



Nordic Motorhome Project

Case description

Nordic Motorhome Rental is a Danish company that rents out motorhomes. Nordic Motorhome Rental was founded in 2019 and is situated just outside Copenhagen. So far there are 8 employees, however the company is very successful, and the two owners are expecting to hire more people in the near future.

Employees: 4 Sales assistants, 2 Cleaning staff, 1 Auto mechanic, 1 Bookkeeper

The Fleet

Nordic Motorhome Rental has a fleet of 32 motorhomes available for hire. Nordic Motorhome Rental currently offers 8 different types of motorhomes. These are of various brands and models. Some are small compact campers for 2 people and others are large with up to 6 beds.

Prices per day

The price per day for rent depends on the brand and model of the motorhome. Apart from the brand and model, the daily price also depends upon the season. There are 3 seasons: Peak season, Middle Season and Low season.

In the peak season, the prices for all motorhomes are 60 % higher than prices in the low season. In middle season, the prices for all motorhomes are 30 % higher than prices in the low season.

- The price per day includes 400 free kilometers per day.
- Insurance is included in the price.
- External cleaning is included in the price.

Pick-up and drop-off points

Nordic Motorhome Rental offers delivery of motorhomes to a location that is most convenient for the customers. It is often an airport, but it can be any other location for instance a ferry port or a hotel. For pick-up or drop-off outside Nordic Motorhome Rental's office, customers will be charged a transfer cost of 0,70€ per kilometer.

Extras

To make the trip more enjoyable customers can rent accessories such as a bike rack, bed linen, child seat, picnic table, chairs, etc.

Fuel & driven kilometers

When customers picks-up the motorhome, the tank is full. By drop-off, the staff checks the fuel level and reads kilometers of the speedometer. If the tank is less than ½ full, there will be a charge of 70€. If it turns out that the customer in average has driven more than 400 kilometers per day, the customer will be charged 1€ per extra kilometer.

Cancellation

In case of cancellation, following charges become due:

- Up to 50 days prior to the start of the term of rental: 20% of the rental price, minimum 200€
- Between 49 and 15 days prior to the start of the term of rental: 50% of the rental price
- Less than 15 days prior to the start of the term of rental: 80% of the rental price
- On the day of renting: 95% of the rental price

Service and repairs

After drop-off, the Motorhome will be cleaned. The auto mechanic checks the oil, water, etc. If repairs or further service is needed, the auto mechanic registers this.

Your task

You are hired to develop a new system for Nordic Motorhome Rental that can handle information about motorhomes, rentals and customers. For this first version of the system the owners and the staff at Nordic motorhome Rentals will be the users of the system. In a future version of the system, the customers should be able to make reservations through a web interface.

Note! During the project your programming teacher represents the owners of Nordic Motorhome Rental.

As representative of Nordic Motorhome Rental, the software design teacher can help you with:

- Further specification of requirements for the system
- Prioritization of requirements

Project Requirements

General requirements

It is very important that there is traceability from your business artifacts to system requirements and UML diagrams and from your UML diagrams to your source code.

Requirements to Business

The report must contain the following:

- Feasibility Study
- Risk analysis
- SWOT analysis for the company
- Stakeholder analysis

Requirements to software design

Your work is to reflect software development based on Craig Larman “Applying UML and Patterns” – where the project work is to follow the Unified Process – UP.

The report must contain the following artefacts:

- A Phase Plan
- A Supplementary Specification (List of Non-functional requirements).
- A Use Case Diagram with all the use cases.
- Show the development of **3 use cases minimum** from design to construction
- Identify conceptual classes by drawing a Domain Model.
- Drawings of System Sequence Diagrams for all implemented use cases.
- Drawings of State Diagrams for application navigation.
- Create a Design Class Diagram (DCD) based on your Domain Model and Sequence Diagrams.
- Mention at least 2 GRASP responsibilities, where they are used or could have been used in your project.
- A Glossary of terms and abbreviations

*You may elaborate using a selection from the following topics

Topics:

Process Models

Unified Process

Requirements gathering

Use case description (brief, casual, fully dressed)

FURPS

UML

Domain Model

Activity Diagram

Use Case Diagram

System Sequence Diagram

Sequence Diagram

State Diagrams

Class Diagram

Package Diagram

GRASP

- Information Expert
- Creator
- Low Coupling
- High Cohesion
- Controller
- Polymorphism
- Pure Fabrication
- Indirection

Quality Concepts

- Quality of design
- Quality of conformance

Software Testing Techniques

- Unit testing
- Integration testing
- Debugging

User Interface Design

- 10 Usability Heuristics
- 8 Golden Rules of Interface Design
- Design Method Toolkit

Requirements to Software Construction

Will be handed out by your Programming teacher on Monday, May 2, 2022.

Requirements to the report and the programming documentation

You are expected to prepare a project report which documents the system's development and implementation. The audience of the report is the teacher/examiner and external examiner.

IMPORTANT:

In the report and in the source code, it should be clear within the project group who is responsible for which chapter, sections, classes, etc.

The project report, which constitutes the written part of the exam, must as a minimum contain the following:

- Front page, including title, name and date of birth, class and date
- Table of contents
- Problem statement or question
- Main section
- Conclusion
- Bibliography (including all sources referenced in the project)
- Appendix (only appendices central to the report are to be included)
- A link to a Github repository with your source code

Number of students	Max pages
1	40
2	50
3	55
4	60

Front page, table of contents, bibliography and appendices are not included in the required number of pages. Appendices will not be assessed.

A standard page is 2,400 characters (standard - Times New Roman 12 or alike), including spaces and footnotes. Each figure or diagram is equivalent to 800 characters (regardless of size).

Project implementation process and guidance

The report must be submitted electronically to WiseFlow - TBA.

Students work in project groups. There should be a group contract (add to appendix).

Teachers offer guidance during the specified project period. The guidance takes place in relation to the present timetable.

The teachers do not read the report or parts of the report before submission.