TaskFusion

KRAVSPECIFIKATION & PROGRAMDESIGN

02161 SOFTWARE ENGINEERING 1

Afleveringsgruppe 13:

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github.com/rwiuff/02161ExamProject

8. maj 2023

INDHOLD

Kravspecifikation & Programdesign
Kursus 02161
Software Engineering 1
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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 implementation 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.

Kravspecifikation & Programdesign
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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 31).

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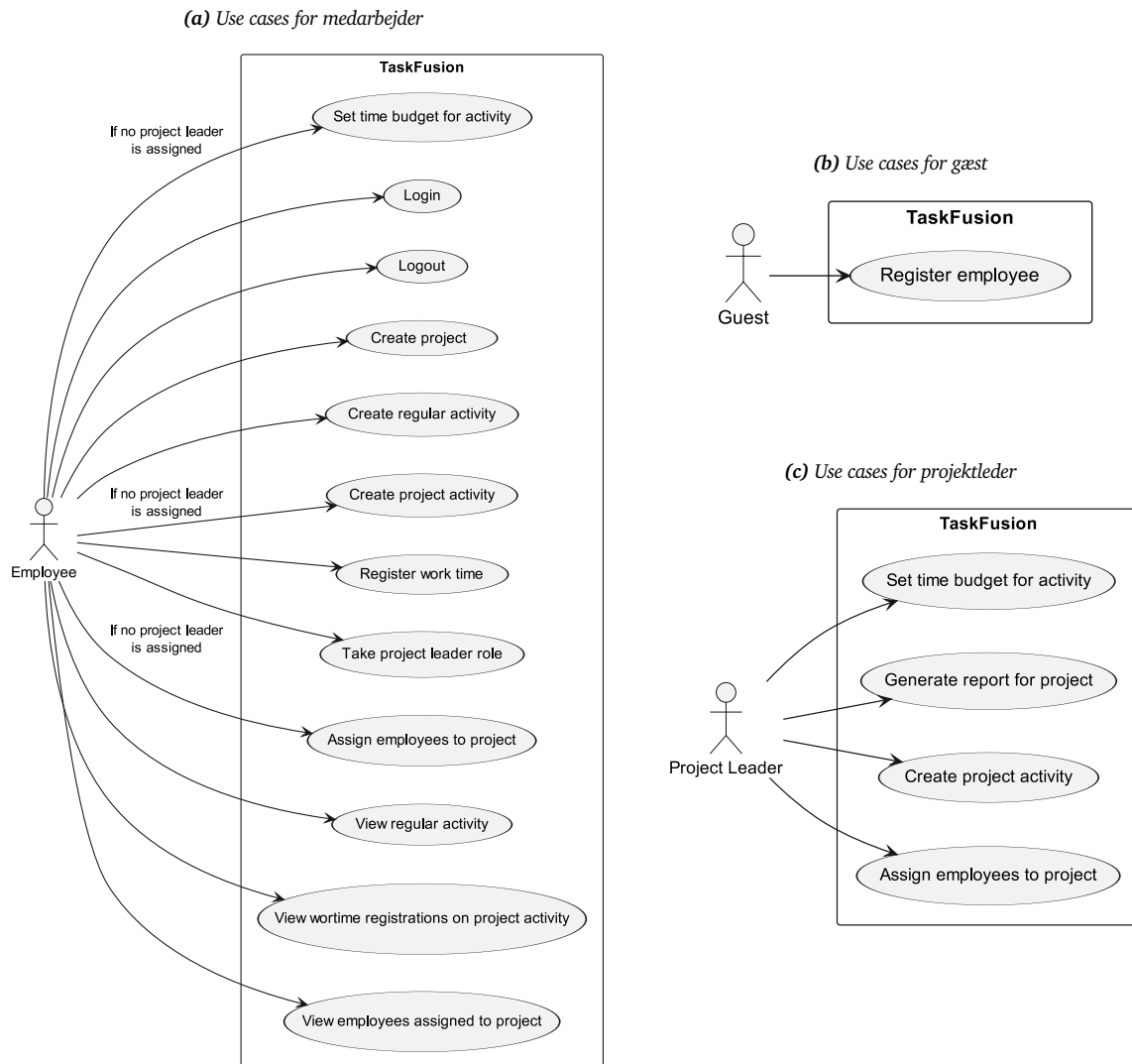
Som beskrevet i Figur 1 har vi tre roller: Medarbejder (Figur 1a), gæst (Figur 1b) og projektleder (Figur 1c). Gæsten er en indgang til et system uden data og kan kun oprette medarbejdere i systemet. Medarbejdere har rettigheder til stort set alle funktioner i programmet, indtil en projektleder udpeges.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

Kravspecifikation & Programdesign
Kursus 02161
Software Engineering 1
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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*

```
1   Feature: Register employee
2   Description: A new employee is added to the application
3   Actors: Guest
4
5   #MAIN SCENARIOS
6   Scenario: 1. Register an employee
7       When the user registers an employee with first name "Michael", last name "Laudrup"
8       Then an employee with first
        ↪ name "Michael", last name "Laudrup" and initials "mila" exists in the application
9
10  #ALTERNATIVE SCENARIOS
11  Scenario: 1a. First name is required to register an employee
12      When the user registers an employee with first name "", last name "Laudrup"
13      Then the error message "Fornavn mangler" is given
14
15  Scenario: 1b. Last name is required to register an employee
16      When the user registers an employee with first name "Michael", last name ""
17      Then the error message "Efternavn mangler" is given
18
19  Scenario: 1c. If initials exists for a new employee, next letter in last name is used
20      When the user registers an employee with first name "Michael", last name "Laudrup"
21      And the user registers an employee with first name "Mikado", last name "Laudrup"
22      Then an employee with first
        ↪ name "Michael", last name "Laudrup" and initials "mila" exists in the application
23      And an employee with
        ↪ first name "Mikado", last name "Laudrup" and initials "milu" exists in the application
24
```

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Software Engineering 1
8. maj 2023

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Listing 2: *Cucmber feature: Login*

```
1   Feature: Employees can login
2   Description: An employee logs in to the application
3   Actors: employee
4
5   #MAIN SCENARIOS
6   Scenario: 1. Login using initials
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       When the user logs in using initials "mila"
9       Then the user with initials "mila" is logged in as an employee
10
11  #ALTERNATIVE SCENARIOS
12  Scenario: 1a. Employee does not exist
13      Given the user logs in using initials "mila"
14      Then the error message "Ukendt medarbejder" is given
15
16  Scenario: 1b. Login is case insensitive
17      Given the user registers an employee with first name "Michael", last name "Laudrup"
18      When the user logs in using initials "MiLa"
19      Then the user with initials "mila" is logged in as an employee
```

Listing 3: *Cucmber feature: Logout*

```
1   Feature: Employees can log out
2   Description: An employee logs out of the application
3   Actors: employee
4
5   #MAIN SCENARIOS
6   Scenario: 1. Logout
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the user logs in using initials "mila"
9       When the user logs out
10      Then none is logged in
```

Kravspecifikation & Programdesign
Kursus 02161
Software Engineering 1
8. maj 2023

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

```
1   Feature: Creating a project
2   Description: An employee creates a project in the application
3   Actors: employee
4
5   #BACKGROUND
6   Background:
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the user logs in using initials "mila"
9
10  #MAIN SCENARIOS
11  Scenario: 1. Creating a project
12      Given the year is 2019
13      When the user creates a project with title "Projektplanlægning"
14      Then a project
        ↪  with title "Projektplanlægning" with project number "19001" exists in the application
15      And the employee "mila" have 1 projects
16
17  Scenario: 2. A project can have a customer
18      Given the year is 2023
19      And the user creates a project with title "Projektplanlægning"
20      When the user sets customer "El-Giganten" on project "23001"
21      Then the project "23001" has customer "El-Giganten"
22      And the employee "mila" have 1 projects
23
24  Scenario: 3. A project in an internal project, if it does not have a customer
25      Given the year is 2023
26      And the user creates a project with title "Projektplanlægning"
27      Then the project "23001" is an internal project
28      And the employee "mila" have 1 projects
29
30  Scenario: 4. Project numbers increments with each new project for the same year
31      Given the year is 2023
32      And the user creates a project with title "Projektplanlægning"
33      When the user creates a project with title "Half-life 3"
34      Then a
        ↪  project with title "Half-life 3" with project number "23002" exists in the application
35      And the employee "mila" have 2 projects
36
```

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Kursus 02161
Software Engineering 1
8. maj 2023

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

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

Kravspecifikation & Programdesign
Kursus 02161
Software Engineering 1
8. maj 2023

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Listing 6: *Cucumber feature: Påtag projektlederrolle*

```
1   Feature: Take on the role of project leader
2   Description: An employee can,
    ↪  when no project leader is assigned to a project, appoint themselves as project leader.
3   Actors: Employees
4
5   #BACKGROUND
6   Background:
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the user registers an employee with first name "Brian", last name "Laudrup"
9       And the user logs in using initials "mila"
10      And the year is 2023
11      And the user creates a project with title "Video game"
12      And the user logs out
13
14  #MAIN SCENARIOS
15  Scenario: 1. An employee can appoint themselves as project leader
16      Given the user logs in using initials "mila"
17      When the user takes the role as project leader on project "23001"
18      Then "mila" is the project leader on project "23001"
19
20  #ALTERNATIVE SCENARIOS
21  Scenario: 1a.
    ↪  An employee appoints himself as project leader on a project where there is already one.
22      Given the user logs in using initials "brla"
23      Given the user takes the role as project leader on project "23001"
24      And the user logs in using initials "mila"
25      Given the user takes the role as project leader on project "23001"
26      Then the error message "Der kan kun være en projektleder" is given
27
28  Scenario: 1b. An employee appoints himself as project leader on a project that does not exist
29      Given the user logs in using initials "mila"
30      And the user takes the role as project leader on project "25001"
31      Then the error message "Projektet kunne ikke findes i samlingen af projekter" is given
```

Kravspecifikation & Programdesign
Kursus 02161
Software Engineering 1
8. maj 2023

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Listing 7: Cucmber feature: Tildel medarbejder til projekt

```
1   Feature: Assign employees onto project
2   Description: Project leader assigns emplyees for a project
3   Actors: Project leader
4
5   #BACKGROUND
6   Background:
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the year is 2023
9       And the user logs in using initials "mila"
10      And the user creates a project with title "Video game"
11      And the user logs out
12
13  #MAIN SCENARIO
14  Scenario: 1. Employee assigns employee to project
15      Given the user logs in using initials "mila"
16      And the user registers an employee with first name "Brian", last name "Laudrup"
17      And the user assigns "brla" to the project "23001"
18      Then the employee "brla" is assigned to the project "23001"
19      And the employee "brla" have 1 projects
20
21  Scenario: 2. Project manager assigns an employee
22      Given the user logs in using initials "mila"
23      And the user takes the role as project leader on project "23001"
24      And the user registers an employee with first name "Brian", last name "Laudrup"
25      When the user assigns "brla" to the project "23001"
26      Then the employee "brla" is assigned to the project "23001"
27      And the employee "brla" have 1 projects
28
29  #ALTERNATIVE SCENARIOS
30  Scenario: 1a. Employee assigns employee to project, with other employee as project leader
31      Given the user logs in using initials "mila"
32      And the user takes the role as project leader on project "23001"
33      And the user registers an employee with first name "Brian", last name "Laudrup"
34      And the user registers an employee with first name "Pape", last name "Poulsen"
35      And the user logs out
36      When the user logs in using initials "brla"
37      And the user assigns "papo" to the project "23001"
38      Then the error message "Kun projektleder kan tildele medarbejdere til projektet" is given
39      And the employee "papo" have 0 projects
40
41  Scenario: 1b. Employee doesn't exist
42      Given the user logs in using initials "mila"
43      And the user assigns "brla" to the project "23001"
44      Then the error message "Ukendt medarbejder" is given
```

Kravspecifikation & Programdesign
Kursus 02161
Software Engineering 1
8. maj 2023

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Listing 8: Cucumber feature: Se medarbejdere tilknyttet et projekt

```
1   Feature: Get a list of participating employees from a project
2   Description: An employee can get a list of employees assigned to a project.
3   Actors: Employees
4
5   Background:
6       Given the user registers an employee with first name "Michael", last name "Laudrup"
7       And the user logs in using initials "mila"
8       And the year is 2023
9       And the user creates a project with title "Video game"
10      And the user assigns the project
          ↪ activity "Graphics design" to project "23001" with startWeek "2304" and endWeek "2305"
11      And the user logs out
12
13  Scenario: 1. An employee can view a list of employees assinged to an activity
14      Given the user logs in using initials "mila"
15      And the user registers an employee with first name "Brian", last name "Laudrup"
16      And the user assigns "brla" to the project "23001"
17      And the user assigns "mefr" to the project "23001"
18      When the
          ↪ user requests a list of employees assigned to the project with project number "23001"
19      Then the employee list contains 2 items
```

Listing 9: Cucmber feature: Opret projektaktivitet som projektleder

```
1   Feature: Creating a project activity for a project with assigned project leader
2   Description: A project leader creates a project activity for a project
3   Actors: employee, projectleader
4
5   #BACKGROUND
6   Background:
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the user registers an employee with first name "Mette", last name "Frederiksen"
9       And the user logs in using initials "mefr"
10      And the year is 2019
11      And the user creates a project with title "Video game"
12      And the user takes the role as project leader on project "19001"
13      And the user logs out
14
15  #MAIN SCENARIOS
16  Scenario: 1. A project leader can create a project activity
17      Given the user logs in using initials "mefr"
18      When the user assigns the project
          ↪ activity "Graphics design" to project "19001" with startWeek "1901" and endWeek "1902"
19      Then the project
          ↪ with the project number "19001" has a project activity titled "Graphics design"
20
21  #ALTERNATIVE SCENARIOS
22  Scenario:
      ↪ 1a. An employee is not able to create a project activity, when a projectleader is assigned
23      Given the user logs in using initials "mila"
24      When the user assigns the project
          ↪ activity "Graphics design" to project "19001" with startWeek "1901" and endWeek "1902"
25      Then the error message
          ↪ "Kun projektlederen kan oprette en projekt aktivitet for dette projekt" is given
```

Kravspecifikation & Programdesign
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Software Engineering 1
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Listing 10: Cucmber feature: Opret projektaktivitet som medarbejder (fortsætter på Listing 11)

```
1   Feature: Creating a project activity for a project without a project leader
2     Description: An employee creates a project activity for a project without a project leader
3     Actors: employee
4
5   #BACKGROUND
6   Background:
7     Given the user registers an employee with first name "Michael", last name "Laudrup"
8     And the user logs in using initials "mila"
9     And the year is 2022
10    And the user creates a project with title "Video Game"
11
12  #MAIN SCENARIOS
13  Scenario: 1. Creating a project activity
14    When the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
15    Then the
        ↪ project with the project number "22001" has a project activity titled "Graphics design"
16
17  Scenario: 2. A time budget can be added to a project activity
18    Given the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
19    When the user sets the time budget to 50 hours
        ↪ on the project activity with the title "Graphics design" and project number "22001"
20    Then the project activity with
        ↪ the title "Graphics design" and project number "22001" has a time budget of 50 hours
21
22  Scenario: 3. A start week can be set to a project activity
23    Given the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2204" and endWeek "2205"
24    Then the project activity
        ↪ with the title "Graphics design" and project number "22001" has start week "2204"
25
26  Scenario: 4. An end week can be set to a project activity
27    Given the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2204" and endWeek "2205"
28    Then the project
        ↪ activity with title "Graphics design" and project number "22001" has end week "2205"
29
30  #ALTERNATIVE SCENARIOS
31  Scenario: 1a. A guest is not able to create a project activity
32    Given the user logs out
33    When the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
34    Then the error message "Login krævet" is given
35
36  Scenario: 1b. A project activity title is unique in a project
37    Given the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
38    When the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
39    Then the error message "Projekt aktivitet findes allerede" is given
40
41  Scenario: 2a. A guest is not able to set a time budget on a project activity
42    Given the user logs out
43    And the user assigns the project
        ↪ activity "Graphics design" to project "22001" with startWeek "2201" and endWeek "2202"
44    When the user sets the time budget to 50 hours
        ↪ on the project activity with the title "Graphics design" and project number "22001"
45    Then the error message "Login krævet" is given
46
```

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

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

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Kursus 02161
Software Engineering 1
8. maj 2023

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Listing 12: Cucmber feature: Anfør tidsbudget på projektaktivitet

```
1  Feature: Set time budget for a regular activity
2  Description: Project leader assigns the time bugdet for a given activity
3  Actors: Project manager
4
5  #BACKGROUND
6  Background:
7    Given the user registers an employee with first name "Michael", last name "Laudrup"
8    And the user registers an employee with first name "Mette", last name "Frederiksen"
9    And the year is 2015
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 "15001"
13   And the user assigns the project
      ↪ activity "Graphics design" to project "15001" with startWeek "2301" and endWeek "2305"
14   And the user logs out
15
16 #MAIN SCENARIO
17 Scenario: 1. Project manager assigns a time budget
18     Given the user logs in using initials "mila"
19     And the user sets the time budget to 32 hours
        ↪ on the project activity with the title "Graphics design" and project number "15001"
20     Then the project activity with
        ↪ the title "Graphics design" and project number "15001" has a time budget of 32 hours
21
22 #ALTERNATIVE SCENARIOS
23 Scenario: 1a. Employee assigns time buget
24     Given the user logs in using initials "mefr"
25     And the user sets the time budget to 32 hours
        ↪ on the project activity with the title "Graphics design" and project number "15001"
26     Then the error message "Kun projektlederen kan tildele tidsbudgetter" is given
```

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

```
1  Feature: Creating a regular activity
2  Description: An employee creates a regular activity in the application
3  Actors: employee
4  test
5
6  #BACKGROUND
7  Background:
8      Given the user registers an employee with first name "Michael", last name "Laudrup"
9      And the user logs in using initials "mila"
10     And the year is 2023
11
12 #MAIN SCENARIOS
13 Scenario: 1. Creating a regular activity
14     When the
        ↪ user creates the regular activity "Ferie" with start week "2304" and end week "2306"
15     Then the user
        ↪ has a regular activity with title "Ferie" with start week "2304" and end week "2306"
16
```

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8. maj 2023

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

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

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Kursus 02161
Software Engineering 1
8. maj 2023

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Listing 15: Cucumber feature: Se fast aktivitet

```gherkin
1  Feature: View regular activity
2    Description: An employee wishes to view a regular activity
3    Actors: employee
4
5  #MAIN SCENARIOS
6  Background:
7      Given the year is 2023
8      And the user registers an employee with first name "Michael", last name "Laudrup"
9      And the user logs in using initials "mila"
10     And the
          ↪ user creates the regular activity "Ferie" with start week "2304" and end week "2306"
11     And the user creates the regular activity "Syg" with start week "2304" and end week "2306"
12     And the user logs out
13
14 Scenario: 1. A employee can view a list of their regular activites
15     Given the user logs in using initials "mila"
16     When the user requests a list of own regular activities
17     Then the regular activities list contains 2 items
18
19 Scenario: 2. A employee can view a regular activity
20     Given the user logs in using initials "mila"
21     When the user requests a regular activity with id 2
22     Then a regular
          ↪ activity is returned with id 2, title "Syg", start week "2304" and end week "2306"
23
24 #ALTERNATIVE SCENARIOS
25 Scenario: 2a. Only owners of a regular activity can view it
26     Given the user registers an employee with first name "Brian", last name "Laudrup"
27     And the user logs in using initials "brla"
28     When the user requests a regular activity with id 1
29     Then the error message "Du har ikke rettighed til at se denne aktivitet" is given
30
31 Scenario: 2b. Guests cant view a regular activity
32     When the user requests a regular activity with id 1
33     Then the error message "Login krævet" is given
34
35 Scenario: 2c. A non existing id is given
36     Given the user registers an employee with first name "Brian", last name "Laudrup"
37     And the user logs in using initials "brla"
38     When the user requests a regular activity with id 3
39     Then the error message "Kunne ikke finde fast aktivitet" is given
40
41 Scenario: 2d. A non existing parameter list is given
42     Given the user
          ↪ registers an employee with first name "Mette Frederiksen", last name "Frederiksen"
43     And the user logs in using initials "mefr"
44     When the
          ↪ user requests a regular activity "Ferie" with start week "2404" and end week "2305"
45     Then the user does not have such a regular activity
```

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8. maj 2023

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

```
1   Feature: Register work time on a project activity
2   Description: An employee registers their work time on a project activity.
3   Actors: employee
4
5   #BACKGROUND
6   Background:
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the user logs in using initials "mila"
9       And the year is 2023
10      And the user creates a project with title "Video Game"
11      And the user assigns the project
        ↪ activity "Graphics design" to project "23001" with startWeek "2303" and endWeek "2305"
12
13  #MAIN SCENARIOS
14  Scenario: 1. Register work time on project activity
15      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"
16      Then the user has 6 hours of registered work
        ↪ time on the project activity with title "Graphics design" and project number "23001"
17
18  Scenario: 2. Register work time on project activity twice
19      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"
20      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"
21      Then the user has 8 hours of registered work
        ↪ time on the project activity with title "Graphics design" and project number "23001"
22
23  Scenario: 3. User can register worktime if a regular activity exists outside activity period
24      Given the
        ↪ user creates the regular activity "Ferie" with start week "2305" and end week "2306"
25      And the user
        ↪ creates the regular activity "Sygeorlov" with start week "2301" and end week "2302"
26      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"
27      Then the user has 6 hours of registered work
        ↪ time on the project activity with title "Graphics design" and project number "23001"
28
29  Scenario: 4. User cannot register worktime if a regular activity exists in activity period
30      Given the
        ↪ user creates the regular activity "Ferie" with start week "2303" and end week "2304"
31      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"
32      Then the error message "Medarbejderen er optaget af den faste aktivitet: Ferie" is given
33
```

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8. maj 2023

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

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

Listing 18: Cucumber feature: Se resterende arbejdstid

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

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8. maj 2023

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

```gherkin
1   Feature: View summary of registered work time pr. activity
2   Description: A project leader can view a summary of registered work time per activity
3   Actors: Project leader and employee
4
5   # #BACKGROUND
6   Background:
7       Given the user registers an employee with first name "Michael", last name "Laudrup"
8       And the user registers an employee with first name "Lars", last name "Svendsen"
9       And the year is 2025
10      And the user logs in using initials "lasv"
11      And the user creates a project with title "Video game"
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 assigns the project
         ↪ activity "Gameplay" to project "25001" with startWeek "2501" and endWeek "2502"
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      #ID 1
17      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"
18      #ID 2
19      And the user logs in using initials "mila"
20      And the user registers a work time of 10 hours to
         ↪ the project activity with title "Gameplay" in the project with project number "25001"
21      #ID 1
22      And the user registers a work time of 10 hours to
         ↪ the project activity with title "Gameplay" in the project with project number "25001"
23      #ID 2
24
25      #MAIN SCENARIO
26      Scenario: 1. The project leader can view a summary of registered work time pr. activity
27          Given the user logs in using initials "lasv"
28          When the user requests
             ↪ a list of all worktime registrations for the project with project number "25001"
29          Then the worktime registration list contains 4 items
30
31      # ALTERNATIVE SCENARIO
32      Scenario: 1a. An employee
         ↪ recieves an error message when attempting to view the summary of registered work time
33          Given the user logs in using initials "mila"
34          When the user requests
             ↪ a list of all worktime registrations for the project with project number "25001"
35          Then the error
             ↪ message "Kun projektlederen kan tilgå oversigten af arbejdstid for projektet" is given
36
37      Scenario: 1b. A project leader can only
         ↪ view the summary of registered work time for the project to which the person is assigned
38          Given the user logs in using initials "mila"
39          And the user creates a project with title "Web development"
40          And the user takes the role as project leader on project "25002"
41          And the user logs in using initials "lasv"
42          When the user requests
             ↪ a list of all worktime registrations for the project with project number "25002"
43          Then the error
             ↪ message "Kun projektlederen kan tilgå oversigten af arbejdstid for projektet" is given
44
```

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Software Engineering 1
8. maj 2023

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

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

Listing 21: *Cucmber feature: Generér 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
```

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8. maj 2023

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Listing 22: *Cucmber feature: Generér 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**.

---

[1](Keep it Short and simple, some also refer to it as Keep It Simple Stupid)

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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.

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

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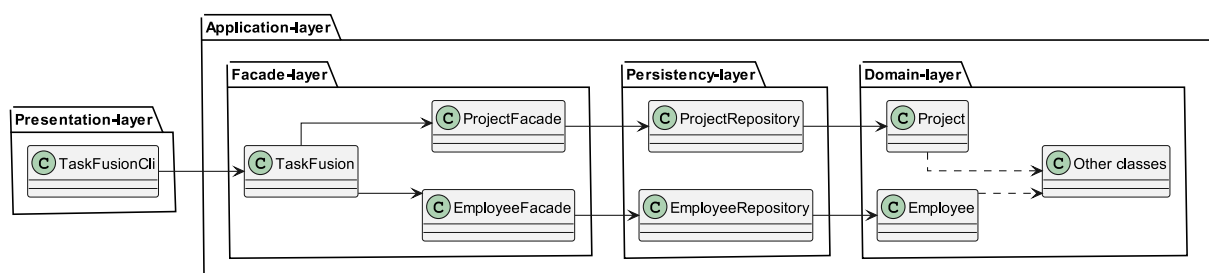
Figur 3: TaskFusion klasser i domain laget

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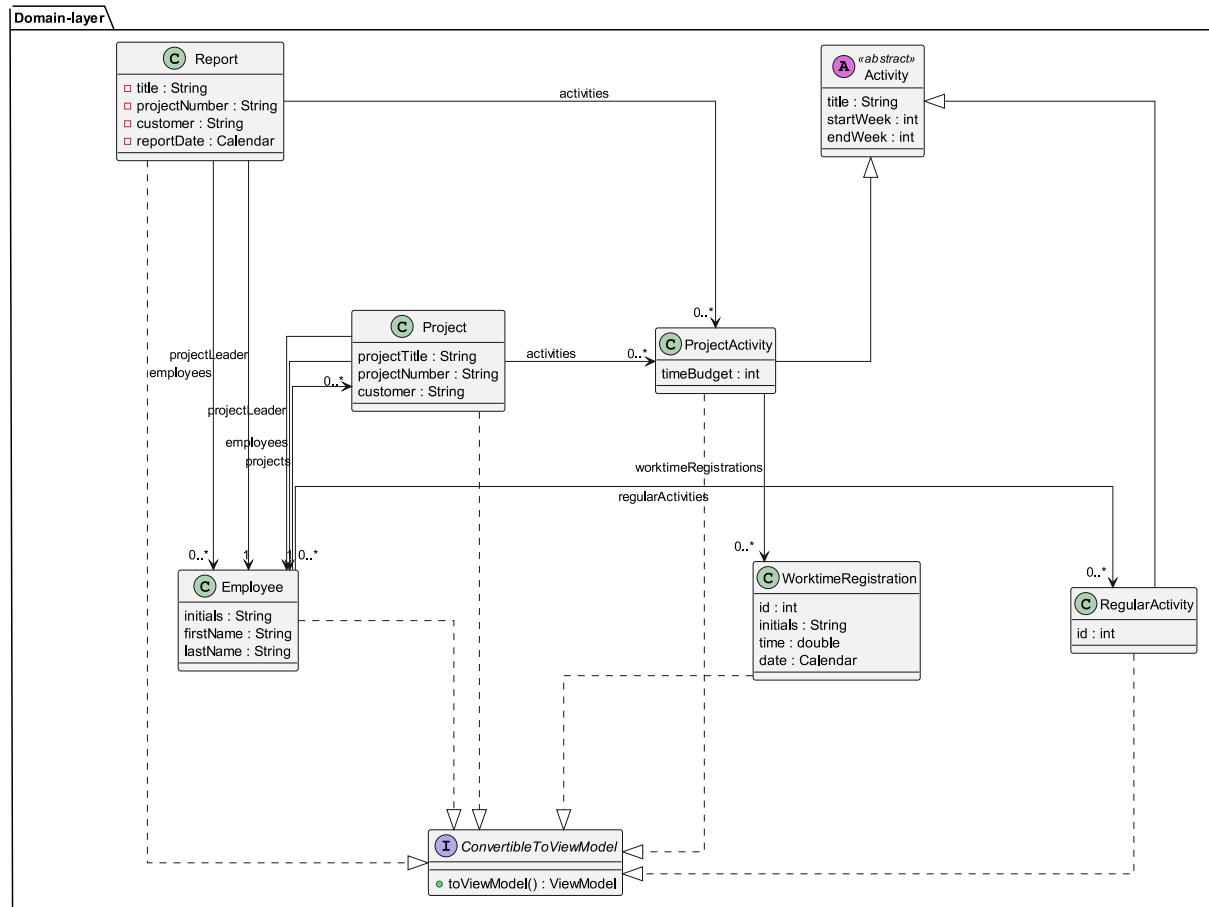
3.2. SEKVENSDIAGRAMMER

Figur 4: *Sekvensdiagram: Opret medarbejder*

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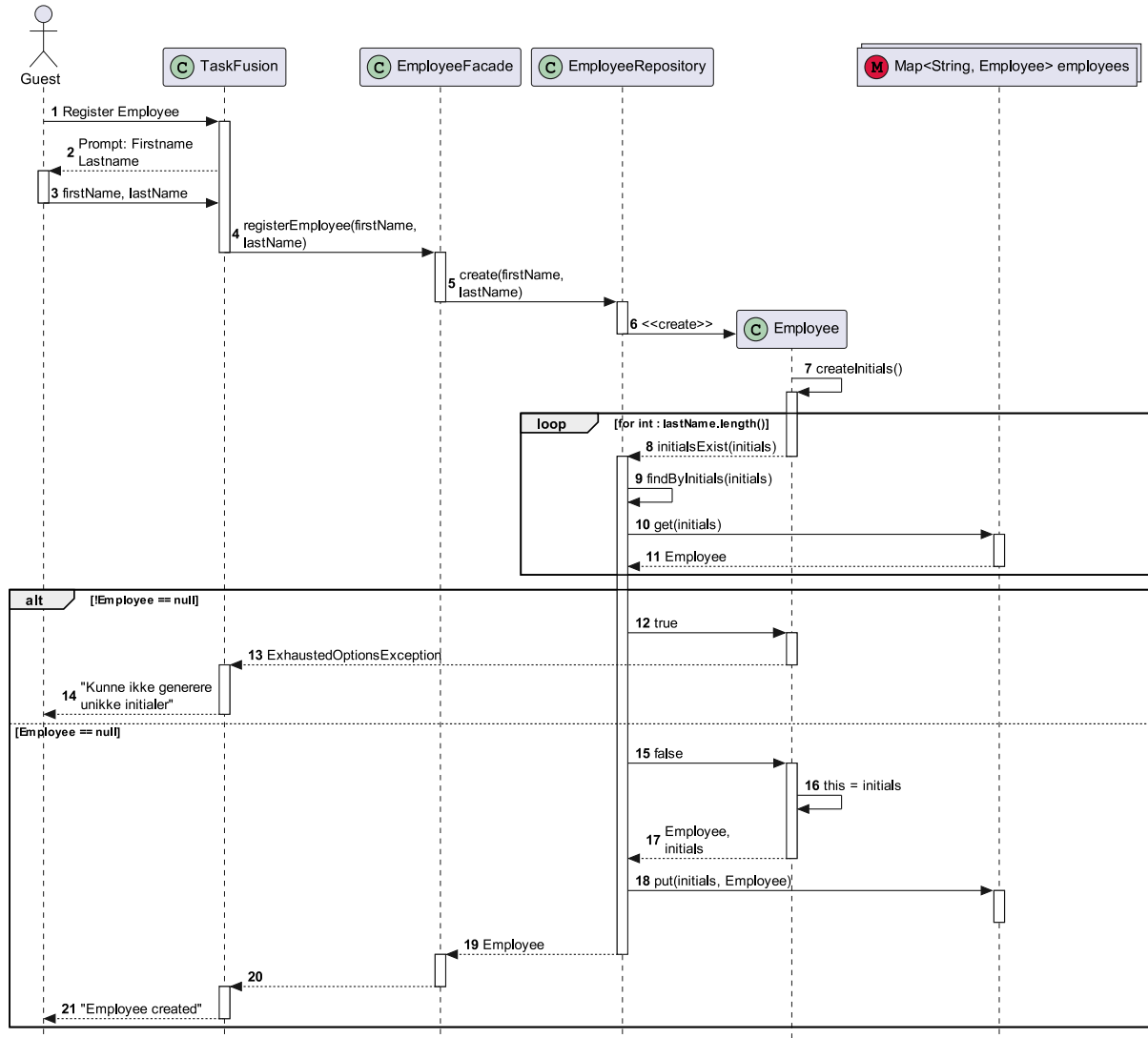
Figur 5: *Sekvensdiagram: Login*
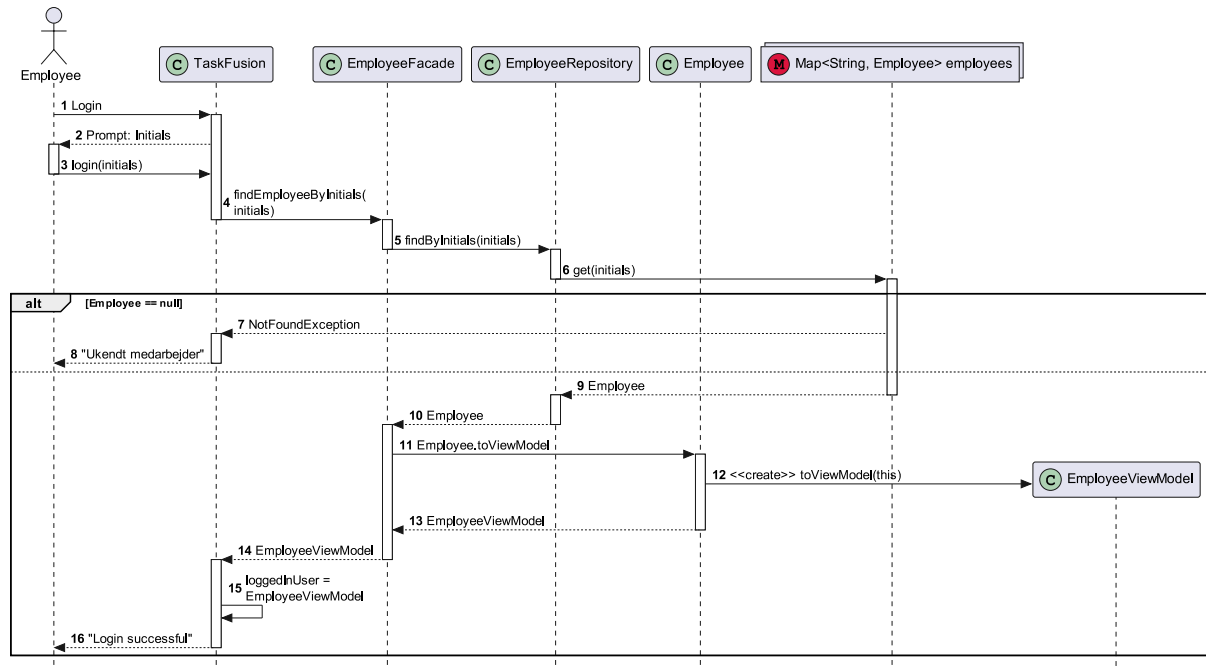
Figur 6: *Sekvensdiagram: Logout*

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Software Engineering 1
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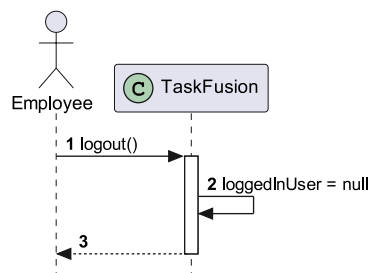
Figur 7: *Sekvensdiagram: Opret projekt*

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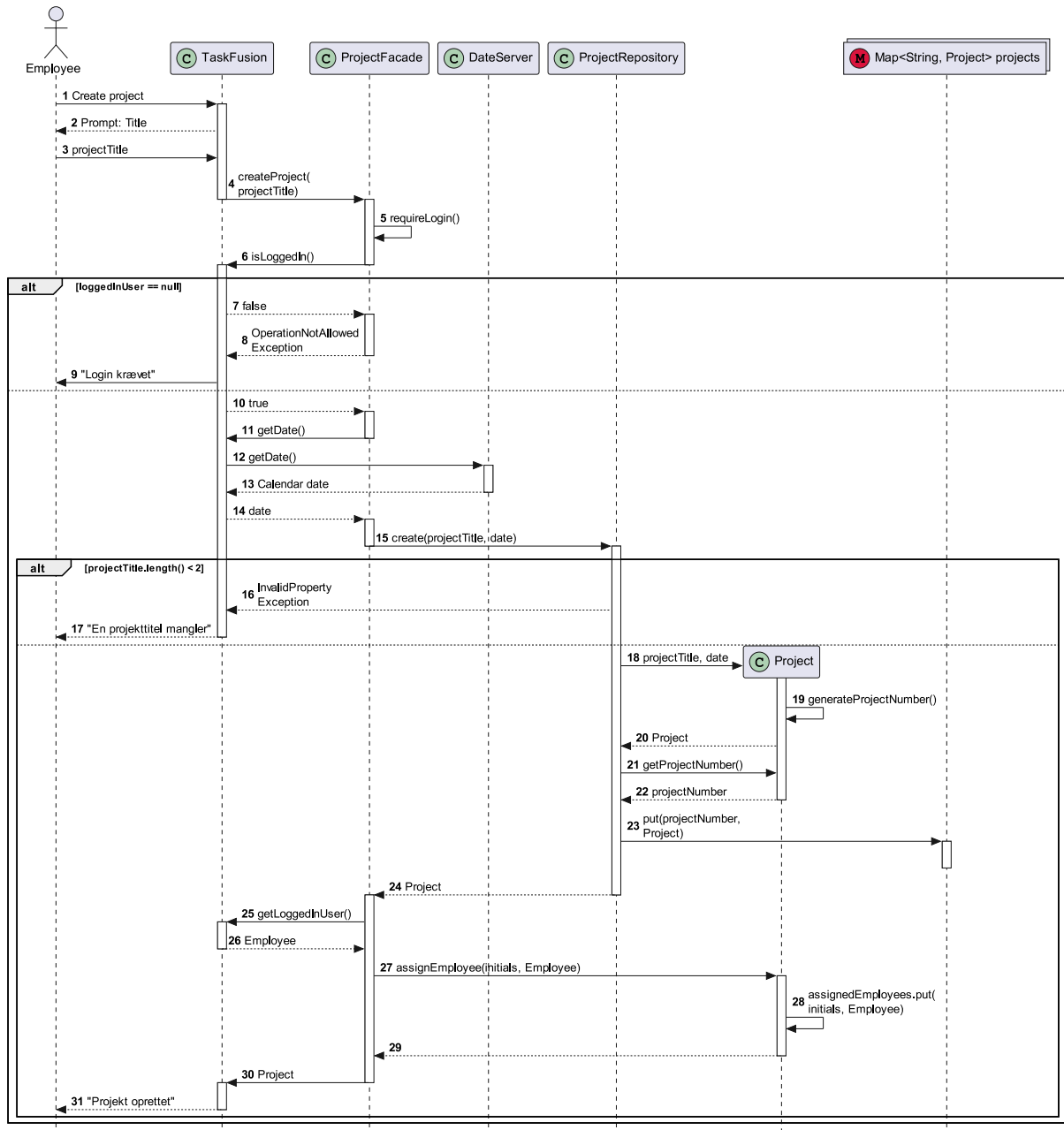
Figur 8: *Sekvensdiagram: Påtag projektlederrolle*
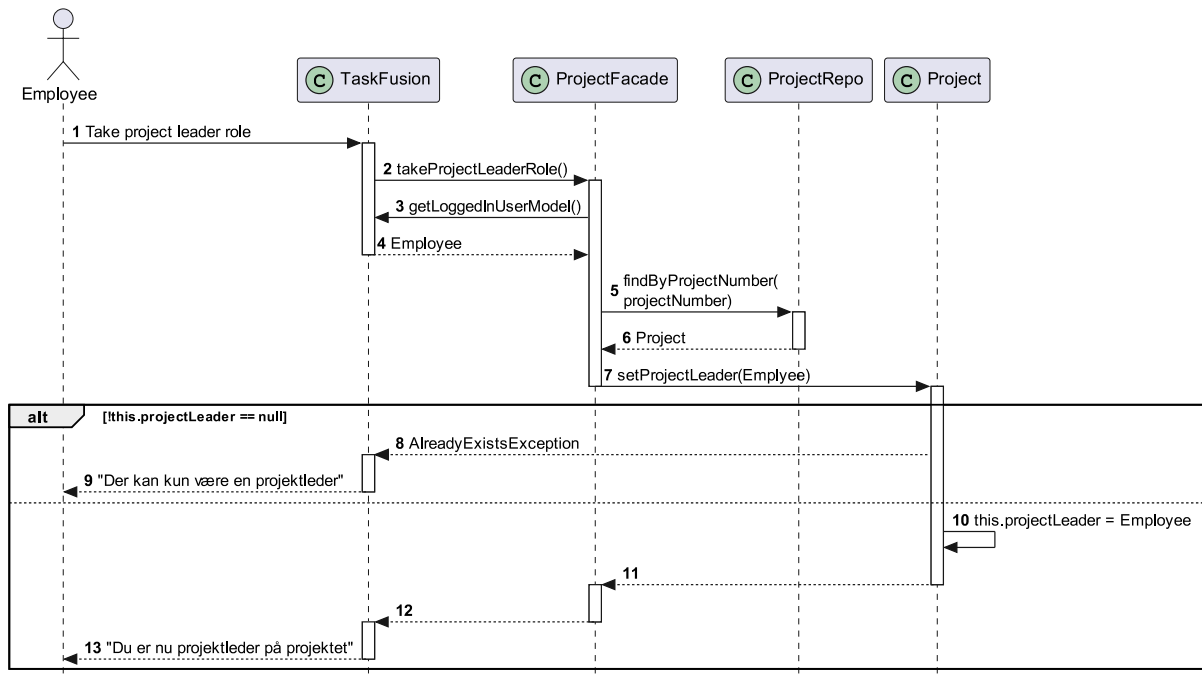
Figur 9: *Sekvensdiagram: Tildel medarbejder til projekt*

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Software Engineering 1
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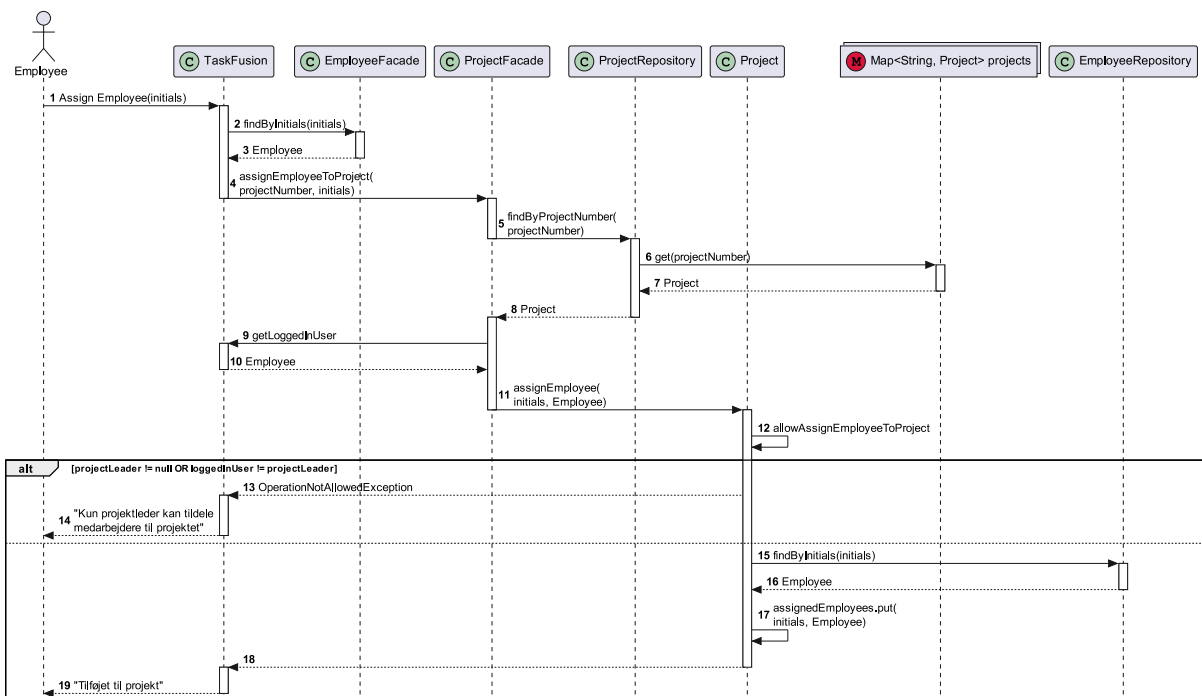
Figur 10: *Sekvensdiagram: Se medarbejdere tilknyttet et projekt*

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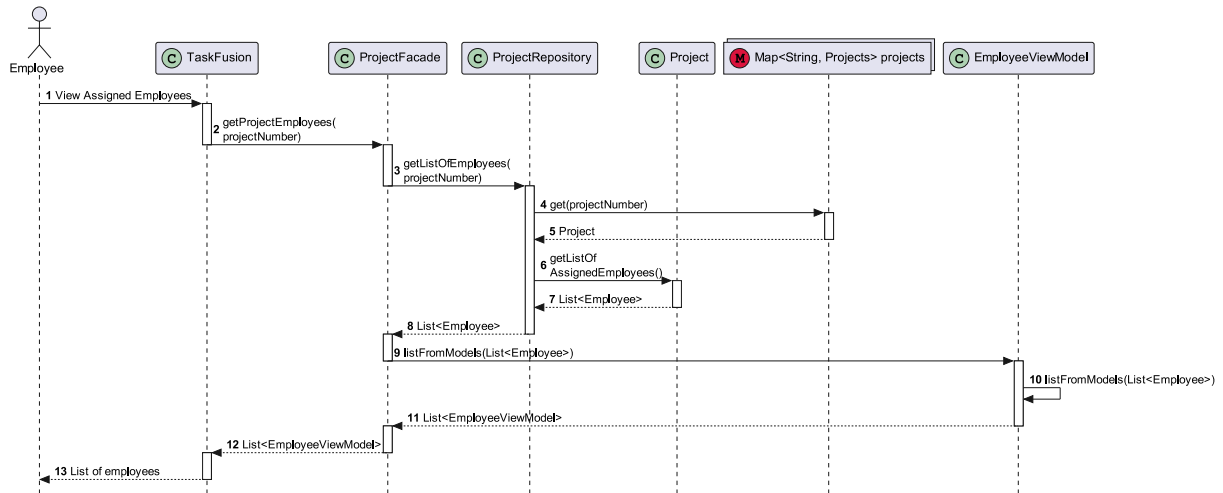
Figur 11: *Sekvensdiagram: Opret projektaktivitet*

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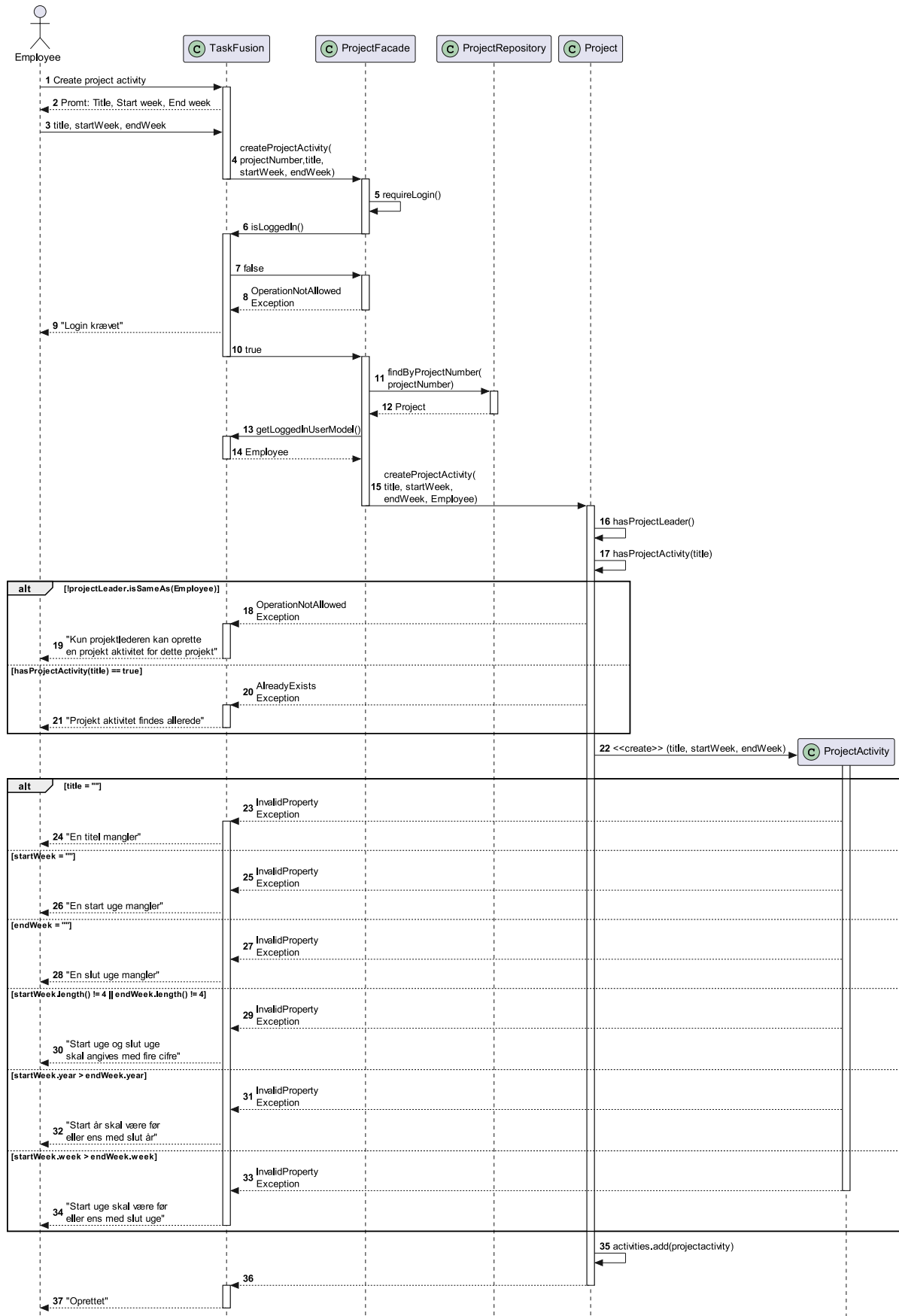
Figur 12: *Sekvensdiagram: Anfør tidsbudget på projektaktivitet*
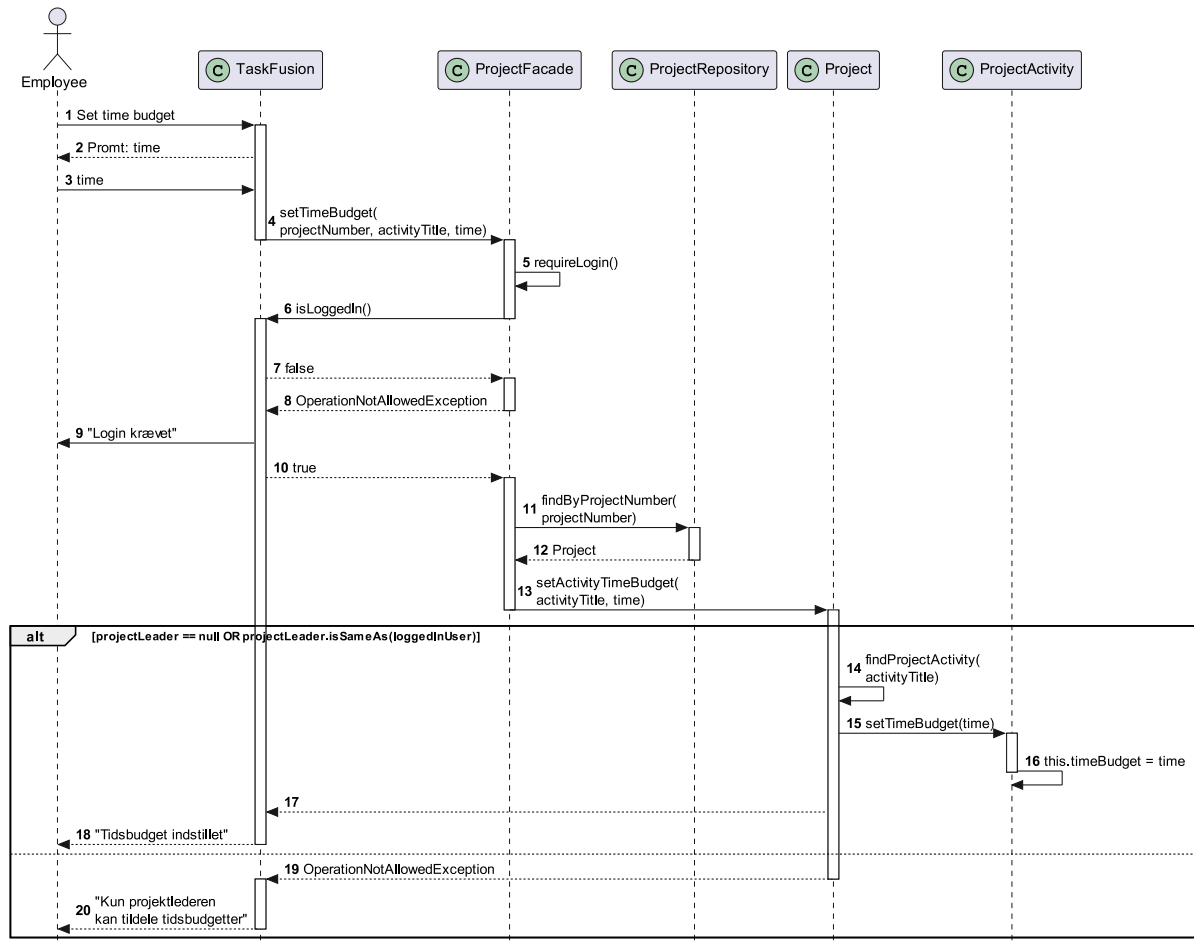
Figur 13: *Sekvensdiagram: Opret fast aktivitet*

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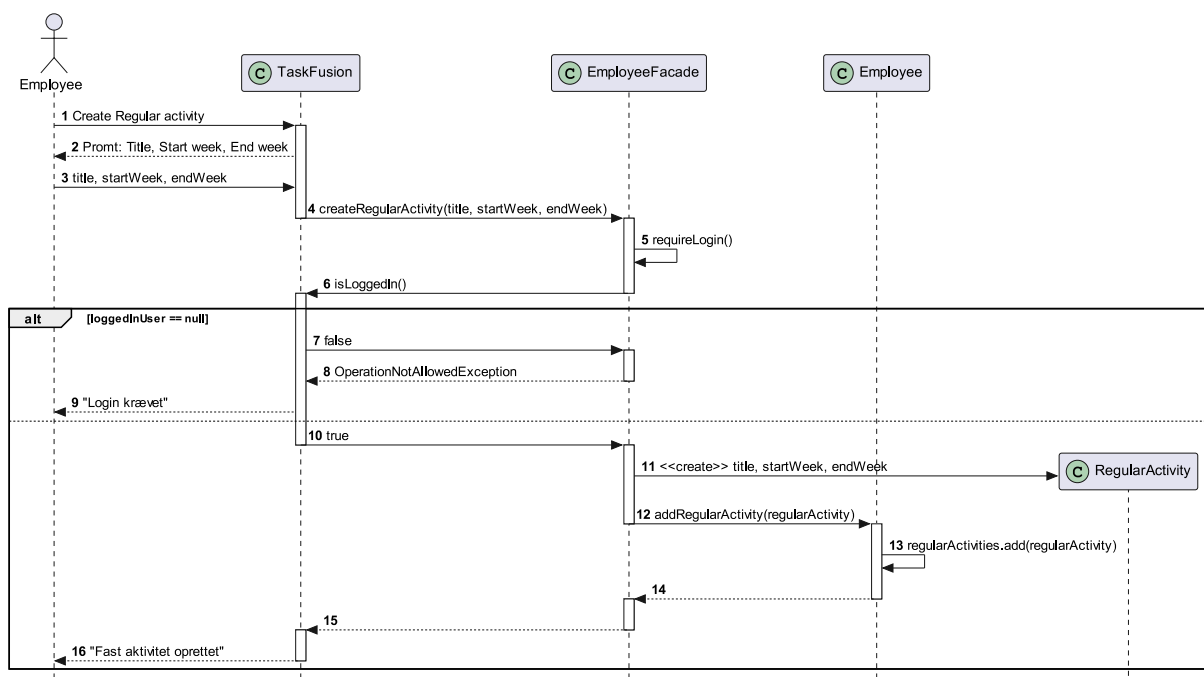
Figur 14: *Sekvensdiagram: Se fast aktivitet*
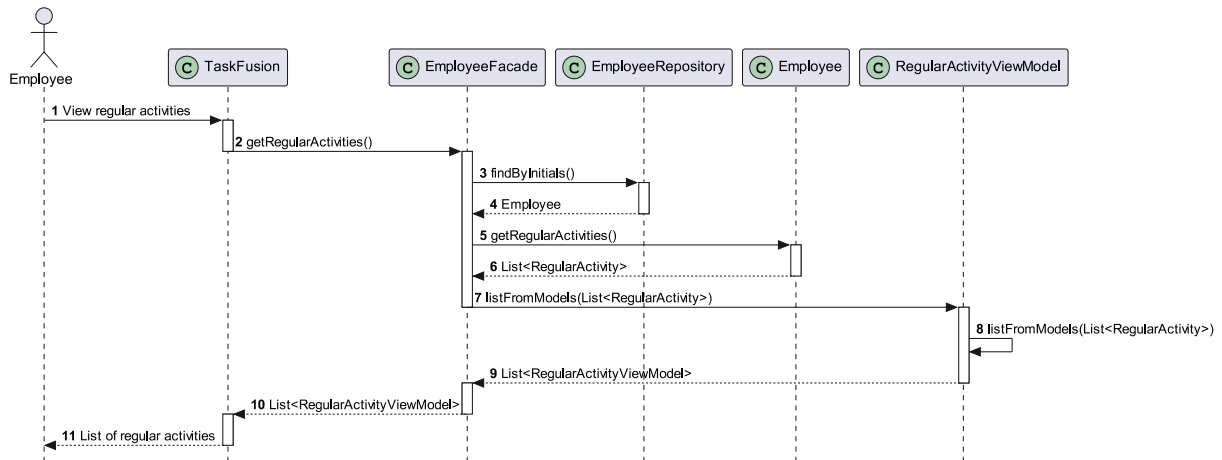
Figur 15: *Sekvensdiagram: Registrer arbejdstid*

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Kursus 02161
Software Engineering 1
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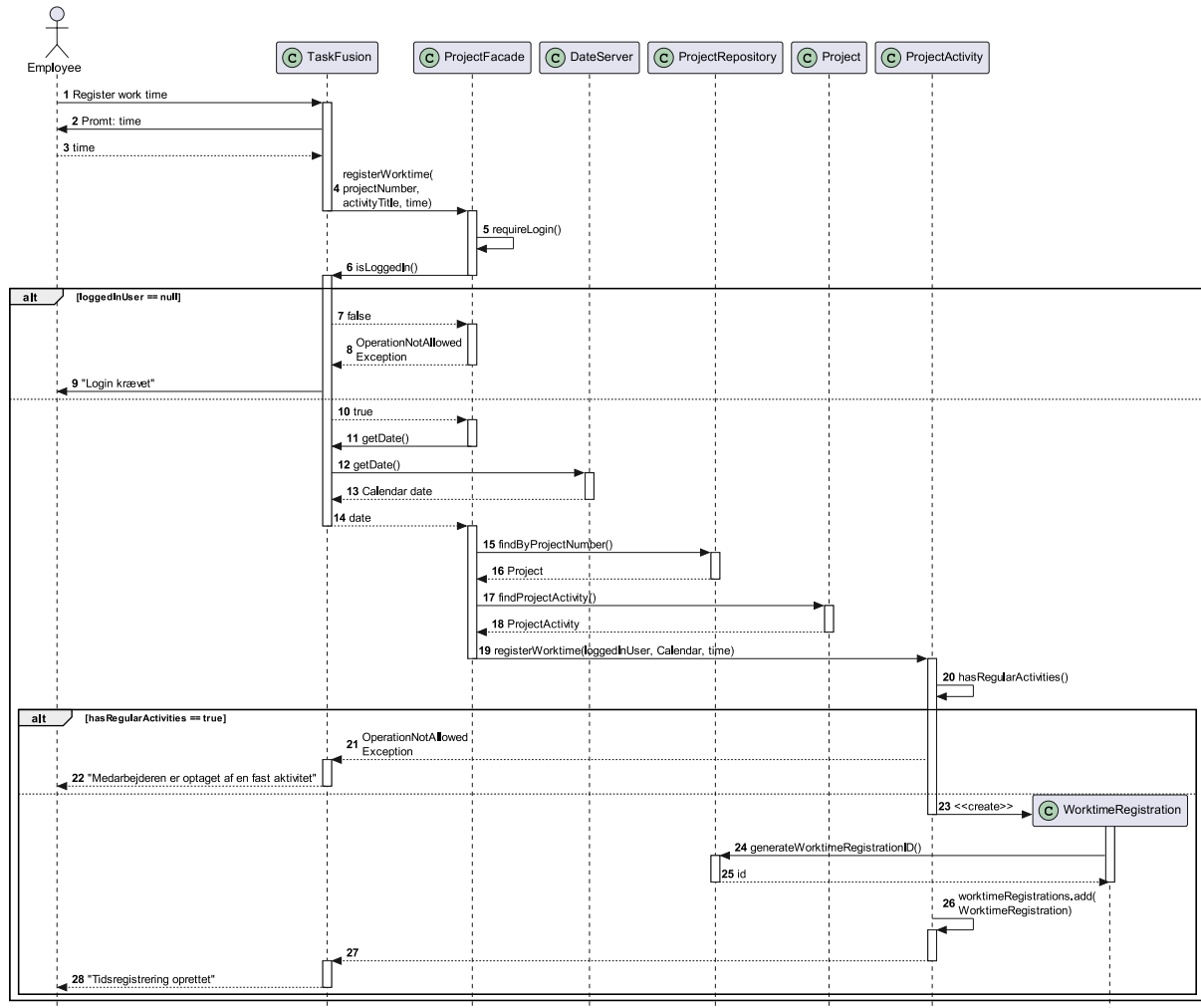
Figur 16: *Sekvensdiagram: Se registreret arbejdstid på projektaktivitet*

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Software Engineering 1
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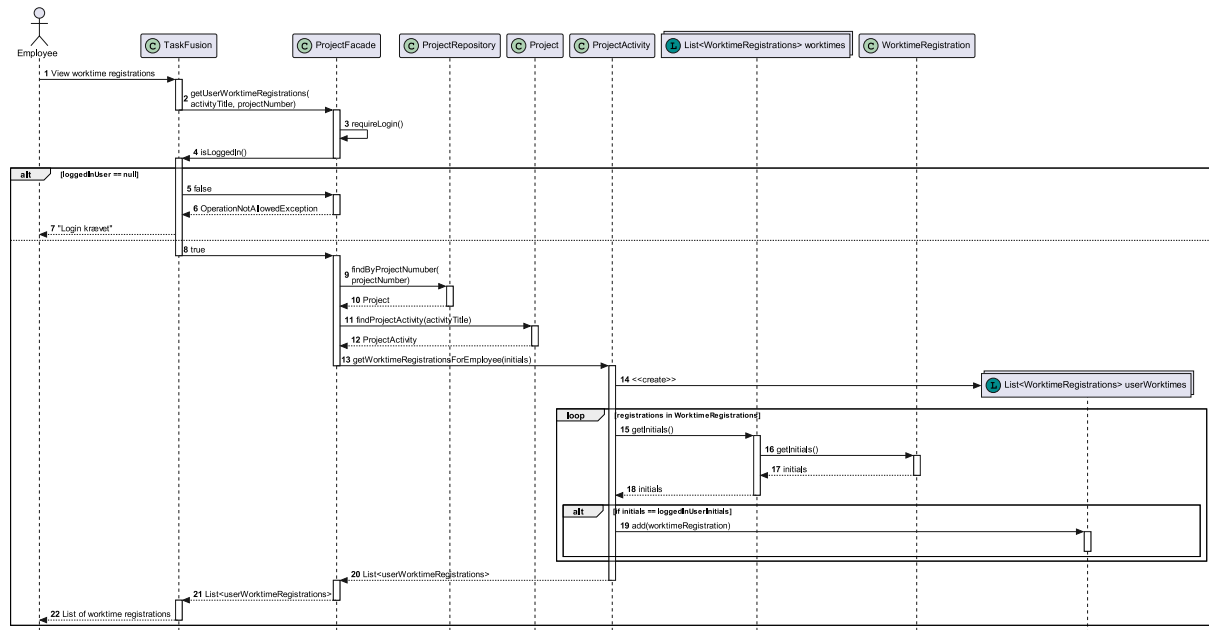
Figur 17: Sekvensdiagram: Generér projektrapport
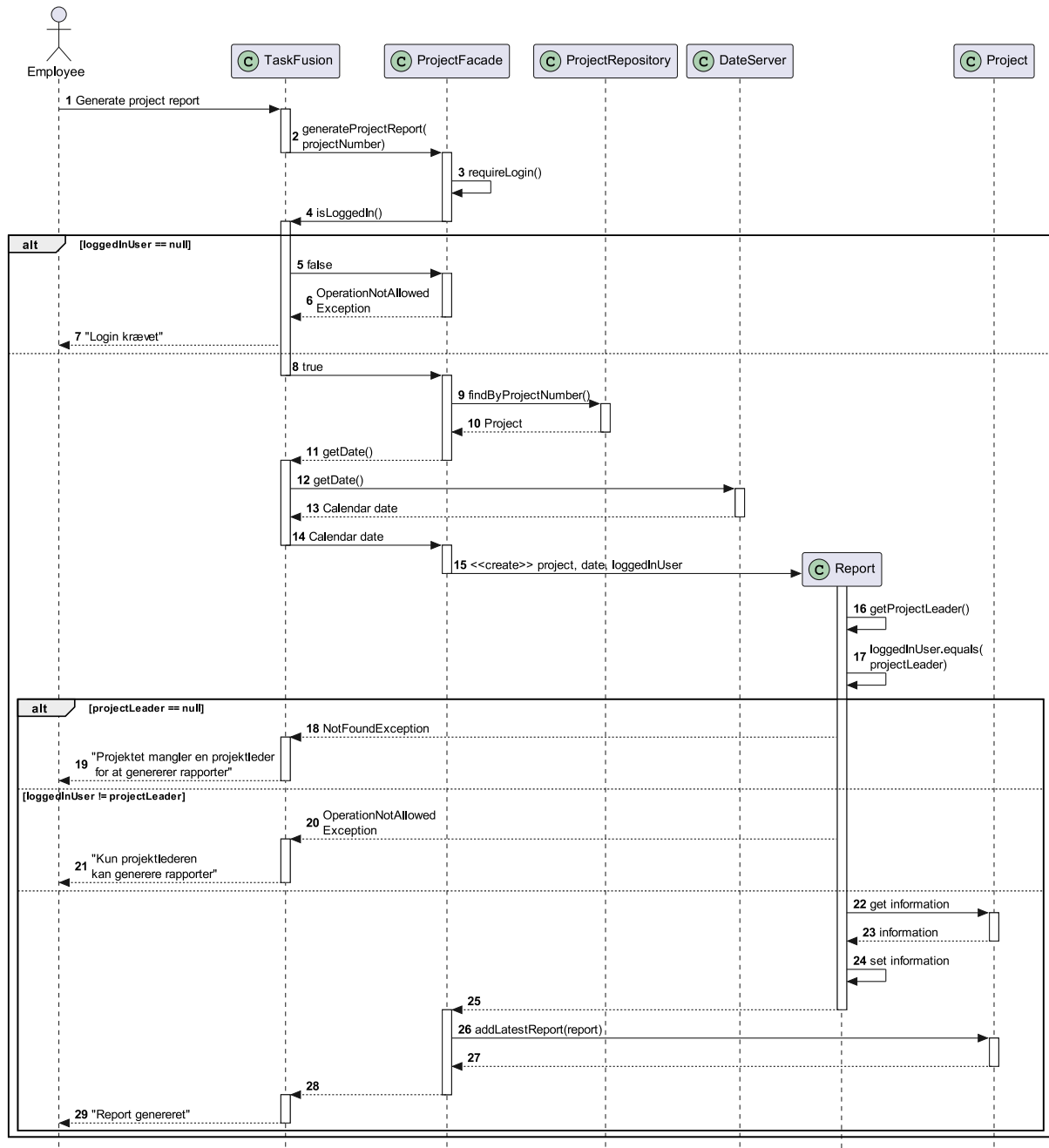
4 DISKUSSION: PROGRAMDESIGN

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

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Software Engineering 1
8. maj 2023

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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 processeret data. Persistency er delt op i to større kategorier: Employees (*EmployeeRepository.java*) og alt vedr. projekter og deres aktiviteter (*ProjectRepository.java*).

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FIGURER

TABELLER

LISTINGS