Lab for Software Engineering

Cinema Management Application

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November 15, 2022

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1 Analysis

1.1 A1

1.1.1 Requirements & Domain-Knowledge

Requirements

R1 Customers can create an account by providing an e-mail address and a password. If an e-mail address which is already associated with an account is provided, account creation fails.

R2 Customers can log in by providing their e-mail address and their password.

R3 A logged in customer can log out.

R4 A customer can browse available showings, ascendingly sorted by date.

R5 A logged in customer can book tickets by selecting the showing from the browsing list and selecting the desired seats. A showing can only be booked up to 15 minutes before it starts.

R6 Staff can add new showings to the database by providing the required data.

R7 Once a showing starts it is marked as "archived".

R8 Archived showings are visible to staff, but not to customers.

R9 Staff can cancel showings. When a show is cancelled all customers who booked tickets for it are notified via e-mail and the showing is then deleted.

R10 Showings which took place a year ago or longer are automatically removed from the database.

R11 When a showing is deleted its associated bookings are also deleted.

Facts

F1 A showing consists of the title of the movie, its duration, the date date, the hall number and unique ID.

F2 A hall consists of a number of rows, a number of seats per row and a unique hall number.

F3 Only one person at a time can sit in a seat.

Assumptions

A1 A web application is a good choice for implementing the desired functionality and all customers are able to use it.

A2 Customers only provide e-mail addresses they can access.

A3 Customers will stay up to date with the list of available showings.

A4 Every booking is paid via an external service.

A5 Staff will only add showings which take place in the future.
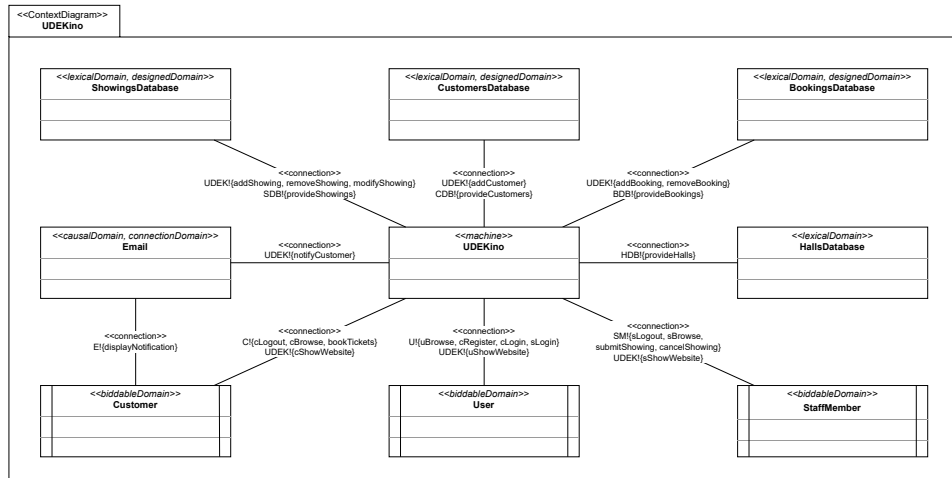
1.1.2 Contextdiagram

Figure 1.1: Contextdiagram

1.2 A2

We can derive the following problem diagrams

Figure 1.2: Problem diagram for R1

Figure 1.3: Mapping diagram for R1
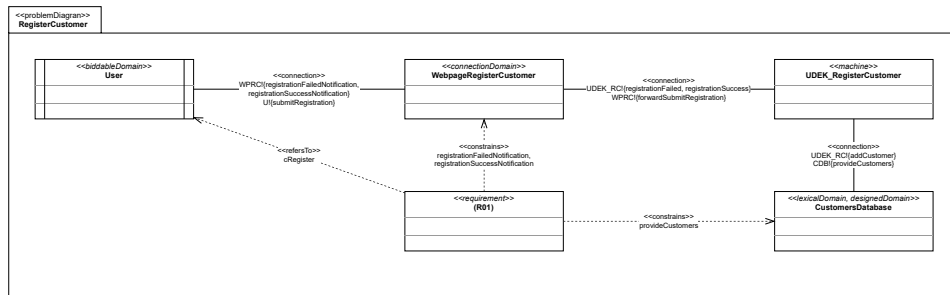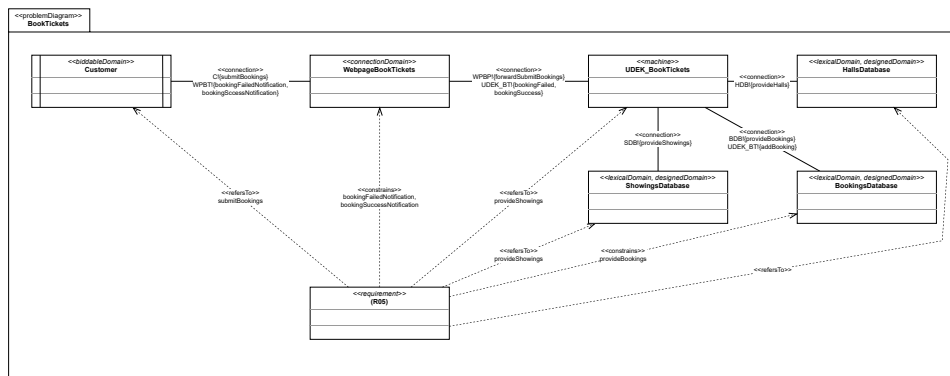

Figure 1.4: Problem diagram for R5
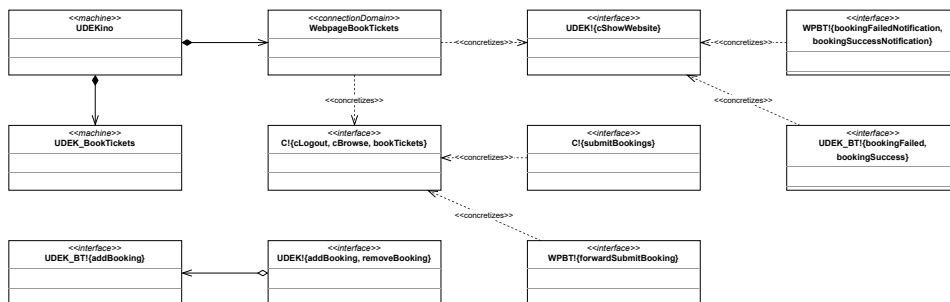
Figure 1.5: Mapping diagram for R5

9,6   G-10/10
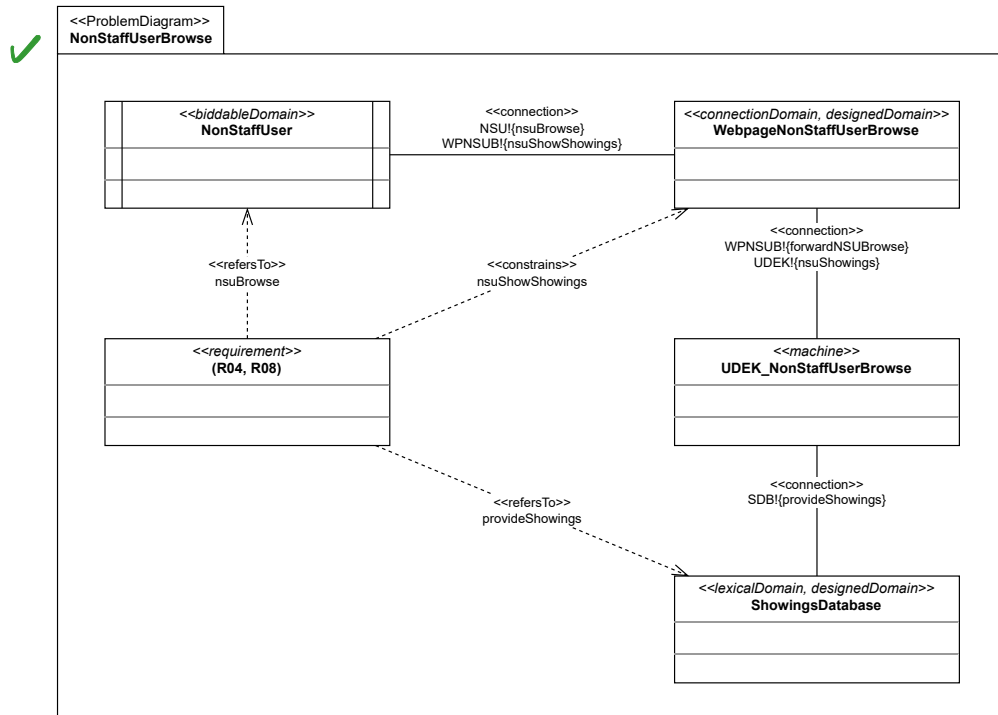
Figure 1.6: Problem diagram for R4 / R8
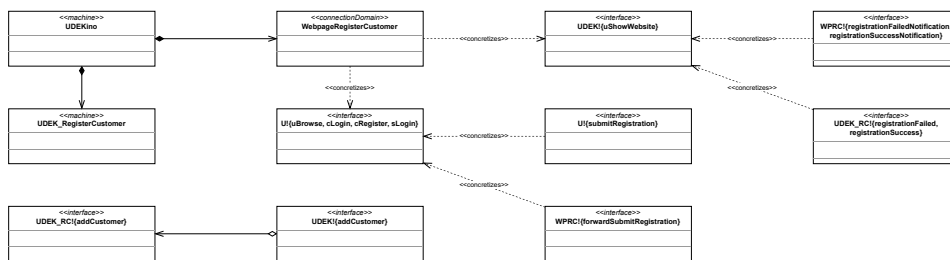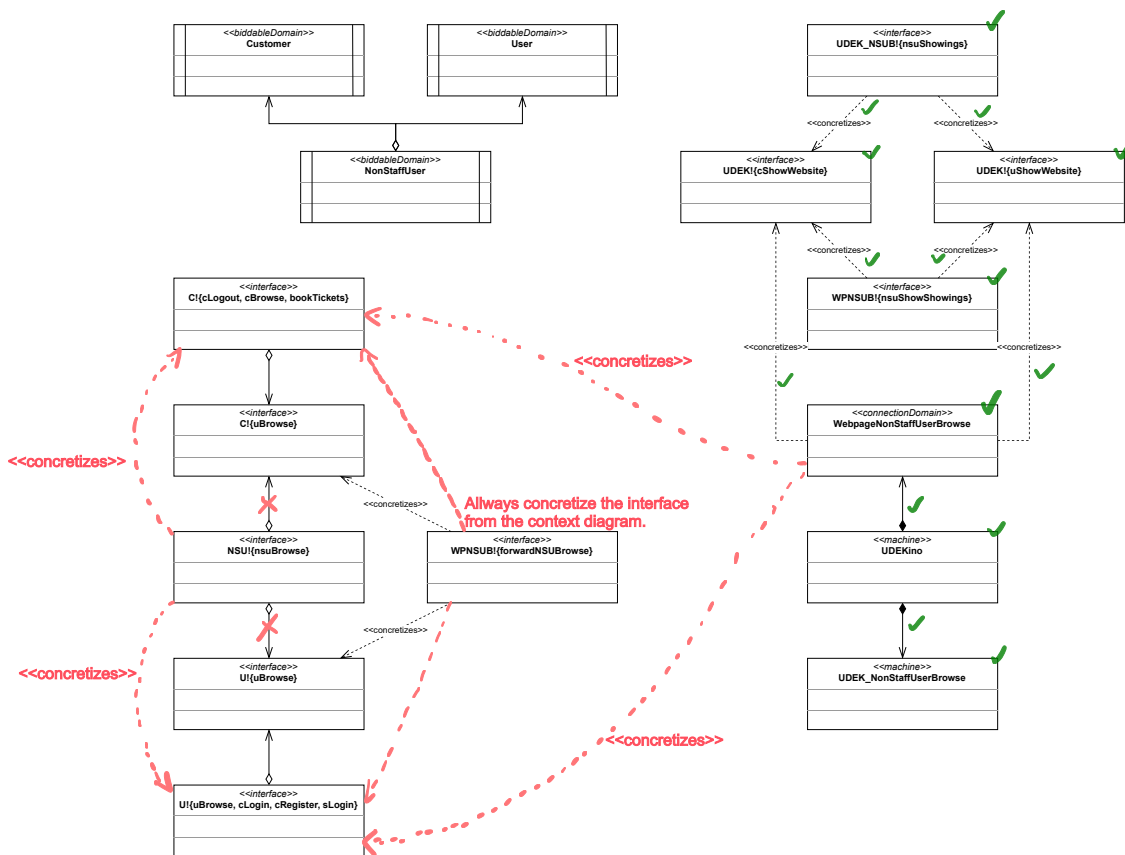

Figure 1.7: Mapping diagram for R4 / R8
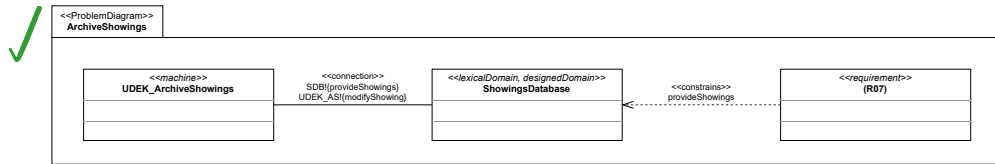
Figure 1.8: Problem diagram for R7
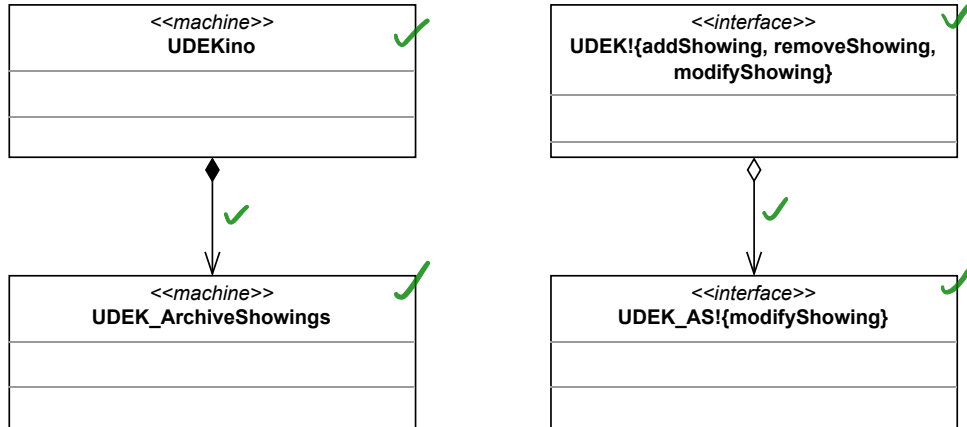
Figure 1.9: Mapping diagram for R7

Frames

- R1 fits to update 2

- R5 fits to update 2

- R4 / R8 fits to query 2 ✔

- R7 fits to simple transformation ✔

1.3 A3

1.4 A4

1.5 A5

A short OCL example:

```
1  context Person inv: self.alter >=0
2
3  pre alter >30
4  post alter=alter@pre+1
```

1.6 A6

Examples of a life-cycle using the math-environment:

$$LC_{guest} = (Browse^+; [Book])^*$$

2 Design

2.1 D1

2.2 D2

2.3 D3

2.4 D4

State diagrams with tikZ:

Figure 2.1: Zustandsdiagramm Person 1

3 Implementation & Testing

3.1 I

3.2 T1

3.3 T2

3.4 T3

4 Glossary

Table 4.1: Glossary

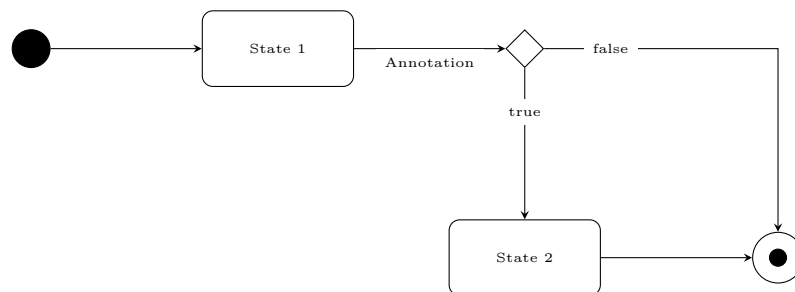| Name	Type	Description	Source
A			
addBooking	phenomenon	the machine adds a new booking to the bookings database	CD
addCustomer	phenomenon	the machine adds a new customer to the customers database	CD
addShowing	phenomenon	the machine adds a new showing to the customers database	CD
B			
bookingFailed	phenomenon	the machine notifies the webpage that a booking has failed	PD R5
bookingFailedNotification	phenomenon	the webpage displays a notification to the customer that a booking has failed	PD R5
bookingSuccess	phenomenon	the machine notifies the webpage that a booking has succeeded	PD R5
bookingSuccessNotification	phenomenon	the webpage displays a notification to the customer that a booking has succeeded	PD R5
BookingsDatabase	lexical domain, designed domain	a database containing the bookings made by customers	CD
bookTickets	phenomenon	a customer books tickets for a showing	CD
C			
Customer	biddable domain	a customer of UDEKino; a user who has logged into a customer account	CD
CustomersDatabase	lexical domain, designed domain	a database containing customer data	CD
cBrowse	phenomenon	a customer browses available showings	CD
cLogin	phenomenon	a user attempts to log into a customer account	CD
cLogout	phenomenon	a customer attempts to log out	CD
cRegister	phenomenon	a user attempts to create customer account on UDEKino	CD
cShowWebsite	phenomenon	the machine shows a website to the customer	CD
D			
displayNotification	phenomenon	the customer's e-mail client displays a notification e-mail to the customer	CD
E			

Table 4.1: Glossary

Name	Type	Description	Source
Email	causal domain, connection domain	an e-mail service offering to deliver e-mails	CD
F			
forwardBookings	phenomenon	the webpage forwards a request to book tickets to the machine	PD R5
forwardNSUBrowse	phenomenon	the website sends a request for a list of upcoming showings to the machine	PD R4 / R8
forwardSubmitRegistration	phenomenon	the webpage forwards a request to register a customer account to the machine	PD R5
G			
H			
HallsDatabase	lexical domain	a database containing the cinema halls, provided by the cinema operator	CD
I			
J			
K			
L			
M			
modifyShowing	phenomenon	the machine modifies a showing in the showings database	CD
N			
NonStaffUser	biddable domain	either of Customer or User	PD R4 / R8
notifyCustomer	phenomenon	the machine notifies the customer via e-mail	CD
nsuBrowse	phenomenon	either of cBrowse or uBrowse	PD R4 / R8
nsuShowings	phenomenon	the machine sends a list of upcoming showings to be displayed by the website	PD R4 / R8
nsuShowShowings	phenomenon	the website displays a list of upcoming showings to the user	PD R4 / R8
O			
P			
provideBookings	phenomenon	the bookings database provides the bookings data to the machine	CD
provideCustomers	phenomenon	the customers database provides the customers data to the machine	CD
provideHalls	phenomenon	the halls database provides the halls data to the machine	CD
provideShowings	phenomenon	the showings database provides the showings data to the machine	CD

Table 4.1: Glossary

Name	Type	Description	Source
Q			
R			
registrationFailed	phenomenon	the machine notifies the webpage that the registration has failed	PD R1
registrationFailedNotification	phenomenon	the webpage displays a to the user that the registration has failed	PD R1
registrationSuccess	phenomenon	the machine notifies the webpage that the registration has succeeded	PD R1
registrationSuccessNotification	phenomenon	the webpage displays a notification to the user that the registration has succeeded	PD R1
removeBooking	phenomenon	the machine removes a booking from the bookings database	CD
removeCustomer	phenomenon	the machine removes a customer from the customers database	CD
removeShowing	phenomenon	the machine removes a showing from the showings database	CD
S			
sBrowse	phenomenon	a staff member browses available showings	CD
sCancelShowing	phenomenon	a staff member attempts to cancel a showing	CD
ShowingsDatabase	lexical domain, designed domain	a database containing the cinema showings	CD
sLogin	phenomenon	a user attempts to log in as a staff member	CD
sLogout	phenomenon	a staff member attempts to log out	CD
sShowWebsite	phenomenon	the machine shows a website to the staff member	CD
StaffMember	biddable domain	a member of cinema staff; a user who has logged in as staff	CD
submitBookings	phenomenon	the customer selects the tickets they wish to book and hits the submit button	PD R5
submitBookings	phenomenon	the user enters their e-mail address and desired password and hits the submit button	PD R1
submitRegistration	phenomenon	the user submits a request to register a new customer account, containing an e-mail address and a password	PD R1
submitShowing	phenomenon	a staff member submits a new showing to the machine for entry into the database	CD
T			

Table 4.1: Glossary

Name	Type	Description	Source
U			
uBrowse	phenomenon	a user browses available showings	CD
UDEKino	machine	the machine to be developed	CD
UDEK_ArchiveShowings	machine	the sub-machine responsible for automatically archiving showings once they have begun	PD R7
UDEK_BookTickets	machine	the sub-machine responsible for customer booking tickets	PD R5
UDEK_NonStaffUserBrowse	machine	the sub-machine responsible for registered and non-registered customers browsing upcoming showings	PD R4 / R8
UDEK_RegisterCustomer	machine	the sub-machine responsible for customer account registration	PD R1
User	biddable domain	a user of the application who is not logged in	CD
uShowWebsite	phenomenon	the machine shows a website to the user	CD
V			
W			
WebpageBookTickets	connection domain, designed domain	a webpage via which a customer can book tickets	PD R5
WebpageNonStaffUserBrowse	connection domain, designed domain	a webpage via which a user can browse upcoming showings	PD R4 / R8
WebpageRegisterCustomer	connection domain, designed domain	a webpage via which a user can register a new customer account	PD R1
X			
Y			
Z			