant (either during the current pass or at the beginning of the next pass). These solutions are part of the examination of the course!**

In this exercise you will learn to use the *Model/View/ Controller* architecture and the *Observer pattern*.

One object the Model, holds the information in some data structure. The model has now visual appearance.

At list one view should be connected to the model, showing data.

Finally each view has a controller, an object that process user interaction.

Write a program that uses the behaviours described before and simulate a very simple student budget administration. The budget contain only: total income for a month and the outcomes for a month in 3 columns: rent and food, books, closed and entertainment.

The programme should contain two frames. One with column of text fields containing numbers ( budget view) and another that draw a bar graph showing the values of the numbers. When the users edits one of the numbers the graph should be redrawn.

Use the OBSERVER patterns. Store the data in the model. The model should be a StudentBudget object. The fields for the StudentsBudget should be: name, income, rentAndfood, books, entertainment and saves.

Attach the graph view as a listener. When a number is updated, the budget view should update the model and the model should tell the graph view that the change has occurred. As a result the graph view should repaint itself.