

Assignment 4

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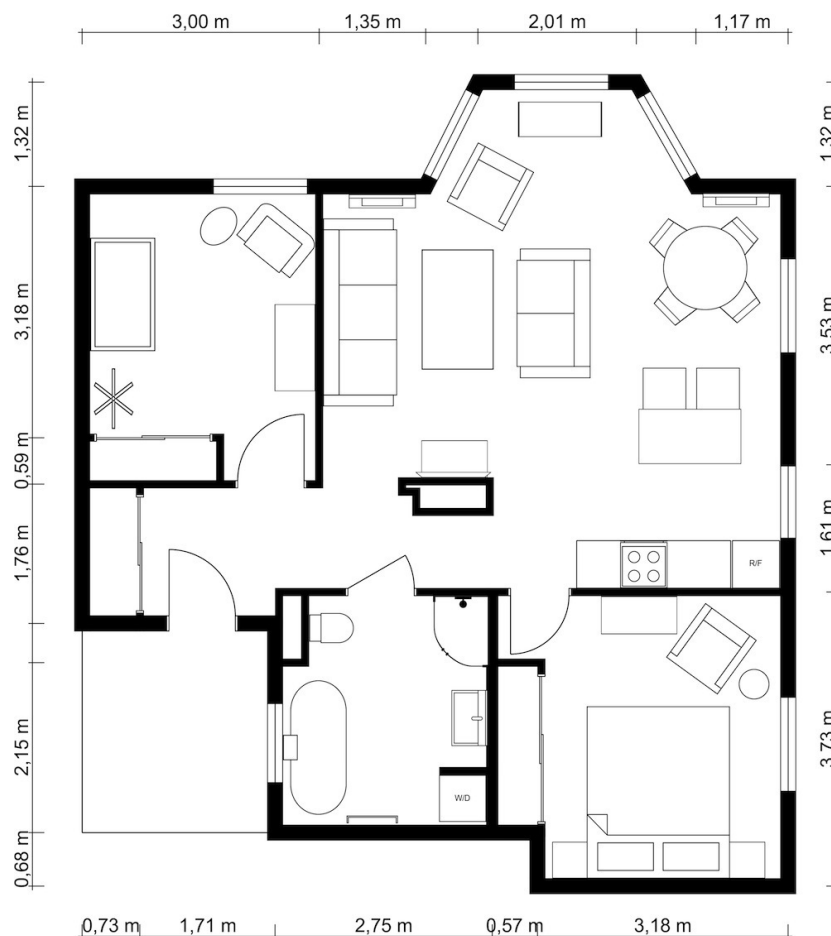
Submission: 16.12.2019

Discussion: 19.12.2018

4.1 Domain Modeling & Use Cases

Imagine you are the requirements expert of a small or medium sized software company located in Aachen. Students of Computer Science are working for your company on a regular basis. All new students constantly complain about the difficulties they have when moving into their new flats.

So, your company analyses existing tools for floorplans and interior design and decides that there is a market gap for such an application suited to be handled by amateurs like students, which could use then to plan the layout of their future flat and placement of their furnishings in advance. Typical floorplans look like this:



You have some early discussions with the student workers and they tell you that one of the most important aspects for them is to plan where to put your existing furniture

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and where to place it in your new flat. Aachen is a historic city with old houses, so each flat is unique.

In the beginning, you need to sketch the basic appearance of your new flat, including the rooms, walls, doors and windows. Perhaps you have an existing drawing, so it would be nice to import as background image in your application.

The application needs to provide a catalogue of furniture elements like tables, chairs, beds, bathtubs, plants. These elements need to be placed inside the flat and the user should be able to modify all elements like moving them around or changing the size. For usability reasons elements can be grouped.

In addition, you should also be able to extend the catalogue by creating and defining your own furniture elements. Therefore, you may import an image or draw your own elements.

While modeling and decorating the user also wants to do computations:

1. calculate the size of the flat, how much space is covered by the furniture elements and what amount of free space is available.
2. validate certain rules and constraints regarding the elements, such as "No elements are allowed to be placed inside a wall"

In addition, the marketing department demands social features for compatibility with the Web 2.0. So the software needs to be able to export the drawings to files or to publish them to a web-based service. This service is managed by moderators to ensure that no illegal content gets to the platform. Other users will be able to comment directly online on the projects published by the user.

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Develop a **domain model** for this application:

Identify domain concepts

- a) Use the Noun-Verb analysis to identify the domain concepts. Please state the nouns, properties, services as well as nouns that define and characterize concepts and relations between them.

Domain Driven Design

- b) Model the Core Domain and the corresponding Bounded Context of your application. Please explain, why your solution is the Core Domain.
- c) Model necessary Subdomains and their corresponding Bounded Context and classify them as Supporting or Generic Subdomains.
- d) Create a Context Map for your Bounded Contexts and explain the relationships between the contexts.

UML Domain Model

- e) Create the domain model based on OO concepts and depict it using an UML class diagram.

DDD vs. OO Domain Model

- f) Discuss the challenges you faced while identifying the domain concepts, components, classes, categories and also while designing the domain model.
- g) Discuss the advantages or disadvantages of using DDD and OO for modelling the domain.

Use Case Modelling

- h) Based on your domain model create scenarios by modeling the main use cases and actors as one or more UML use case diagram.
- i) Use the tabular textual description template uploaded in the exercise materials to detail the use cases you have identified.
- j) In the first step, you should have identified around 10 use cases. Please specify five of these using UML activity diagrams. **Do mind, that these should not be trivial!**
- k) Explain the advantages of using activity diagrams.