# Java Programming I: Exercise 11

*The deadline for submissions is one week after the exercise.*

The aim of this exercise is to learn how to bundle classes and interfaces into packages, and how to use classes that are in packages.

Source code of the lecture examples

- [UsageDemoPackage.zip](UsageDemoPackage.zip)

# [Core Set, Problem 1] Creating a Package

## (4 points)

Assume you have written some classes. You decide to put them into three packages, as listed in the following table. Furthermore, assume the classes are currently in the default package (they have no package statements).

**Table 1. Package Names and Class Names**

| Package Names | Class Names |
|---------------|-------------|
| mygame.server | Server |
| mygame.shared | Utilities |
| mygame.client | Client |

Write your answers to the following questions in the file *package.pdf*:

- Which line of code will you need to add to each source file to put each class in the right package?
- To adhere to the directory structure, you will need to create some subdirectories in the development directory and put source files in the correct subdirectories. What subdirectories must you create? Which subdirectory does each source file go in?
- Do you think you'll need to make any other changes to the source files to make them compile correctly? If so, what?

# [Advanced Set, Problem 2] Designing a Package to Calculate Fuel Consumption

## (8 points)

Please go back to the solution of the [Fuel Consumption Problem](Fuel Consumption Problem). Modify your solution as follows:

- Store *SimpleCar, AdvancedCar, DeluxeCar,* and *FuelConsumptionCalculation* classes in different files.
- Create the *fuelconsumption package* (the aforementioned classes should belong to this package).

- Compile the package.
- Create a new *BusTaxi* class. This class is a subclass of *DeluxeCar*. Characteristics of this class are presented in Table 1 and a sample of the statement submitted by the bus driver at the end of the day is in Table 2.
- Create a *TestPackage* class. In the main method of this class,
  - you should create two objects of *BusTaxi* class and one object of each other class: *SimpleCar*, *AdvancedCar*, and *DeluxeCar*;
  - your code has to calculate fuel consumption;
  - your application has to answer the question: How much fuel does the company save when applying new regulations on air conditioner usage?
- You should answer the following question: How does the *calculateFuelConsumption* method of the *FuelConsumptionCalculation* class know about the code of *float calculateFuelConsumptionOldRegulations()* and *float calculateFuelConsumptionNewRegulations()* of the *BusTaxi* class? The *FuelConsumptionCalculation* class belongs to the *fuelconsumption* package. This package and its byte code are created before the *BusTaxi* class in terms of time.

The file name for your answers is *Consumption.pdf*.

### Table 1. BusTaxi Class Characteristics

| Maker | Fuel economy (km/liter) | Air conditioner fuel economy (hour/liter) |
|---|---|---|
| Mercedes | 6.6 | 11.5 / min_number_passengers |

### Table 2. An example of the statement submitted by a bus driver

| Time to begin work | Time to finish work | Total number of kilometers traveled by a car | Total number of hours traveled with passengers | Minimum number of passengers during the day |
|---|---|---|---|---|
| 7 | 18 | 200 | 10 | 10 |