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Lift Case
Use-Case-Realization Specification: Change Floor

Version 2.0

Revision History

Date	Version	Description	Author
30-05-00	1.0	Initial document	Onno van Roosmalen
13-06-00	1.1	Minor textual modifications. Inclusion of scheme for class descriptions.	Onno van Roosmalen
17-07-00	2.0	Changes in 2nd elaboration-iteration diagrams taken into account	Onno van Roosmalen

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1. Introduction

In this document the analysis model is described and the main modeling decisions are explained. It is shown how the "Change Floor" Use-Case is realized with the identified domain objects and their properties. The document, together with the analysis model provides a reasonably complete quasi-formal description and specification of features of the lift system as described in the Stakeholder Requests and the Supplemental Specification document, but only for as far as the information in these document pertains to the "Change Floor" Use Case. In this document possible shortcomings in the mentioned document may be identified. They may serve as input to a list of questions that can be posed to the stakeholders and/or domain experts. Important information supplied by these parties can be used as input for later versions or iterations of this document.

1.1 Scope

The document only pertains to the "Change Floor" Use Case. Considerations are restricted to those concepts and requirements that will likely have an impact on the structure and/or the construction process of the software for this system. The modeling of business processes that depend on the use of the lift system falls outside the scope of this document.

1.2 References

[1] Lift Case – Stakeholder Requests document
[2] Lift Case – Supplementary Specification document
[3] Lift Case – UCS-Change Floor document
[4] Lift Case – Glossary.

2. Analysis

The domain for the lift case consists of all hardware and control aspects of the lift system, the possible users and the interface through which these users may interact with the system. The domain is modeled in an analysis model using two views, the Use-Case view and the Logical view. The logical view contains some State Transition Diagrams for selected objects that have non-trivial behavior. Some interaction diagrams are given as well to show realization of the use case.

2.1 Use-Case View

The Use-Case view (see AnalysisModel.mdl) consists of a single Use-Case diagram that elaborates the "Change Floor" Use Case. It distinguishes several, possibly relevant, variations on transportation of users from one floor to another. The diagram requires no further explanation. The Use Case is realized as depicted in the sequence diagram.
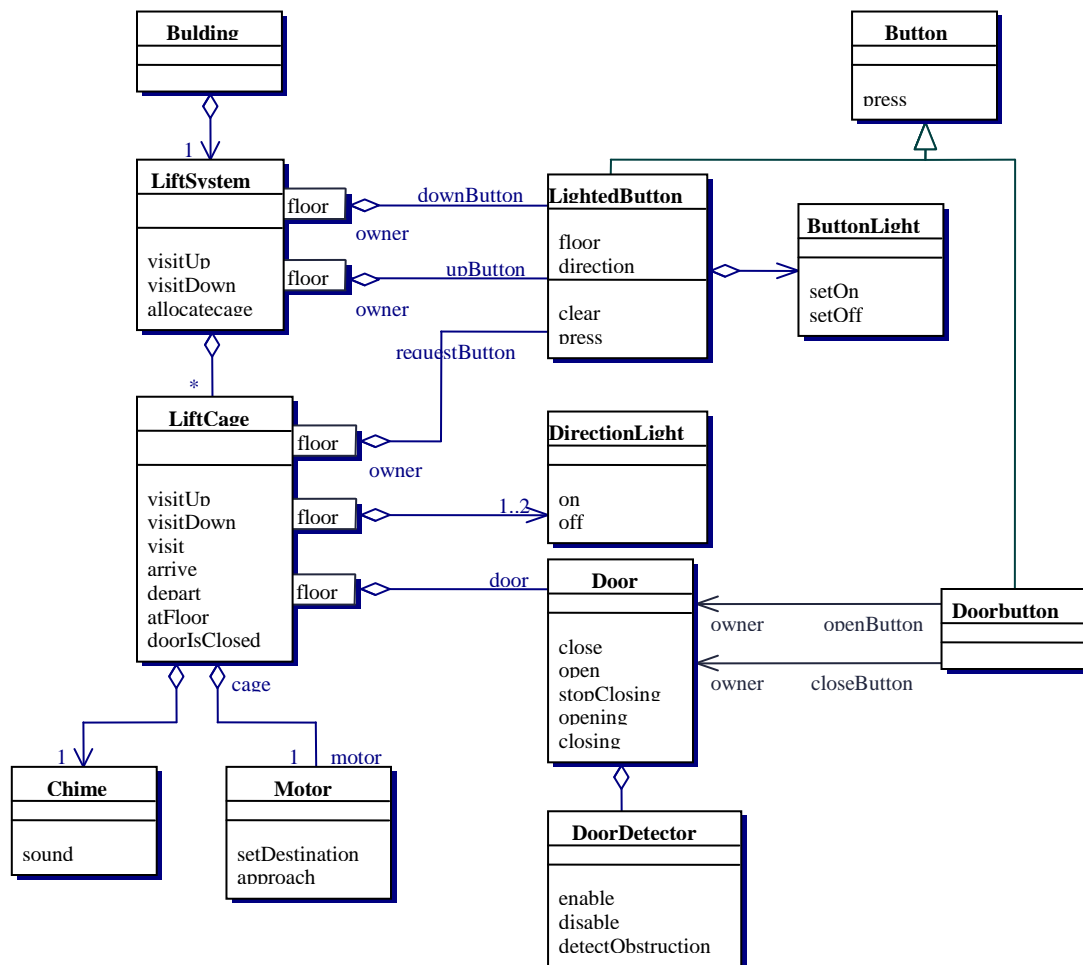
2.2 Logical View

Starting point for the logical view were the nouns found in the specification documents. The glossary gives a summary of the relevant terms and a brief explanation. The main guiding principle for setting up the class diagram was the aggregation relationships between the various lift components. After these were identified, other associations were introduced. These mainly follow from the required interactions between the lift objects as described in the interaction diagrams. The following modeling decisions were taken during the elaboration iterations:

1. The Shaft class was removed from the analysis model. It fulfills no purpose. There is no state information of a shaft that cannot naturally be placed in other objects.
2. The Floor class was removed. There is no relevant state information that cannot be placed naturally in e.g. the Lift Request Buttons. The only relevant feature of floors, namely their floor number, can be included using the floor number as qualifications in the association with objects that actually reside on a floor.

3. Not all physical composition-relationships depicted in earlier versions of the analysis model play a role in the object interactions. For instance, the door buttons are located in a lift cage but they only interact with the door. Door buttons are modeled as only associated with doors.

4. Some of the classes in earlier versions of the analysis model are actually roles played by instances of the shown base class. For example "FloorRequestButtons" are in behavior identical to "LiftRequestButtons". One generic LightedButton class replaces the various button-classes. The original class-names are replaced by role names.

5. Only floor doors remain in the design. No distinction is made between cage doors and floor doors. The door class specifies the behavior of a combination of doors.

6. Class Building is maintained as the root class representing a general "client". One could envisage the lift embedded in a building management system.

Refining the responsibilities of the various objects, guided by the intended realization of the Use Case, state charts were obtained starting with the objects at the bottom of the composition hierarchy These objects have simpler behavior and it is relatively easy to determine their interface.