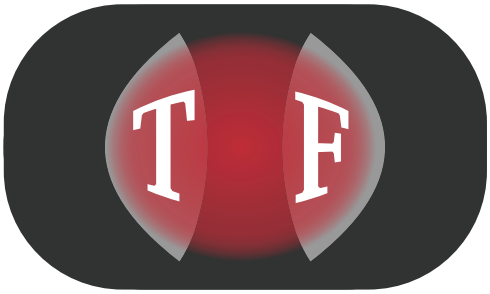


TaskFusion

# Kravspecifikation & Programdesign

02161 Software Engineering 1

**Afleveringsgruppe 13:**

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## Indhold

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# 1 Kravspecifikation

## 1.1. Indledning

Denne del af rapporten dokumenterer de usecases og begreber som med udgangspunkt i projektoplægget, danner kravspecifikationerne for projektet. Use cases udvikles til Cucumber scenarier som igennem Behavior- og Test Driven Development bliver til den implementering som findes i anden rapport.

## 1.2. Ordliste

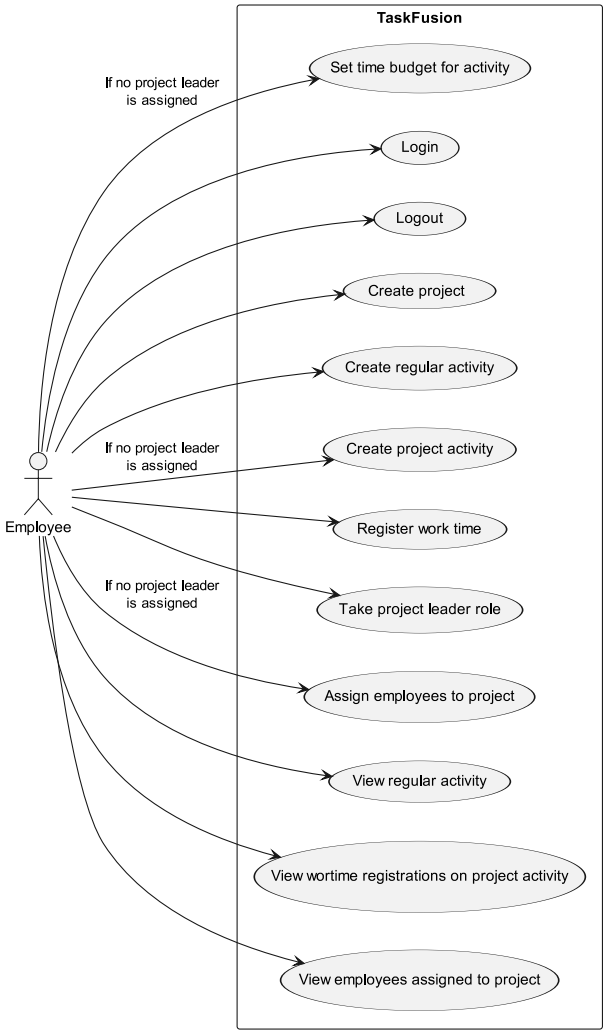
| | |
|---|---|
| **Medarbejder** | *[Employee]* En medarbejder er en entitet ansat i Softwarehuset A/S, som har et unikt medarbejder ID (medarbejder initialer). En medarbejder kan påtage sig en projektleder rolle, oprette projekter, faste aktiviteter, projektaktiviteter og registrere arbejdstid på aktiviteter. |
| **Projekt aktivitet** | *[Project activity]* En delopgave af et projekt. Aktiviteter har en start- og slutuge, og kan få fastsat en budgetteret tid. Alle medarbejdere kan udføre arbejde på alle projektaktiviteter. |
| **Fast aktivitet** | *[Regular activity]* Aktivitet der ikke kan pålægges et projekt. F.eks. ferie, sygdom, kurser. Disse har en start- og slutuge. |
| **Projekt** | *[Project]* Udviklingsarbejde udført for en kunde. Et projekt administreres af en projektleder og er inddelt i aktiviteter. Hvert projekt har et projektnummer. |
| **Kunde** | *[Customer]* En ekstern entitet som bestiller og er modtager af projekter. |
| **Projektleder** | *[Project leader]* En medarbejder der har ret til at oprette og tildele aktiviteter for et givent projekt samt generere projektrapporter. |
| **Medarbejder initialer** | *[Employee initials]* Unik identifikation for hver enkelt medarbejder, bestående af fire bogstaver. To første fra fornavn efterfulgt af to første fra efternavn. F.eks. “rawi”. Hvis initialer allerede er taget, vælges bogstav et og tre i efternavn, derefter et og fire, osv. |
| **Projektnummer** | *[Project number]* Identifikation for hvert enkelt projekt. Har formen årstal efterfulgt af et trecifret løbenummer. F.eks. “23001” |
| **Budgetteret tid** | *[Time budget]* En aktivitets estimerede antal hele timer. |
| **Arbejdstidsregistrering** | *[Work time registration]* Mængde tid i inkrementer af halve timer, brugt på en aktivitet. Kan registreres af den medarbejder som har brugt arbejdstid på en given aktivitet. |
| **Start- og sluttid** | *[Start- and end week]* En periode med opløsning på uge-niveau til aktiviteter. Begge tider angives som år og uge, ved formatet “ÅÅUU”. F.eks. 2304 for uge 4 i 2023. En starttid afgrænser starten af en given uge, en sluttid afgrænser ved slutningen af en given uge. Start- og sluttid kan derfor godt være ens. |
| **Projektrapport** | *[Project report]* Et udskrift der viser info om et projekt, (Leder, kunde, projekt ID), samt aktiviteter, deres arbejdstidsregistreringer og samlede fremgang. |

### 1.3. Use case diagrammer

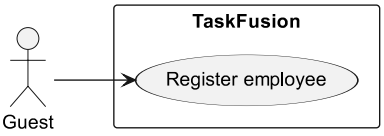
Dette afsnit starter med Figur 1 som viser hvilke aktører der kan udfører hvilke cases. Herefter kommer en oversigt (Tabel 1) over de detaljerede use cases med henvisning til Cucumber features (Sider 3 til 19) og sekvensdiagrammer (Sider 22 til 32).

***Figur 1:*** *Use case diagrammer for programmet hvori de tre aktører inkluderet er Gæst, Medarbejder og Projektleder.*

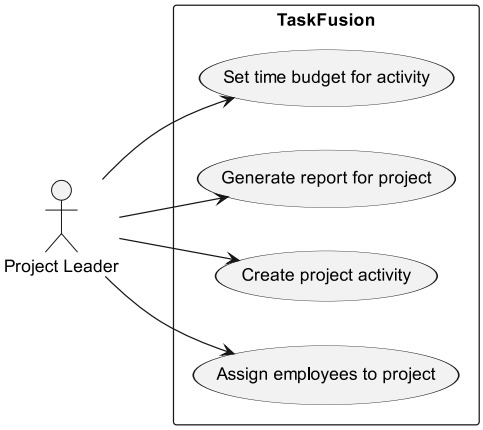
***(a)*** *Use cases for medarbejder*




***(b)*** *Use cases for gæst*




***(c)*** *Use cases for projektleder*




Som beskrevet i Figur 1 har vi tre roller: Medarbejder (Figur 1a), gæst (Figur 1b) og projektleder (Figur 1c). Gæsten er en indgang til et system uden data og kan kun oprette medarbejdere i systemet. Medarbejdere har rettigheder til stort set alle funktioner i programmet, indtil en projektleder udpeges. Herefter er det kun projektlederen på et projekt, der kan tilføje medarbejdere til projektet, oprette projektaktiviteter, angive tidsbudgetter og generere rapporter.

***Tabel 1:*** *Use cases for programmet*

| Detaljeret use case | Cucumber feature | Sekvensdiagram |
|---|---|---|
| Opret medarbejder | Listing 1 | Figur 4 |
| Login | Listing 2 | Figur 5 |
| Logout | Listing 3 | Figur 6 |
| Opret projekt | Listings 4 og 5 | Figur 7 |
| Påtag projektlederrolle | Listing 6 | Figur 8 |
| Tildel medarbejder til projekt | Listing 7 | Figur 9 |
| Se medarbejdere tilknyttet et projekt | Listing 8 | Figur 10 |
| Opret projektaktivitet | Listings 9, 10 og 11 | Figur 11 |
| Anfør tidsbudget på projektaktivitet | Listing 12 | Figur 12 |
| Opret fast aktivitet | Listings 13 og 14 | Figur 13 |
| Se fast aktivitet | Listing 15 | Figur 14 |
| Registrer arbejdstid | Listings 16 og 17 | Figur 15 |
| Se registreret arbejdstid på projektaktivitet | Listings 18, 19 og 20 | Figur 16 |
| Generér projektrapport | Listings 21 og 22 | Figur 17 |

## 1.4. Detaljerede use cases

***Listing 1:*** *Cucumber feature: Opret medarbejder*

```
@RegisterEmployee
Feature: Register employee
Description: A new employee is added to the application
Actors: Guest

#MAIN SCENARIOS
Scenario: 1. Register an employee
    When the user registers an employee with first name "Michael", last name "Laudrup"
    Then an employee with first
     ↪ name "Michael", last name "Laudrup" and initials "mila" exists in the application

#ALTERNATIVE SCENARIOS
Scenario: 1a. First name is required to register an employee
    When the user registers an employee with first name "", last name "Laudrup"
    Then the error message "Fornavn mangler" is given

Scenario: 1b. Last name is required to register an employee
    When the user registers an employee with first name "Michael", last name ""
    Then the error message "Efternavn mangler" is given

Scenario: 1c. If initials exists for a new employee, next letter in last name is used
    When the user registers an employee with first name "Michael", last name "Laudrup"
    And the user registers an employee with first name "Mikado", last name "Laudrup"
    Then an employee with first
     ↪ name "Michael", last name "Laudrup" and initials "mila" exists in the application
    And an employee with
     ↪ first name "Mikado", last name "Laudrup" and initials "milu" exists in the application

```

***Listing 2:*** *Cucmber feature: Login*

```
@Login
Feature: Employees can login
Description: An employee logs in to the application
Actors: employee

#MAIN SCENARIOS
Scenario: 1. Login using initials
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    When the user logs in using initials "mila"
    Then the user with initials "mila" is logged in as an employee

#ALTERNATIVE SCENARIOS
Scenario: 1a. Employee does not exist
    Given the user logs in using initials "mila"
    Then the error message "Ukendt medarbejder" is given

Scenario: 1b. Login is case insensitive
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    When the user logs in using initials "MiLa"
    Then the user with initials "mila" is logged in as an employee
```

***Listing 3:*** *Cucmber feature: Logout*

```
@Logout
Feature: Employees can log out
Description: An employee logs out of the application
Actors: employee

#MAIN SCENARIOS
Scenario: 1. Logout
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user logs in using initials "mila"
    When the user logs out
    Then none is logged in
```

***Listing 4:*** *Cucmber feature: Opret projekt (fortsætter på Listing 5)*

```
@CreateProject
Feature: Creating a project
Description: An employee creates a project in the application
Actors: employee

#BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user logs in using initials "mila"

#MAIN SCENARIOS
Scenario: 1. Creating a project
    Given the year is 2019
    When the user creates a project with title "Projektplanlægning"
    Then a project
     ↪  with title "Projektplanlægning" with project number "19001" exists in the application
    And the employee "mila" have 1 projects

Scenario: 2. A project can have a customer
    Given the year is 2023
    And the user creates a project with title "Projektplanlægning"
    When the user sets customer "El-Giganten" on project "23001"
    Then the project "23001" has customer "El-Giganten"
    And the employee "mila" have 1 projects

Scenario: 3. A project in an internal project, if it does not have a customer
    Given the year is 2023
    And the user creates a project with title "Projektplanlægning"
    Then the project "23001" is an internal project
    And the employee "mila" have 1 projects

Scenario: 4. Project numbers increments with each new project for the same year
    Given the year is 2023
    And the user creates a project with title "Projektplanlægning"
    When the user creates a project with title "Half-life 3"
    Then a
     ↪  project with title "Half-life 3" with project number "23002" exists in the application
    And the employee "mila" have 2 projects
```

***Listing 5:*** *Cucmber feature: Opret projekt (fortsat fra Listing 4)*

```
37
38  #ALTERNATIVE SCENARIOS
39  Scenario: 1a. A guest is not able to create a project
40      Given the user logs out
41      And the year is 2023
42      When the user creates a project with title "Projektplanlægning"
43      Then the error message "Login krævet" is given
44
45  Scenario: 1b. A title is required to create a project
46      When the user creates a project with title ""
47      Then the error message "En projekttitel mangler" is given
48      And the employee "mila" have 0 projects
49
50  Scenario: 3a. A project in an external project, if it has a customer
51      Given the year is 2023
52      And the user creates a project with title "Projektplanlægning"
53      When the user sets customer "El-Giganten" on project "23001"
54      Then the project "23001" is an external project
55      And the employee "mila" have 1 projects
56
57  Scenario: 5a. Project number increments is reset with each year
58      Given the year is 2021
59      And the user creates a project with title "Projektplanlægning"
60      And the user creates a project with title "Programdesign"
61      And the year is 2022
62      And the user creates a project with title "Half-life 3"
63      And the user creates a project with title "Implementering"
64
65      Then a project
        ↪  with title "Projektplanlægning" with project number "21001" exists in the application
66      And a project
        ↪  with title "Programdesign" with project number "21002" exists in the application
67      And a
        ↪  project with title "Half-life 3" with project number "22001" exists in the application
68      And a project
        ↪  with title "Implementering" with project number "22002" exists in the application
69      And there is 4 projects in the application
70      And the employee "mila" have 4 projects
71
```

***Listing 6:*** *Cucumber feature: Påtag projektlederrolle*

```
@AssignProjectLeaderToProject
Feature: Take on the role of project leader
Description: An employee can,
 ↪ when no project leader is assigned to a project, appoint themselves as project leader.
Actors: Employees

#BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user registers an employee with first name "Brian", last name "Laudrup"
    And the user logs in using initials "mila"
    And the year is 2023
    And the user creates a project with title "Video game"
    And the user logs out

#MAIN SCENARIOS
Scenario: 1. An employee can appoint themselves as project leader
    Given the user logs in using initials "mila"
    When the user takes the role as project leader on project "23001"
    Then "mila" is the project leader on project "23001"

#ALTERNATIVE SCENARIOS
Scenario: 1a.
 ↪ An employee appoints himself as project leader on a project where there is already one.
    Given the user logs in using initials "brla"
    Given the user takes the role as project leader on project "23001"
    And the user logs in using initials "mila"
    Given the user takes the role as project leader on project "23001"
    Then the error message "Der kan kun være en projektleder" is given

Scenario: 1b. An employee appoints himself as project leader on a project that does not exist
    Given the user logs in using initials "mila"
    And the user takes the role as project leader on project "25001"
    Then the error message "Projektet kunne ikke findes i samlingen af projekter" is given
```

***Listing 7:*** *Cucmber feature: Tildel medarbejder til projekt*

```
@AssignEmployeeToProject
Feature: Assign employees onto project
Description: Project leader assigns emplyees for a project
Actors: Project leader

#BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the year is 2023
    And the user logs in using initials "mila"
    And the user creates a project with title "Video game"
    And the user logs out

#MAIN SCENARIO
Scenario: 1. Employee assigns employee to project
    Given the user logs in using initials "mila"
    And the user registers an employee with first name "Brian", last name "Laudrup"
    And the user assigns "brla" to the project "23001"
    Then the employee "brla" is assigned to the project "23001"
    And the employee "brla" have 1 projects

Scenario: 2. Project manager assigns an employee
    Given the user logs in using initials "mila"
    And the user takes the role as project leader on project "23001"
    And the user registers an employee with first name "Brian", last name "Laudrup"
    When the user assigns "brla" to the project "23001"
    Then the employee "brla" is assigned to the project "23001"
    And the employee "brla" have 1 projects

#ALTERNATIVE SCENARIOS
Scenario: 1a. Employee assigns employee to project, with other employee as project leader
    Given the user logs in using initials "mila"
    And the user takes the role as project leader on project "23001"
    And the user registers an employee with first name "Brian", last name "Laudrup"
    And the user registers an employee with first name "Pape", last name "Poulsen"
    And the user logs out
    When the user logs in using initials "brla"
    And the user assigns "papo" to the project "23001"
    Then the error message "Kun projektleder kan tildele medarbejdere til projektet" is given
    And the employee "papo" have 0 projects

Scenario: 1b. Employee doesn't exist
    Given the user logs in using initials "mila"
    And the user assigns "brla" to the project "23001"
    Then the error message "Ukendt medarbejder" is given
```

***Listing 8:*** *Cucumber feature: Se medarbejdere tilknyttet et projekt*

```
@GetList
Feature: Get a list of participating employees from a project
Description: An employee can get a list of employees assigned to a project.
Actors: Employees

Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user logs in using initials "mila"
    And the year is 2023
    And the user creates a project with title "Video game"
    And the user assigns the project
     ↪ activity "Graphics design" to project "23001" with startWeek "2304" and endWeek "2305"
    And the user logs out

Scenario: 1. An employee can view a list of employees assinged to an activity
    Given the user logs in using initials "mila"
    And the user registers an employee with first name "Brian", last name "Laudrup"
    And the user assigns "brla" to the project "23001"
    And the user assigns "mefr" to the project "23001"
    When the
     ↪ user requests a list of employees assigned to the project with project number "23001"
    Then the employee list contains 2 items
```

***Listing 9:*** *Cucmber feature: Opret projektaktivitet som projektleder*

```
@CreateProjectActivityWithLeader
Feature: Creating a project activity for a project with assigned project leader
Description: A project leader creates a project activity for a project
Actors: employee, projectleader

#BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user registers an employee with first name "Mette", last name "Frederiksen"
    And the user logs in using initials "mefr"
    And the year is 2019
    And the user creates a project with title "Video game"
    And the user takes the role as project leader on project "19001"
    And the user logs out

#MAIN SCENARIOS
Scenario: 1. A project leader can create a project activity
    Given the user logs in using initials "mefr"
    When the user assigns the project
     ↪ activity "Graphics design" to project "19001" with startWeek "1901" and endWeek "1902"
    Then the project
     ↪ with the project number "19001" has a project activity titled "Graphics design"

#ALTERNATIVE SCENARIOS
Scenario:
 ↪ 1a. An employee is not able to create a project activity, when a projectleader is assigned
    Given the user logs in using initials "mila"
    When the user assigns the project
     ↪ activity "Graphics design" to project "19001" with startWeek "1901" and endWeek "1902"
    Then the error message
     ↪ "Kun projektlederen kan oprette en projekt aktivitet for dette projekt" is given
```

***Listing 10:*** *Cucmber feature: Opret projektaktivitet som medarbejder (fortsætter på Listing 11)*

```
@CreateProjectActivitiyWithoutLeader
Feature: Creating a project activity for a project without a project leader
  Description: An employee creates a project activity for a project without a project leader
  Actors: employee

#BACKGROUND
Background:
  Given the user registers an employee with first name "Michael", last name "Laudrup"
  And the user logs in using initials "mila"
  And the year is 2022
  And the user creates a project with title "Video Game"

#MAIN SCENARIOS
Scenario: 1. Creating a project activity
  When the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
  Then the
   ↪ project with the project number "22001" has a project activity titled "Graphics design"

Scenario: 2. A time budget can be added to a project activity
  Given the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
  When the user sets the time budget to 50 hours
   ↪ on the project activity with the title "Graphics design" and project number "22001"
  Then the project activity with
   ↪ the title "Graphics design" and project number "22001" has a time budget of 50 hours

Scenario: 3. A start week can be set to a project activity
  Given the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2204" and endWeek "2205"
  Then the project activity
   ↪ with the title "Graphics design" and project number "22001" has start week "2204"

Scenario: 4. An end week can be set to a project activity
  Given the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2204" and endWeek "2205"
  Then the project
   ↪ activity with title "Graphics design" and project number "22001" has end week "2205"

#ALTERNATIVE SCENARIOS
Scenario: 1a. A guest is not able to create a project activity
  Given the user logs out
  When the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
  Then the error message "Login krævet" is given

Scenario: 1b. A project activity title is unique in a project
  Given the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
  When the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
  Then the error message "Projekt aktivitet findes allerede" is given

Scenario: 2a. A guest is not able to set a time budget on a project activity
  Given the user logs out
  And the user assigns the project
   ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
  When the user sets the time budget to 50 hours
   ↪ on the project activity with the title "Graphics design" and project number "22001"
  Then the error message "Login krævet" is given
```

***Listing 11:*** *Cucmber feature: Opret projektaktivitet som medarbejder (fortsat fra Listing 10)*

```
47
48  Scenario: 3a. A guest is not able to set a start week on a project activity
49    Given the user logs out
50    When the user assigns the project
       ↪  activity "Graphics design" to project "22001" with startWeek "2202" and endWeek "2401"
51    Then the error message "Login krævet" is given
52
53  Scenario: 3b. A start week needs to be before or the same as the end week
54    Given the user logs in using initials "mila"
55    And the user assigns the project
       ↪  activity "Graphics design" to project "22001" with startWeek "2202" and endWeek "2201"
56    Then the error message "Start uge skal være før eller ens med slut uge" is given
57
58  Scenario: 3c. A start week needs to be before or the same as the end week
59    Given the user logs in using initials "mila"
60    And the user assigns the project
       ↪  activity "Graphics design" to project "22001" with startWeek "2302" and endWeek "2203"
61    Then the error message "Start år skal være før eller ens med slut år" is given
62
63  Scenario: 3d. A start week needs to be four digits
64    Given the user logs in using initials "mila"
65    And the user assigns the project
       ↪  activity "Graphics design" to project "22001" with startWeek "222" and endWeek "2203"
66    Then the error message "Start uge og slut uge skal angives med fire cifre" is given
67
68  Scenario: 3e. A end week needs to be four digits
69    Given the user logs in using initials "mila"
70    And the user assigns the project
       ↪  activity "Graphics design" to project "22001" with startWeek "2203" and endWeek "22211"
71    Then the error message "Start uge og slut uge skal angives med fire cifre" is given
72
73  Scenario: 4a. A guest is not able to set an end week on a project activity
74    Given the user logs out
75    When the user assigns the project
       ↪  activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
76    Then the error message "Login krævet" is given
```

***Listing 12:*** *Cucmber feature: Anfør tidsbudget på projektaktivitet*

```
@ActivityWorktimeBudget
Feature: Set time budget for a regular activity
Description: Project leader assigns the time bugdet for a given activity
Actors: Project manager

#BACKGROUND
Background:
  Given the user registers an employee with first name "Michael", last name "Laudrup"
  And the user registers an employee with first name "Mette", last name "Frederiksen"
  And the year is 2015
  And the user logs in using initials "mila"
  And the user creates a project with title "Projektplanlægning"
  And the user takes the role as project leader on project "15001"
  And the user assigns the project
   ↪ activity "Graphics design" to project "15001" with startWeek "2301" and endWeek "2305"
  And the user logs out

#MAIN SCENARIO
Scenario: 1. Project manager assigns a time budget
    Given the user logs in using initials "mila"
    And the user sets the time budget to 32 hours
     ↪ on the project activity with the title "Graphics design" and project number "15001"
    Then the project activity with
     ↪ the title "Graphics design" and project number "15001" has a time budget of 32 hours

#ALTERNATIVE SCENARIOS
Scenario: 1a. Employee assigns time buget
    Given the user logs in using initials "mefr"
    And the user sets the time budget to 32 hours
     ↪ on the project activity with the title "Graphics design" and project number "15001"
    Then the error message "Kun projektlederen kan tildele tidsbudgetter" is given
```

***Listing 13:*** *Cucmber feature: Opret fast aktivitet (fortsætter på Listing 14)*

```
@CreateRegularActivity
Feature: Creating a regular activity
Description: An employee creates a regular activity in the application
Actors: employee
test

#BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user logs in using initials "mila"
    And the year is 2023

#MAIN SCENARIOS
Scenario: 1. Creating a regular activity
    When the
     ↪ user creates the regular activity "Ferie" with start week "2304" and end week "2306"
    Then the user
     ↪ has a regular activity with title "Ferie" with start week "2304" and end week "2306"
```

***Listing 14:*** *Cucmber feature: Opret fast aktivitet (fortsat fra Listing 13)*

```
17
18  #ALTERNATIVE SCENARIOS
19  Scenario: 1a. A guest is not able to create a regular activity
20      Given the user logs out
21      When the
         ↪  user creates the regular activity "Ferie" with start week "2304" and end week "2306"
22      Then the error message "Login krævet" is given
23
24  Scenario: 1b. A title is required to create a regular activity
25      When the user creates the regular activity "" with start week "2304" and end week "2306"
26      Then the error message "En titel mangler" is given
27
28  Scenario: 1c. A start week is required to create a regular activity
29      When the user creates the regular activity "Ferie" with start week "" and end week "2306"
30      Then the error message "En start uge mangler" is given
31
32  Scenario: 1d. An end week is required to create a regular activity
33      When the user creates the regular activity "Ferie" with start week "2304" and end week ""
34      Then the error message "En slut uge mangler" is given
35
36  Scenario: 1e. Start week needs to be before end week
37      When the
         ↪  user creates the regular activity "Ferie" with start week "2304" and end week "2303"
38      Then the error message "Start uge skal være før eller ens med slut uge" is given
39
40  Scenario: 1f. Same start and end week is allowed
41      When the
         ↪  user creates the regular activity "Ferie" with start week "2304" and end week "2304"
42      Then the user
         ↪  has a regular activity with title "Ferie" with start week "2304" and end week "2304"
43
44  Scenario: 1g. Start week can be greater than end week if start year is less than end year
45      When the
         ↪  user creates the regular activity "Ferie" with start week "2304" and end week "2402"
46      Then the user
         ↪  has a regular activity with title "Ferie" with start week "2304" and end week "2402"
47
48  Scenario: 1h. Start week must be of 4 characters long
49      When the
         ↪  user creates the regular activity "Ferie" with start week "23042" and end week "2305"
50      Then the error message "Start uge og slut uge skal angives med fire cifre" is given
51
52  Scenario: 1i. End week must be of 4 characters long
53      When the user creates the regular activity "Ferie" with start week "2304" and end week "2"
54      Then the error message "Start uge og slut uge skal angives med fire cifre" is given
55
56  Scenario: 1j. The year of start week must be before the year of end week
57      When the
         ↪  user creates the regular activity "Ferie" with start week "2404" and end week "2305"
58      Then the error message "Start år skal være før eller ens med slut år" is given
```

***Listing 15:*** *Cucumber feature: Se fast aktivitet*

```
@ViewRegularActivity
Feature: View regular activity
  Description: An employee wishes to view a regular activity
  Actors: employee

#MAIN SCENARIOS
Background:
    Given the year is 2023
    And the user registers an employee with first name "Michael", last name "Laudrup"
    And the user logs in using initials "mila"
    And the
     ↪ user creates the regular activity "Ferie" with start week "2304" and end week "2306"
    And the user creates the regular activity "Syg" with start week "2304" and end week "2306"
    And the user logs out

Scenario: 1. A employee can view a list of their regular activites
    Given the user logs in using initials "mila"
    When the user requests a list of own regular activities
    Then the regular activities list contains 2 items

Scenario: 2. A employee can view a regular activity
    Given the user logs in using initials "mila"
    When the user requests a regular activity with id 2
    Then a regular
     ↪ activity is returned with id 2, title "Syg", start week "2304" and end week "2306"

#ALTERNATIVE SCENARIOS
Scenario: 2a. Only owners of a regular activity can view it
    Given the user registers an employee with first name "Brian", last name "Laudrup"
    And the user logs in using initials "brla"
    When the user requests a regular activity with id 1
    Then the error message "Du har ikke rettighed til at se denne aktivitet" is given

Scenario: 2b. Guests cant view a regular activity
    When the user requests a regular activity with id 1
    Then the error message "Login krævet" is given

Scenario: 2c. A non existing id is given
    Given the user registers an employee with first name "Brian", last name "Laudrup"
    And the user logs in using initials "brla"
    When the user requests a regular activity with id 3
    Then the error message "Kunne ikke finde fast aktivitet" is given

Scenario: 2d. A non existing parameter list is given
    Given the user
     ↪ registers an employee with first name "Mette Frederiksen", last name "Frederiksen"
    And the user logs in using initials "mefr"
    When the
     ↪ user requests a regular activity "Ferie" with start week "2404" and end week "2305"
    Then the user does not have such a regular activity
```

***Listing 16:*** *Cucmber feature: Registrer arbejdstid (fortsætter på Listing 17)*

```
@RegisterActivityWorktime
Feature: Register work time on a project activity
Description: An employee registers their work time on a project activity.
Actors: employee

#BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user logs in using initials "mila"
    And the year is 2023
    And the user creates a project with title "Video Game"
    And the user assigns the project
     ↪ activity "Graphics design" to project "23001" with startWeek "2303" and endWeek "2305"

#MAIN SCENARIOS
Scenario: 1. Register work time on project activity
    When the user registers a work time of 6 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "23001"
    Then the user has 6 hours of registered work
     ↪ time on the project activity with title "Graphics design" and project number "23001"

Scenario: 2. Register work time on project activity twice
    When the user registers a work time of 6 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "23001"
    And the user registers a work time of 2 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "23001"
    Then the user has 8 hours of registered work
     ↪ time on the project activity with title "Graphics design" and project number "23001"

Scenario: 3. User can register worktime if a regular activity exists outside activity period
    Given the
     ↪ user creates the regular activity "Ferie" with start week "2305" and end week "2306"
    And the user
     ↪ creates the regular activity "Sygeorlov" with start week "2301" and end week "2302"
    When the user registers a work time of 6 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "23001"
    Then the user has 6 hours of registered work
     ↪ time on the project activity with title "Graphics design" and project number "23001"

Scenario: 4. User cannot register worktime if a regular activity exists in activity period
    Given the
     ↪ user creates the regular activity "Ferie" with start week "2303" and end week "2304"
    When the user registers a work time of 6 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "23001"
    Then the error message "Medarbejderen er optaget af den faste aktivitet: Ferie" is given
```

***Listing 17:*** *Cucmber feature: Registrer arbejdstid (fortsat fra Listing 16)*

```
34
35  #ALTERNATIVE SCENARIOS
36  Scenario: 1.a Register worktime in half-hour increments
37      When the user registers a work time of 6.5 hours to the project
         ↪  activity with title "Graphics design" in the project with project number "23001"
38      Then the user has 6.5 hours of registered work
         ↪  time on the project activity with title "Graphics design" and project number "23001"
39
40  Scenario: 1.b Project not found
41      When the user registers a work time of 6 hours to the project
         ↪  activity with title "Graphics design" in the project with project number "23002"
42      Then the error message "Projektet kunne ikke findes i samlingen af projekter" is given
43
44  Scenario: 1.c Project activity not found
45      When the user registers a work time of 6 hours to
         ↪  the project activity with title "Regndans" in the project with project number "23001"
46      Then the error message "Projektaktiviteten findes ikke." is given
```

***Listing 18:*** *Cucumber feature: Se resterende arbejdstid*

```
1   @ActivityRemainingWork
2   Feature: Get reamining activity progress
3   Description: Project leader gets remaining time on activity
4   Actors: Project manager
5
6   #MAIN SCENARIO
7   Scenario: Project leader gets remaining time on activity
8       Given the user registers an employee with first name "Michael", last name "Laudrup"
9       And the year is 2025
10      And the user logs in using initials "mila"
11      And the user creates a project with title "Projektplanlægning"
12      And the user takes the role as project leader on project "25001"
13      And the user assigns the project
         ↪  activity "Graphics design" to project "25001" with startWeek "2501" and endWeek "2505"
14      And the user sets the time budget to 32 hours
         ↪  on the project activity with the title "Graphics design" and project number "25001"
15      And the user registers a work time of 6 hours to the project
         ↪  activity with title "Graphics design" in the project with project number "25001"
16      When the user requests the remaining time on "Graphics design" on project "25001"
17      Then the activity returns 26 hours
```

***Listing 19:*** *Cucumber feature: Se registreret arbejdstid på projektaktivitet (fortsætter på Listing 20)*

```
@OverviewWorktime
Feature: View summary of registered work time pr. activity
Description: A project leader can view a summary of registered work time per activity
Actors: Project leader and employee

# #BACKGROUND
Background:
    Given the user registers an employee with first name "Michael", last name "Laudrup"
    And the user registers an employee with first name "Lars", last name "Svendsen"
    And the year is 2025
    And the user logs in using initials "lasv"
    And the user creates a project with title "Video game"
    And the user takes the role as project leader on project "25001"
    And the user assigns the project
     ↪ activity "Graphics design" to project "25001" with startWeek "2501" and endWeek "2505"
    And the user assigns the project
     ↪ activity "Gameplay" to project "25001" with startWeek "2501" and endWeek "2502"
    And the user registers a work time of 6 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "25001"
    #ID 1
    And the user registers a work time of 10 hours to the project
     ↪ activity with title "Graphics design" in the project with project number "25001"
    #ID 2
    And the user logs in using initials "mila"
    And the user registers a work time of 10 hours to
     ↪ the project activity with title "Gameplay" in the project with project number "25001"
    #ID 1
    And the user registers a work time of 10 hours to
     ↪ the project activity with title "Gameplay" in the project with project number "25001"
    #ID 2

#MAIN SCENARIO
Scenario: 1. The project leader can view a summary of registered work time pr. activity
    Given the user logs in using initials "lasv"
    When the user requests
     ↪ a list of all worktime registrations for the project with project number "25001"
    Then the worktime registration list contains 4 items

# ALTERNATIVE SCENARIO
Scenario: 1a. An employee
 ↪ recieves an error message when attempting to view the summary of registered work time
    Given the user logs in using initials "mila"
    When the user requests
     ↪ a list of all worktime registrations for the project with project number "25001"
    Then the error
     ↪ message "Kun projektlederen kan tilgå oversigten af arbejdstid for projektet" is given

Scenario: 1b. A project leader can only
 ↪ view the summary of registered work time for the project to which the person is assigned
    Given the user logs in using initials "mila"
    And the user creates a project with title "Web development"
    And the user takes the role as project leader on project "25002"
    And the user logs in using initials "lasv"
    When the user requests
     ↪ a list of all worktime registrations for the project with project number "25002"
    Then the error
     ↪ message "Kun projektlederen kan tilgå oversigten af arbejdstid for projektet" is given
```

***Listing 20:*** *Cucumber feature: Se registreret arbejdstid på projektaktivitet (fortsat fra Listing 19)*

```
45
46  Scenario: 1c. The project leader recieves an error message if no work time has been registered
47      Given the user logs in using initials "mila"
48      And the user creates a project with title "Web development"
49      And the user takes the role as project leader on project "25002"
50      When the user requests
         ↪  a list of all worktime registrations for the project with project number "25002"
51      Then the worktime registration list contains 0 items
```

***Listing 21:*** *Cucmber feature: Generer projektrapport (fortsætter på Listing 22)*

```
1   Feature: Create project report
2   Description: User creates a report
3   Actors: User
4
5   #BACKGROUND
6   Background:
7       Given the date is 20.04.2025
8       And the user registers an employee with first name "Michael", last name "Laudrup"
9       And the user registers an employee with first name "Brian", last name "Laudrup"
10      And the user logs in using initials "mila"
11      And the user creates a project with title "TaskFusion"
12      And the user takes the role as project leader on project "25001"
13      And the user assigns the project
         ↪  activity "AcceptanceTests" to project "25001" with startWeek "2506" and endWeek "2507"
14      And the user sets the time budget to 47 hours
         ↪  on the project activity with the title "AcceptanceTests" and project number "25001"
15      And the user assigns the project
         ↪  activity "UnitTests" to project "25001" with startWeek "2507" and endWeek "2508"
16      And the user sets the time budget to
         ↪  80 hours on the project activity with the title "UnitTests" and project number "25001"
17      And the user registers a work time of 6.5 hours to the project
         ↪  activity with title "AcceptanceTests" in the project with project number "25001"
18      And the user registers a work time of 1 hours to the project
         ↪  activity with title "AcceptanceTests" in the project with project number "25001"
19      And the user registers a work time of 3.5 hours to
         ↪  the project activity with title "UnitTests" in the project with project number "25001"
20      And the user registers a work time of 2.5 hours to
         ↪  the project activity with title "UnitTests" in the project with project number "25001"
21      And the user logs in using initials "brla"
22      And the user registers a work time of 2 hours to the project
         ↪  activity with title "AcceptanceTests" in the project with project number "25001"
23      And the user registers a work time of 3 hours to the project
         ↪  activity with title "AcceptanceTests" in the project with project number "25001"
24      And the user registers a work time of 5 hours to
         ↪  the project activity with title "UnitTests" in the project with project number "25001"
25      And the user registers a work time of 7 hours to
         ↪  the project activity with title "UnitTests" in the project with project number "25001"
26      And the user logs out
27
28  Scenario: 1a. User generates report
29      Given the user logs in using initials "mila"
30      When the user generates a report for project "25001"
31      Then the number of reports for project "25001" is 1
32
```

***Listing 22:*** *Cucmber feature: Generer projektrapport (fortsat fra Listing 21)*

```
33 Scenario: 1b. User generates multiple reports
34     Given the user logs in using initials "mila"
35     And the date is 20.04.2025
36     And the user generates a report for project "25001"
37     And the date is 21.04.2025
38     And the user generates a report for project "25001"
39     Then the number of reports for project "25001" is 2
40
41 Scenario: 2a. Login is required to generate a report
42     Given the user generates a report for project "25001"
43     Then the error message "Login krævet" is given
44
45 Scenario: 2b. Project leader is required to generate a report
46     Given the user logs in using initials "mila"
47     And the user creates a project with title "FaskTusion"
48     When the user generates a report for project "25002"
49     Then the
       ↪  error message "Projektet mangler en projektleder for at genererer rapporter" is given
50
51 Scenario: 2c. Only project leader can generate a report
52     Given the user logs in using initials "brla"
53     When the user generates a report for project "25001"
54     Then the error message "Kun projektlederen kan generere rapporter" is given
```

# 2 Diskussion: Kravspecifikation

## 2.1. Oplægsmæssige overvejelser og afgrænsninger

**2.1.1. En admin rolle** Oplægget nævner som udgangspunkt ikke et krav om en administrator rolle, men derimod at det er et internt system og at der ikke er behov for et sikkerhedslag. Ofte er det oplagt at have en admin entitet, og i dette projekt kunne det som eksempel give mening til oprettelse af medarbejdere. Men i forbindelse med en kortlægning af projektet samt afgrænsning af funktioner, ser vi større værdi for kunden i at fokusere på de ønskede funktioner i stedet for at *gætte* på at de vil have en admin. Desuden kan en sådan rolle laves senere, hvis nødvendigt. At en gæst kan oprette en medarbejder er dermed et eksempel på brugen af K.I.S.S. [1] ved at anskue denne funktionalitet som en mock admin-klasse, der eksisterer udelukkende i forbindelse med udviklingen af arbejdstidsregistrering og projekthåndtering, de centrale ønsker.

**2.1.2. UI og fokus på business logik** Oplægget kræver en brugerflade, men giver frit lejde til hvorvidt denne skal være en GUI eller CLI. Vi ønsker at levere noget brugbart til kunden hurtigt, og have K.I.S.S. i fokus for vores beslutninger og afgrænsning. Fra tidlige leverancer kan vi bruge kundens feedback til at videreudvikle på softwareløsningen iterativt, og bedre kunne prioritere udvikling af funktioner løbende. Derfor har vi i første ikke noget grafisk bruger interface, men derimod et program der køres i et CLI. På et senere stadie, i samtale med kunden, kan en grafisk brugerflade implementeres.

**2.1.3. Medarbejdere med samme navn** For at tilgodese at medarbejdere kan hedde det samme vil medarbejder-objekter blive gemt ud fra deres initialer **som derfor skal være unikke**.

## 2.2. Tekniske overvejelser

**2.2.1. Abstractions og compositions** Disse to begreber bliver kun brugt i abstrakt forstand, da man i Java ikke har direkte kontrol over objekter. De kan konstrueres, men eksistere selv når objekter der peger på dem slettes. Java har en garbage collector der jævnligt analysere pointers i programmet og fjerner objekter der ikke bliver peget på.

**2.2.2. Persistence** For at gøre det muligt at gemme data i objekter og være sikker på at kun disse objekter konstrueres vil singletons blive brugt som indgang til gemt information. Dette kan optimeres ved at gemme data på filer, men dette har vi valgt ikke at fokusere på, for at få tid til funktionalitet.

**2.2.3. Adskillelse af UI fra business logik** UI'en er som nævnt tekstbaseret. Hele UI-laget er separeret fra business logikken igennem *Facades*, og vil kunne se objekter som *ModelView*-klasser der ikke kan ændre på underliggende data men blot læse disse.

[1] (**K**eep **I**t **S**hort and **S**imple, some also refer to it as **K**eep **I**t **S**imple, **S**tupid)

# 3 PROGRAMDESIGN

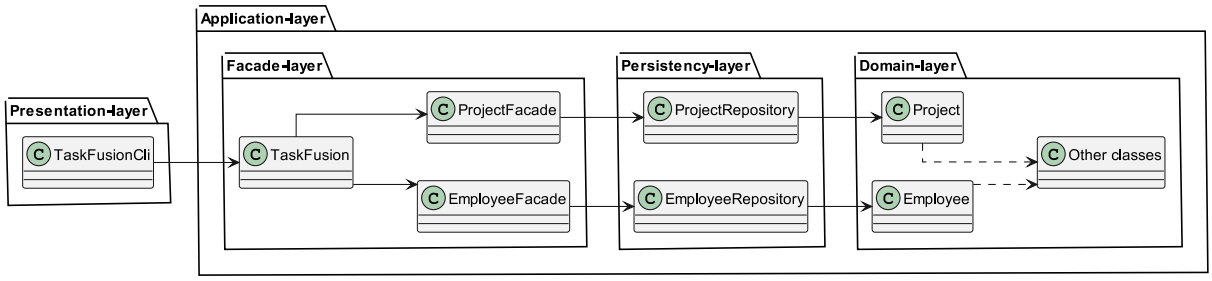
## 3.1. KLASSEDIAGRAM AF PROGRAMDESIGN

Programmets klasser inddeles i lag som ses på Figur 2. TaskFusionCLI opretter et TaskFusion objekt som opretter ProjectFacade og EmployeeFacade. Her kan TaskFusion sende metodekald til to singletons:

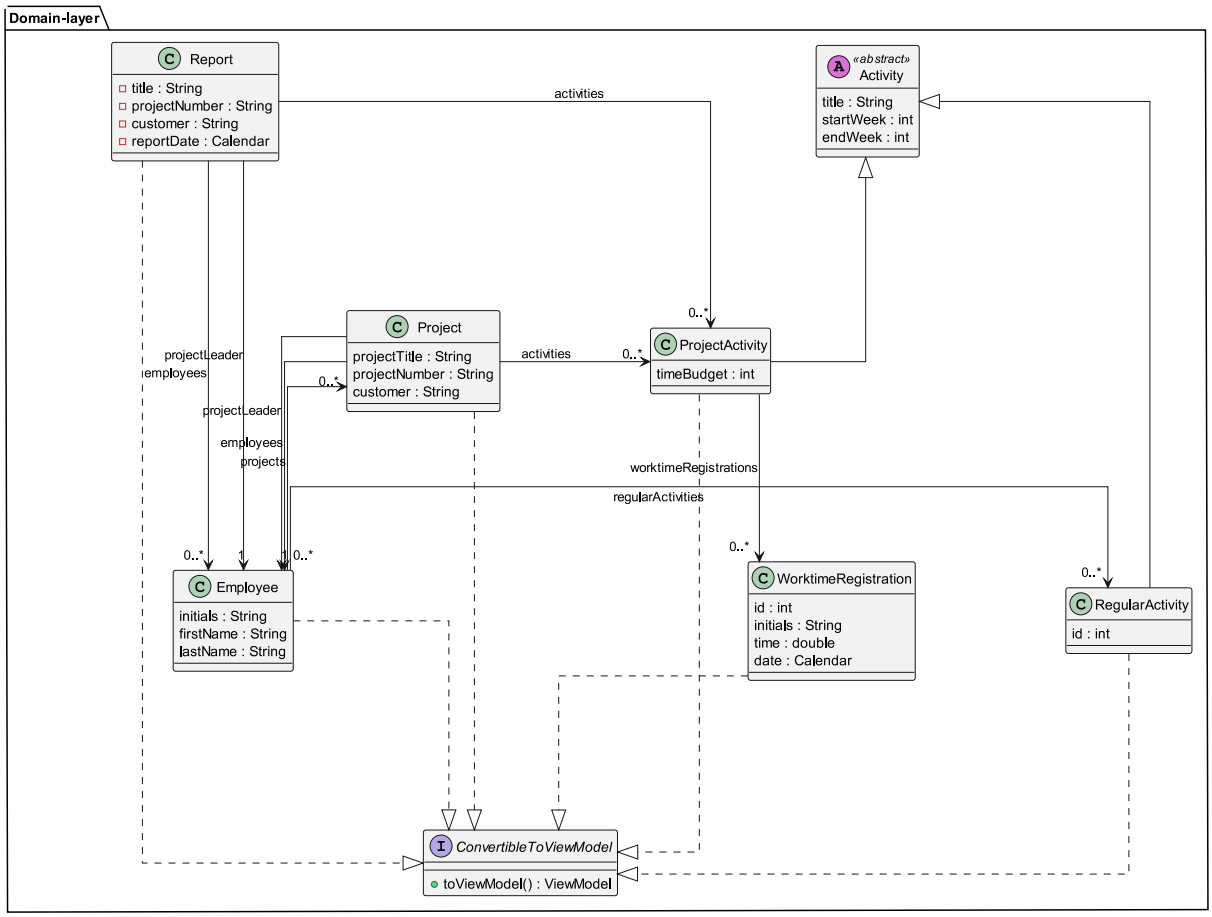
- ProjectRepository
- EmployeeRepository

Metodekaldene opretter og ændrer felter i *domain*-laget, som ses på Figur 3. Skal data bruges i CLI'en hentes en *ModelViewModel* af et objekt, som CLI'en formaterer til brugerfladen.

***Figur 2:*** *TaskFusion klasser inddelt i lag*

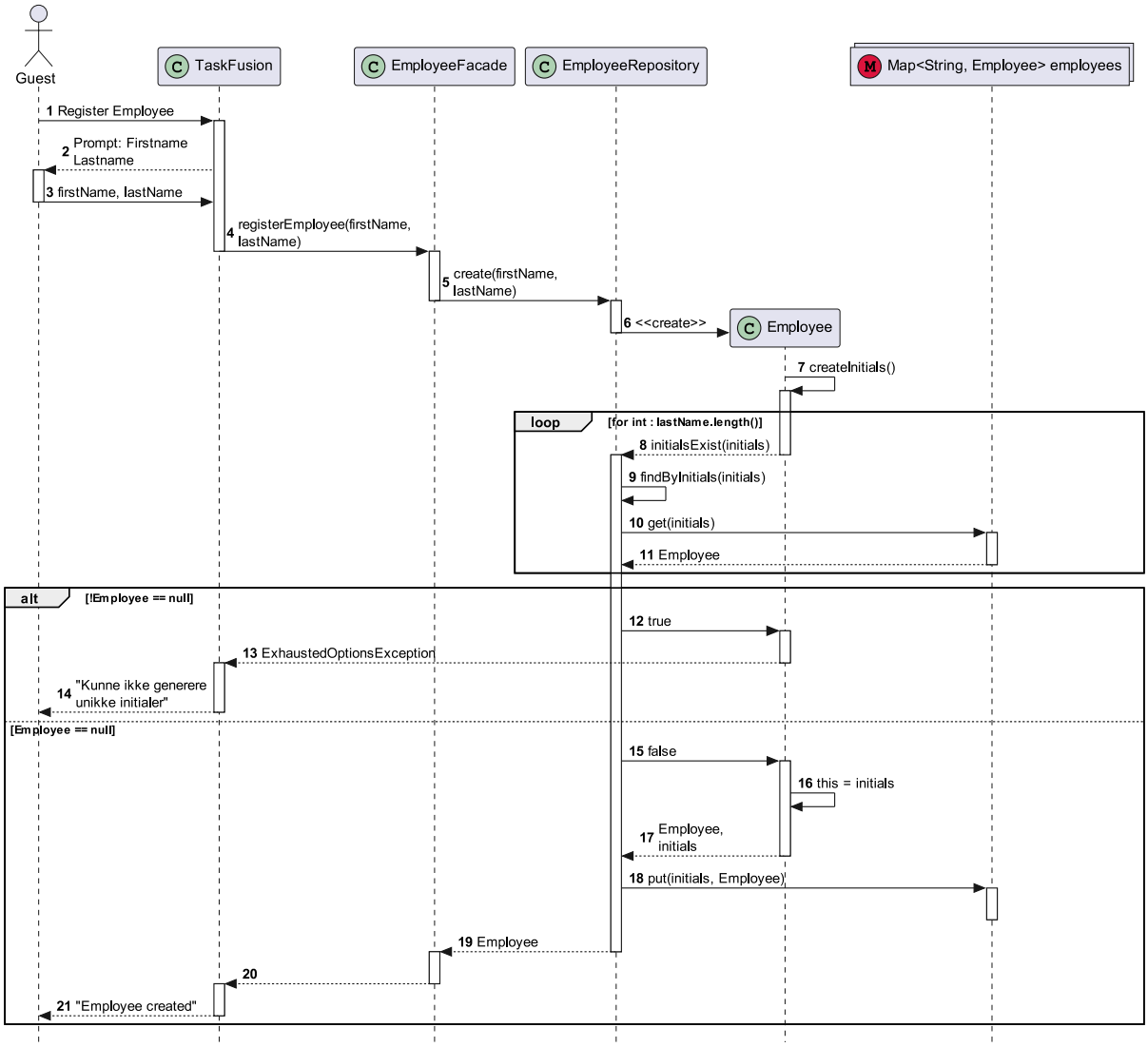



***Figur 3:*** *TaskFusion klasser i domain laget*



## 3.2. SEKVENSDIAGRAMMER

***Figur 4:*** *Sekvensdiagram: Opret medarbejder*



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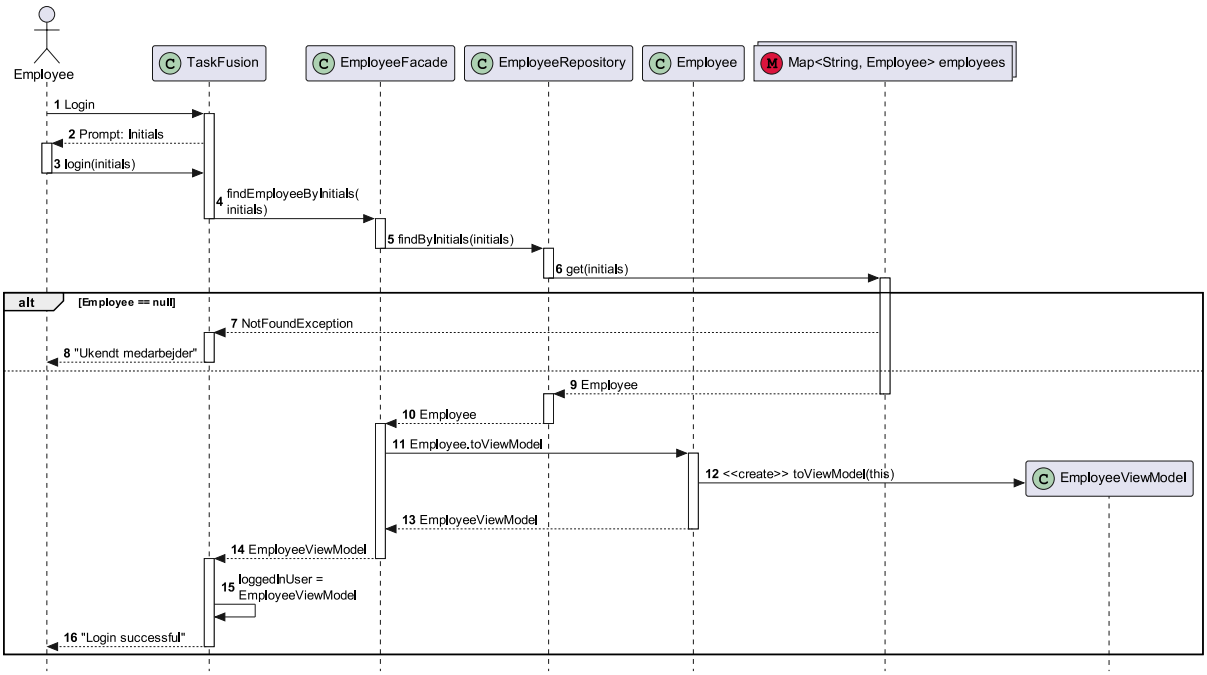
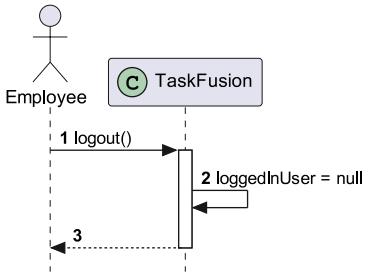
***Figur 5:*** *Sekvensdiagram: Login*




***Figur 6:*** *Sekvensdiagram: Logout*



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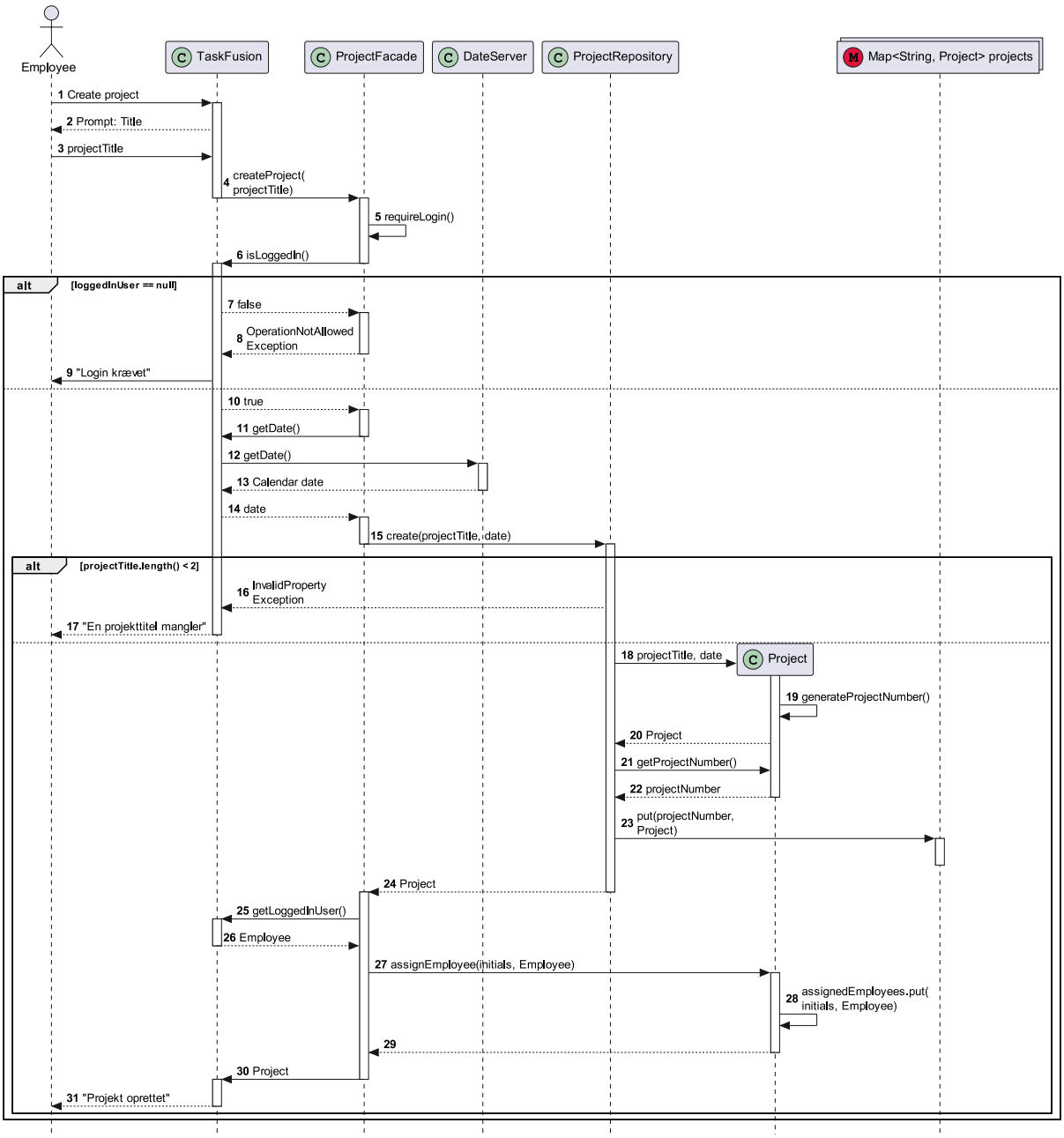
***Figur 7:*** *Sekvensdiagram: Opret projekt*



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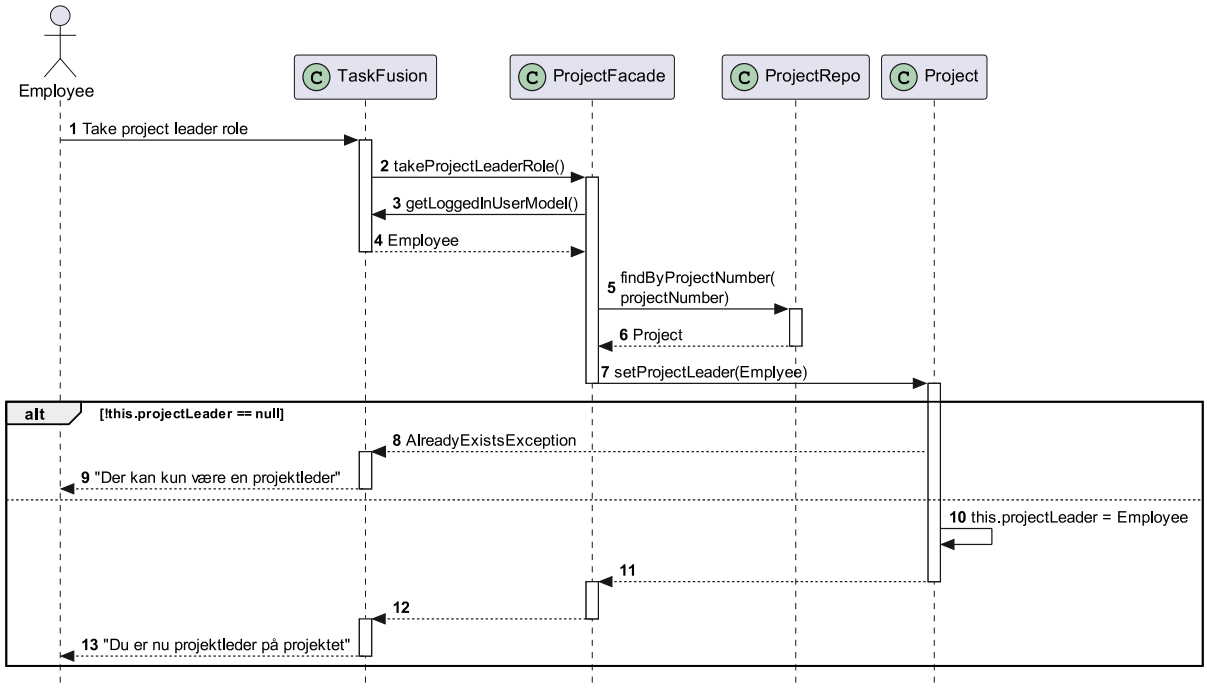
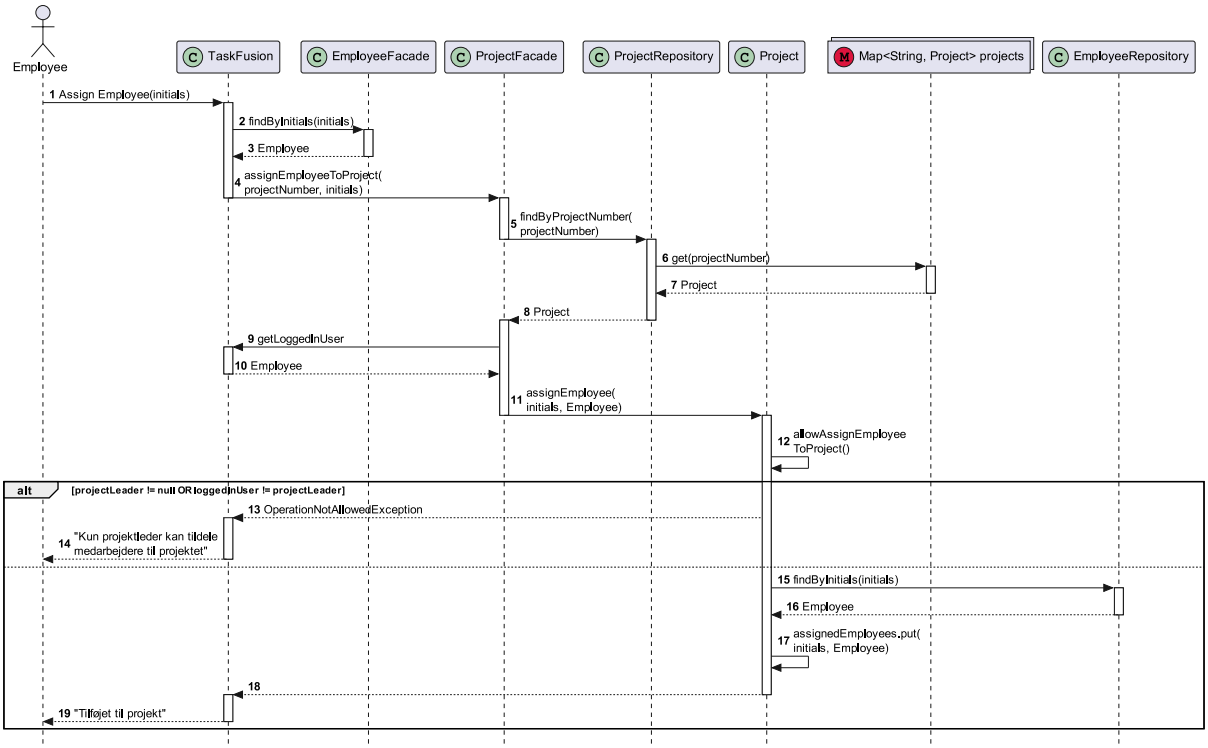
***Figur 8:*** *Sekvensdiagram: Påtag projektlederrolle*




***Figur 9:*** *Sekvensdiagram: Tildel medarbejder til projekt*



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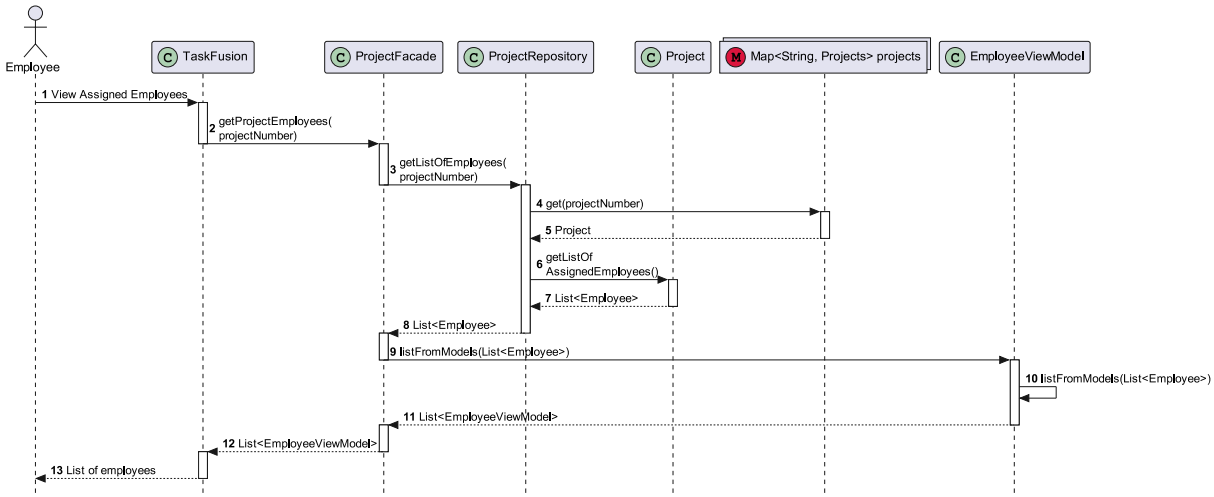
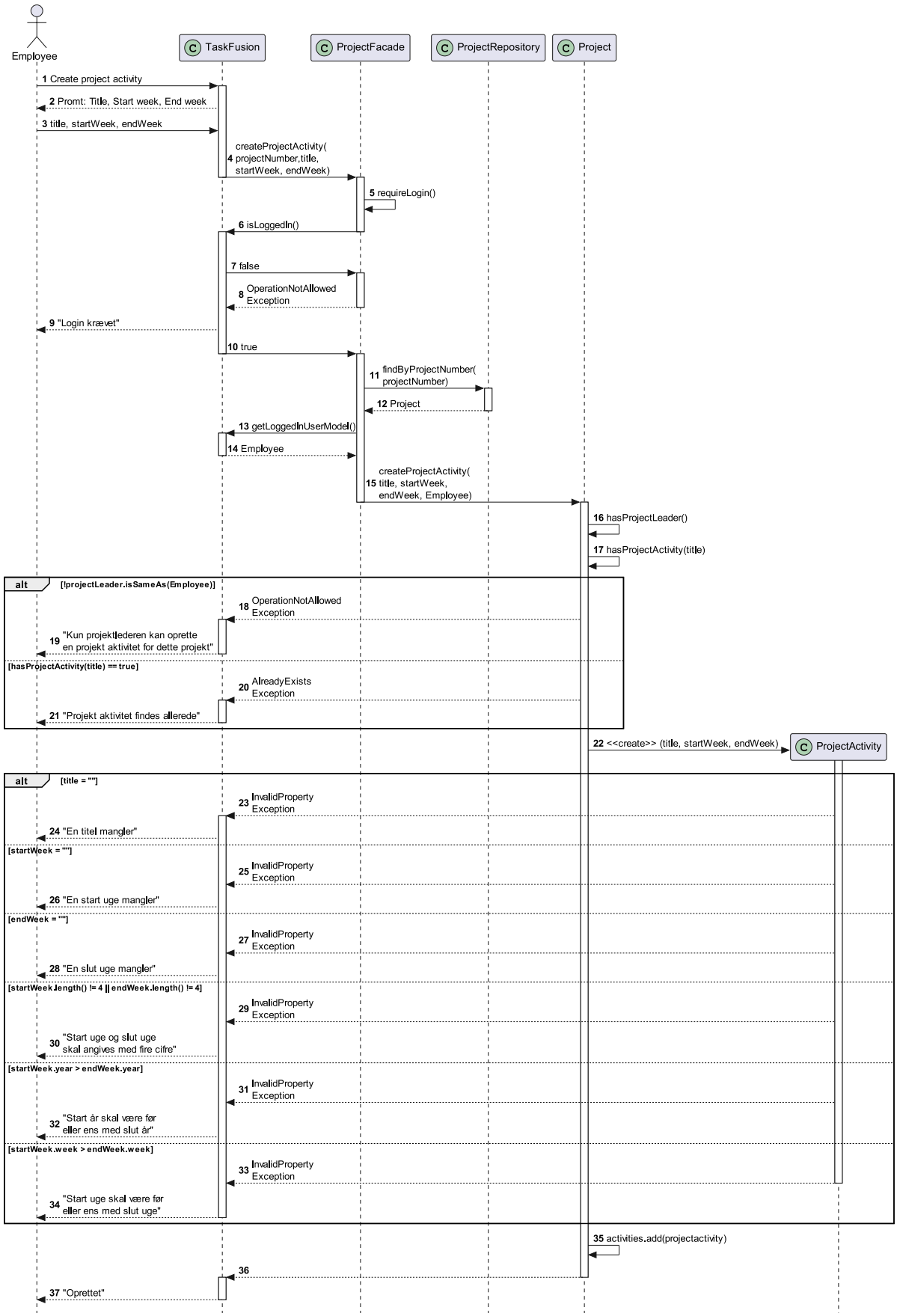
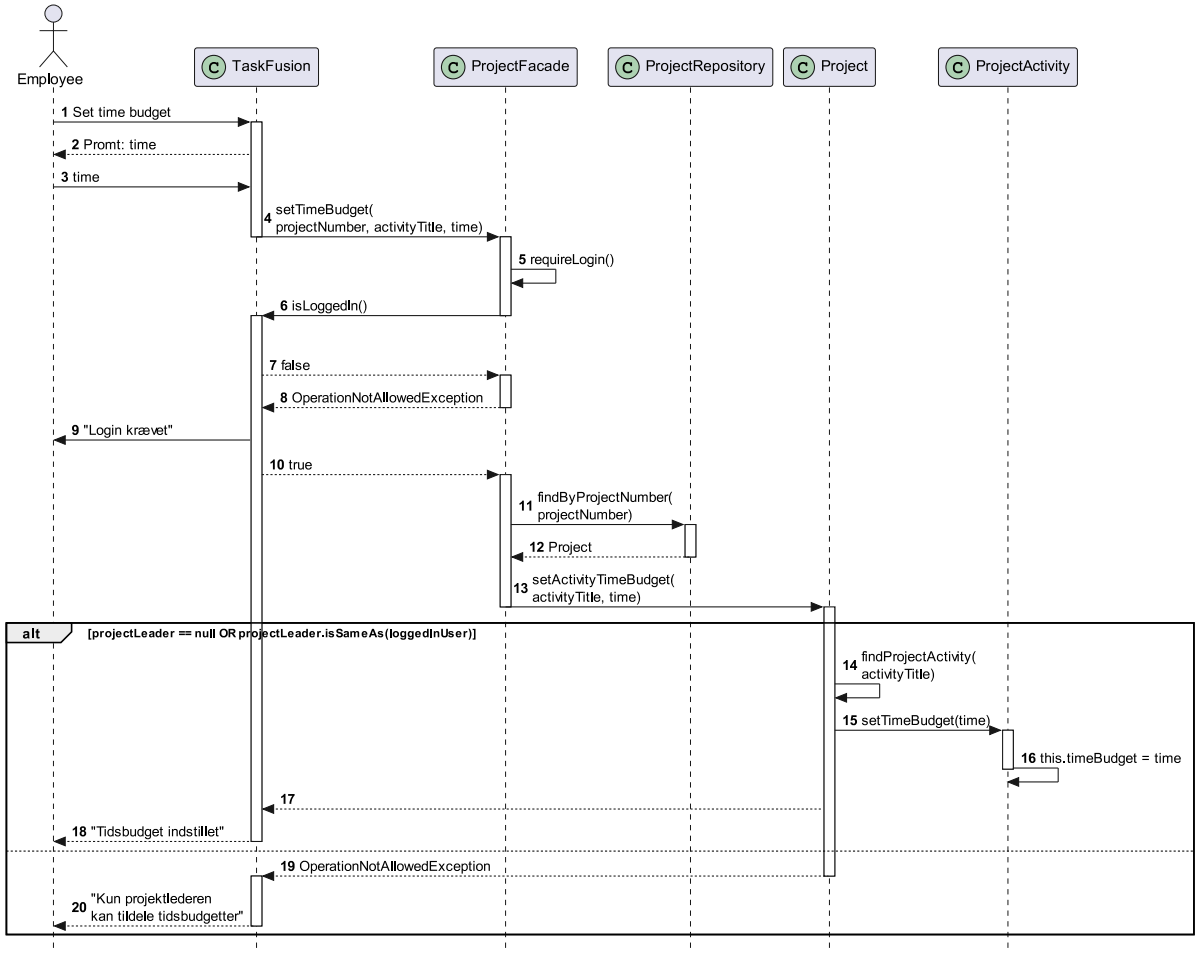
***Figur 10:*** *Sekvensdiagram: Se medarbejdere tilknyttet et projekt*



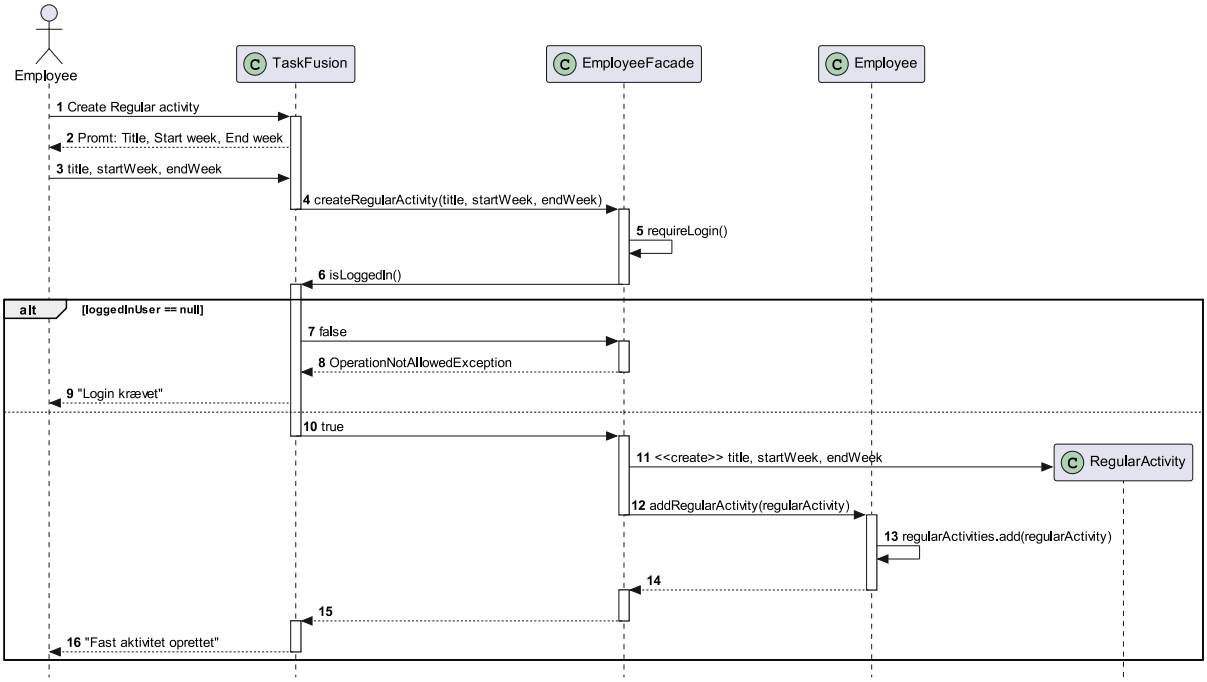
***Figur 11:*** *Sekvensdiagram: Opret projektaktivitet*



***Figur 12:*** *Sekvensdiagram: Anfør tidsbudget på projektaktivitet*




***Figur 13:*** *Sekvensdiagram: Opret fast aktivitet*



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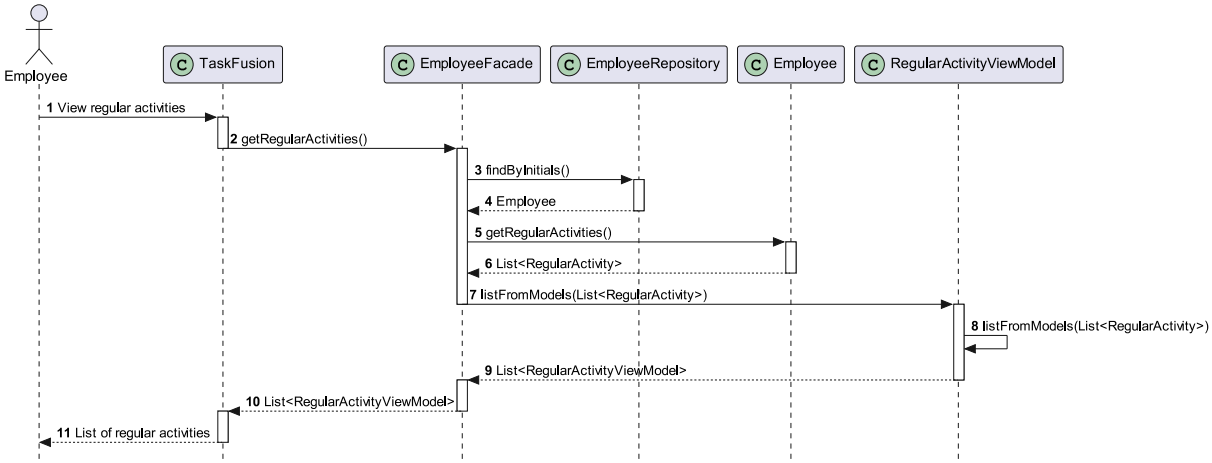
***Figur 14:*** *Sekvensdiagram: Se fast aktivitet*



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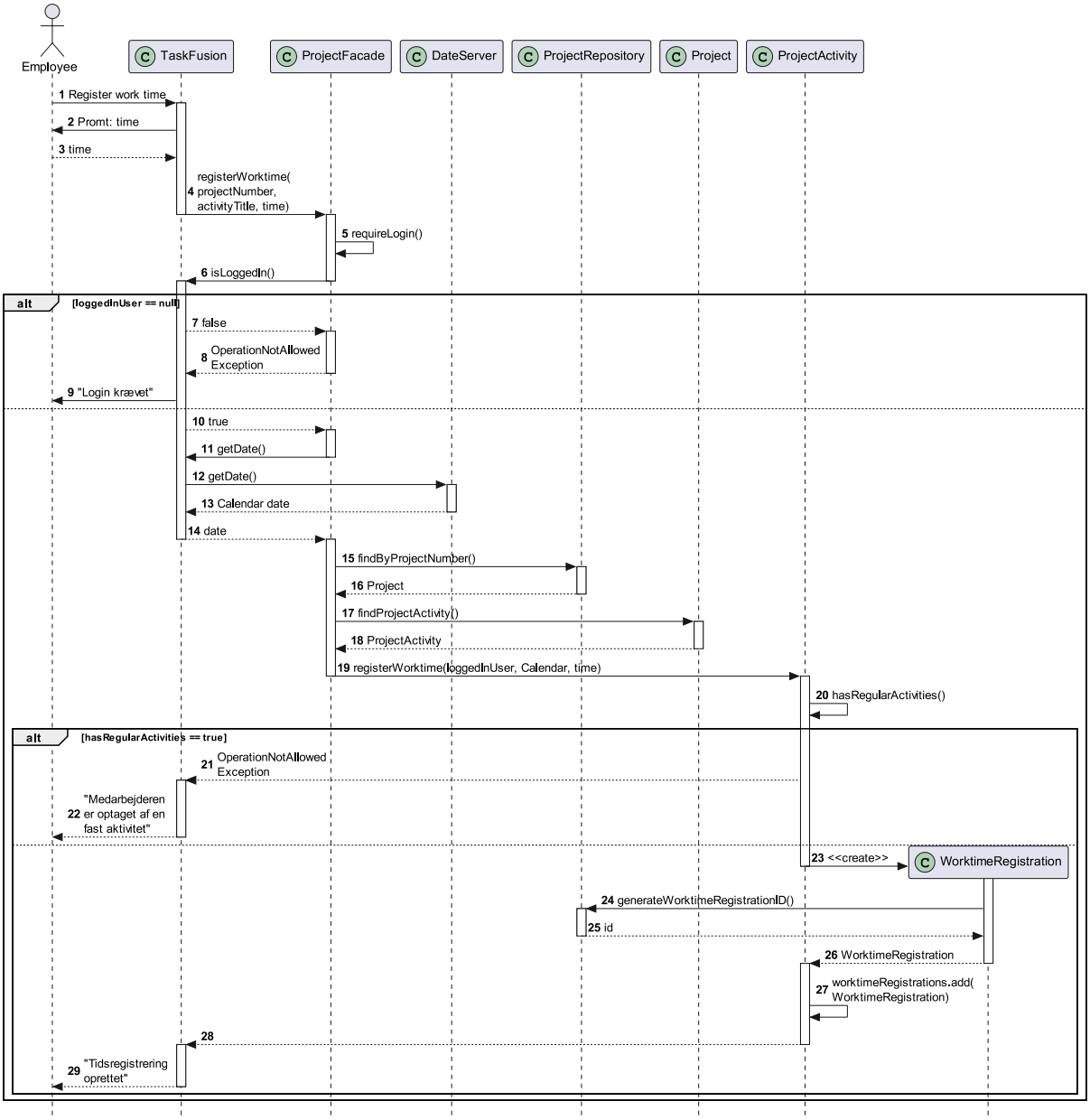
***Figur 15:*** *Sekvensdiagram: Registrer arbejdstid*



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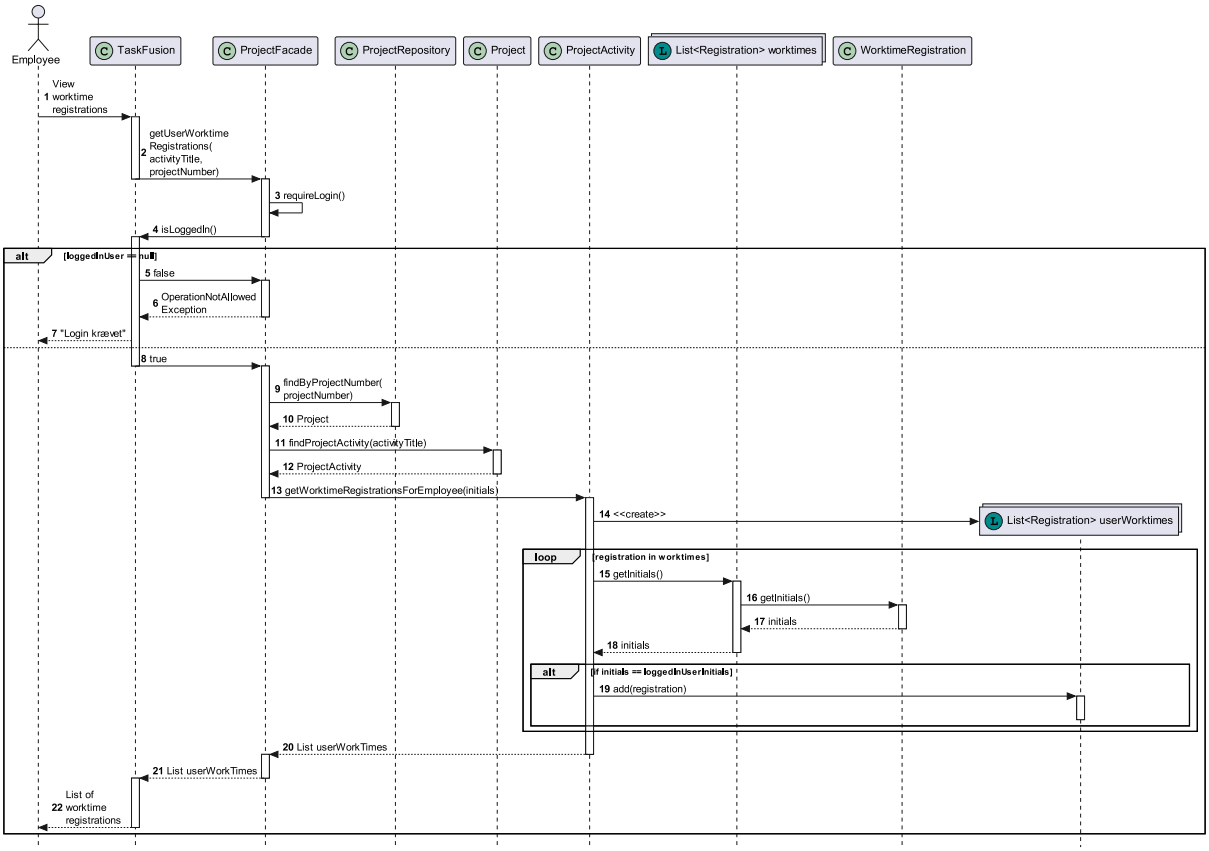
***Figur 16:*** *Sekvensdiagram: Se registreret arbejdstid på projektaktivitet*



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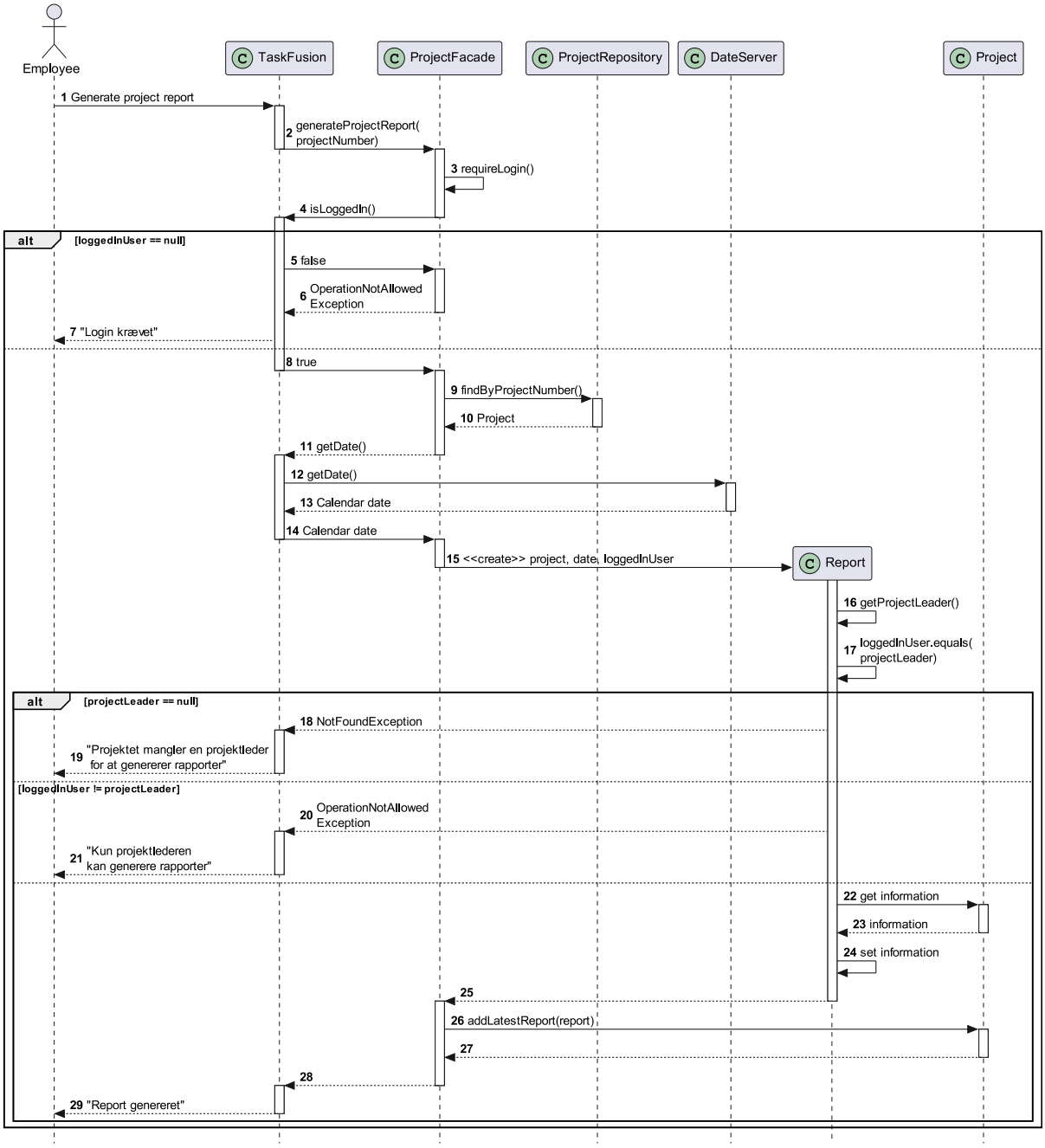
***Figur 17:*** *Sekvensdiagram: Generer projektrapport*



# 4 Diskussion: Programdesign

I dette afsnit bearbejdes to ting kort:

1. Valg af datastrukturer
2. Valg af klassestrukturer

## 4.1. Datastrukturer

I valg af datastrukturer er det vigtigt hvorledes vi henter og gemmer data. I programmet bliver medarbejdere og aktiviteter defineret med en unik streng, mens projekter bliver defineret med et løbenummer. Hvis man for nemheds skyld konverterer løbenummeret til en streng, er der mulighed for, at alle tre objekter kan gemmes i Map strukturer. Dette gør det nemt at hente objekter med `.get(key)`, udføre operationer på objekterne og overskrive objekterne i Map'et med `.put(key, Object)`. Er det nødvendigt at iterere over et Map, kan man også nemt bruge Java's `.stream()` metode. Ønsker man at gemme brugt arbejdstid på en aktivitet, er det derimod nemmest at gemme denne i en List, da arbejdstiden kun akkumuleres.

## 4.2. Klassestrukturer

Programmet skal holdes simpelt og objekter skal nødvendigvis eje hinanden på en simpel måde. Desuden vil der være fokus på at adskille præsentationslag, businesslag og persistency så meget som muligt, således at lav kobling såvel som en overskuelig programstruktur opnås. Selve UI'en vil være en CLI (*command-line-interface*) hvor en struktur bestående af *view*-klasser haves. Yderligere benyttes *facades* til at samle business-lagets funktioner, hvilket gør det let at hente bearbejdet data. Persistency er delt op i to større kategorier: Employees (*EmployeeRepository.java*) og alt vedr. projekter og deres aktiviteter (*ProjectRepository.java*).

# FIGURER



# TABELLER



# LISTINGS