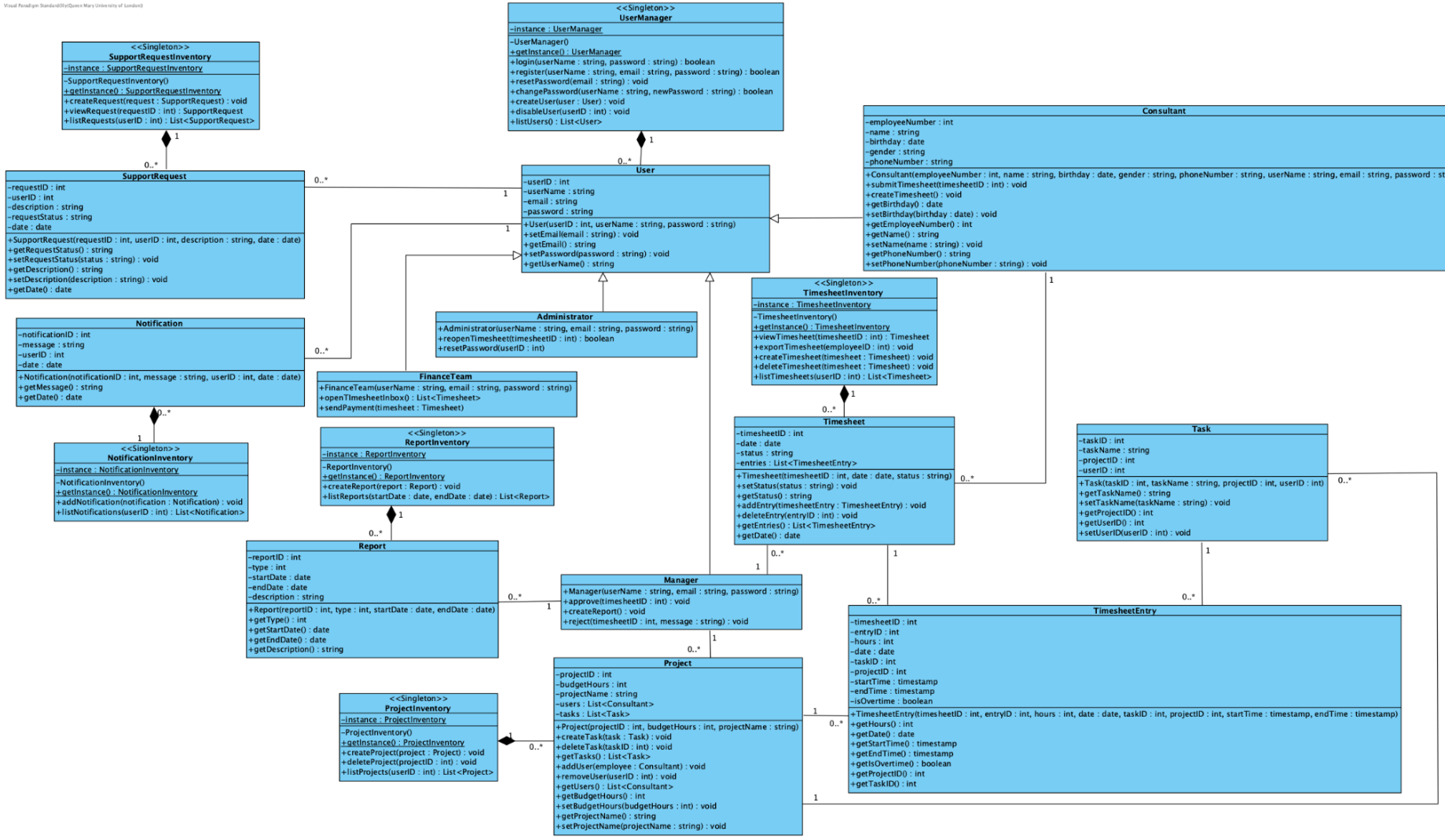
GROUP 19
FDM CLOCK-IN APPLICATION

ECS506U Software Engineering Group Project

Design Report

Contents

1. Class Diagram



2. Traceability matrix

Class	Requirement	Brief Explanation
User	RQ1	The username is an attribute of the class, this allows for user authentication and identification.
User	RQ2	Register is an operation and email is an attribute of the class
Consultant	RQ4	All the attributes in the class are related to storing and changing personal information.
User	RQ6	This is fulfilled by the resetPassword method in the class, which will replace the user's old password in the system.
TimesheetEntry	RQ8	The class fulfils this as all the attributes are used to implement this requirement.
TimesheetInventory	RQ10	The attributes in the class are related to adding and accessing past timesheets
TimesheetEntry	RQ11	The 'hours' and 'projectID' attributes fulfil the requirement as they allow for the data to be stored and filtered.
TimesheetEntry	RQ12	The 'hours' and 'taskID' attributes fulfil the requirement as they allow for the data to be stored and filtered.
Notification	RQ15	The attributes in the class are related to storing and accessing notifications.
Manager	RQ22	This is fulfilled by the approve method in the class, as it relates to how managers access submitted timesheets.
Manager	RQ23	This is fulfilled by the reject method in the class as it relates to how managers access submitted timesheets.
Manager	RQ28	The 'createReport' function facilitates the generation of comprehensive reports.
Project	RQ32	The 'BudgetHours' is an attribute of the class that fulfils the requirement of storing project budget hours.
Administrator	RQ34	This is fulfilled by the 'reopenTimesheet' method in the class as it ensures that only administrators can re-open the timesheets.
SupportRequest	RQ38	The class's attributes and methods would fulfil this as it satisfies the requirements for the storing and using of support requests.

3. Design Discussion

3.1

User

Included:
The UserID is a unique identifier crucial for database management and user authentication. The email attribute is essential for communication purposes, while the role attribute facilitates role-based access control within the application.
Excluded:

Depending on specific project requirements, additional attributes such as contact number, address, or profile picture might be considered optional and could be ignored if not deemed necessary for the core functionality.

Timesheet

Included:
TimesheetID is crucial for uniquely identifying each timesheet. Status tracks the submission and approval workflow.
Excluded:
Depending on specific requirements, additional metadata like comments or attachments might be included but can be ignored if not critical

Consultant

Included:
ConsultantID serves as a unique identifier, so it is required to be there. PhoneNumber should also be important, as there should be a way to communicate with the consultant.
Excluded:
Other personal details might be optional and can be ignored based on the system's scope

Timesheet Entry

Included:
EntryID uniquely identifies each entry. TaskID, Date, and Hours capture the specifics of each task. Also, the startTime and endTime help to know, when exactly did the user start and finished working.
Excluded:
Depending on needs, additional attributes such as project codes or client details might be included but can be ignored if not essential.

3.2

User and SupportRequest:

One-to-Many (One User can create multiple SupportRequests). Users can create support requests, and each support request is associated with a specific user. This association allows tracking the relationship between users and their support requests.

User and Notification:

One-to-Many (One User can receive multiple Notifications). Users can receive notifications. This association allows users to be associated with the notifications they receive, enabling effective communication within the system.

Manager and Report:

One-to-Many (One Manager can generate multiple Reports). Managers can generate reports. This association enables the tracking of reports generated by each manager, facilitating accountability and reporting functionalities.

Manager and Project:

One-to-Many (One Manager can oversee multiple Projects). Managers can oversee multiple projects. This association allows for efficient project management, linking each manager to the projects they are responsible for.

Manager and TimeSheet:

One-to-Many (One Manager can oversee multiple Timesheets). Managers oversee timesheets submitted by consultants. This association enables managers to track and manage the timesheets associated with each manager.

TimeSheet and Consultant:

Many-to-One (Many Timesheets can be associated with one Consultant). Each timesheet is associated with a specific consultant. This association allows tracking of the timesheets submitted by individual consultants.

TimeSheet and TimeSheetEntry:

One-to-Many (One Timesheet can have multiple TimesheetEntries). Timesheets consist of multiple entries. This association allows organising and managing the entries associated with each timesheet.

Project and TimeSheetEntry:

One-to-Many (One Project can have multiple TimeSheetEntries). Projects can have multiple timesheet entries associated with them. This association allows tracking the time spent on various tasks within a project.

TimeSheetEntry and Task:

Many-to-One (Many TimeSheetEntries can be associated with one Task). Each timesheet entry is associated with a specific task. This association allows linking individual time entries to the tasks they represent.

Task and Project:

Many-to-One (Many Tasks can be associated with one Project). Multiple tasks can be associated with a single project. This association allows organizing and managing tasks within the context of a specific project.

3.3

Differences between design and initial domain model:

- Removals:
    - **Payment** – In the new design, the timesheet app provides a PDF of the exported timesheets that can be utilised by the finance team. However, the timesheet app does not feature any payment processing thus the payment class has been removed.
- Additions:
    - **Support Request** – The timesheet app now includes a way for users to contact support in the event of an issue. The Support Request class allows users to file support requests which are handled by a support team.
    - **Timesheet, Project, and Support Inventory** – These classes were introduced to act as a centralised inventory system for timesheets, projects, support requests and reports. This makes it more convenient to store and access all related information in one location.
    - **Timesheet entry** – Each timesheet covers a 7-day period, and a timesheet entry is created for each day.
    - **Report** – The manager can make reports based on timesheet data

3.4

Design Patterns:

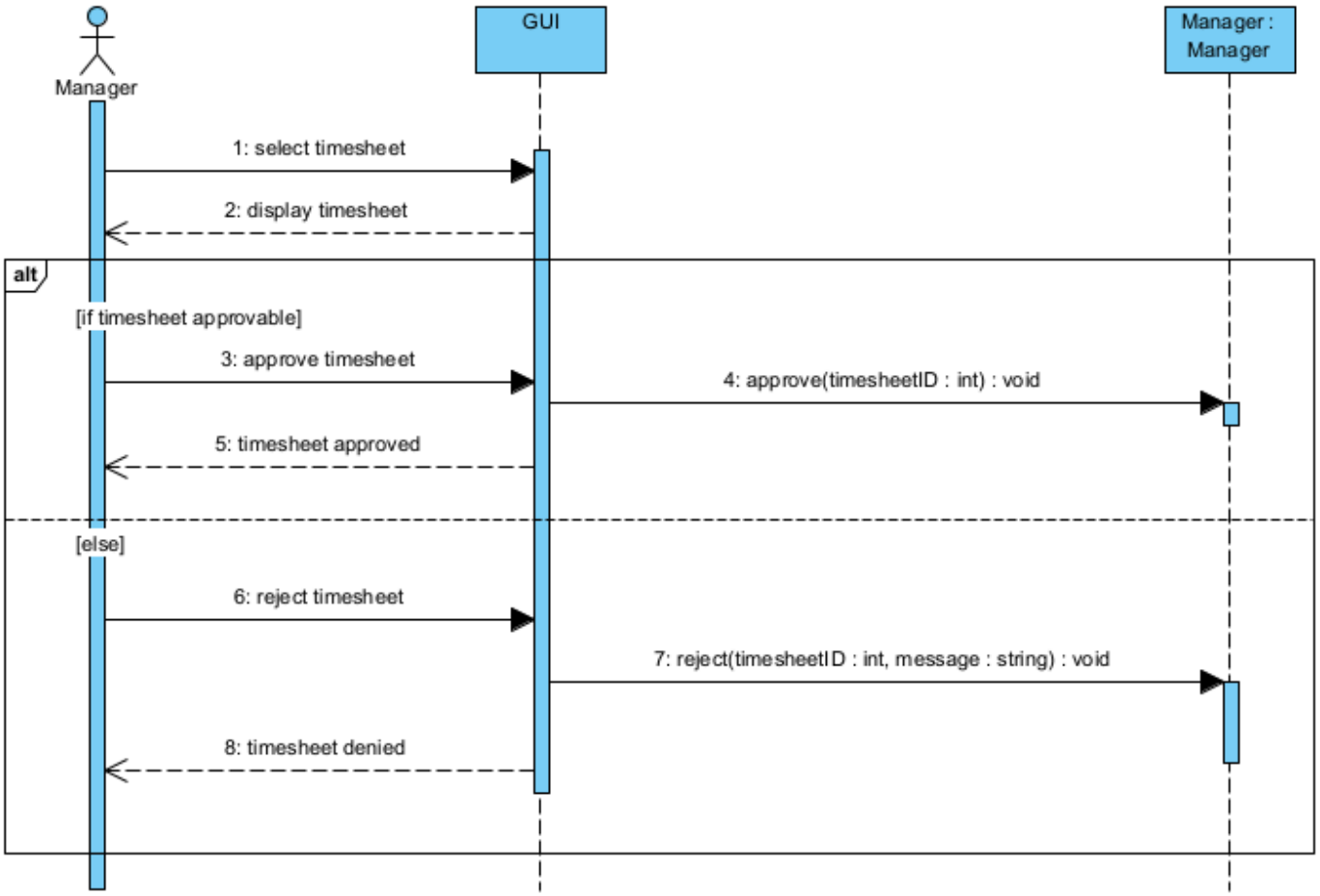
Singleton – Singletons are implemented for the Inventories, acting as containers. For instance, the Timesheet Inventory handles the creation, deletion, and storage of timesheets. Multiple instances of Timesheet Inventory could result in multiple timesheets with the same ID but different data, leading to data discrepancies. To prevent this, the singleton design pattern ensures there is only one instance of an inventory class at any given time.

4. Sequence Diagrams

Approve/deny timesheet:

Scenario: The manager receives timesheets from FDM consultants and decides to approve or deny their timesheets, whereby approving leads to exporting the timesheet, and denying leads to returning the timesheet to the consultant with notes explaining why.

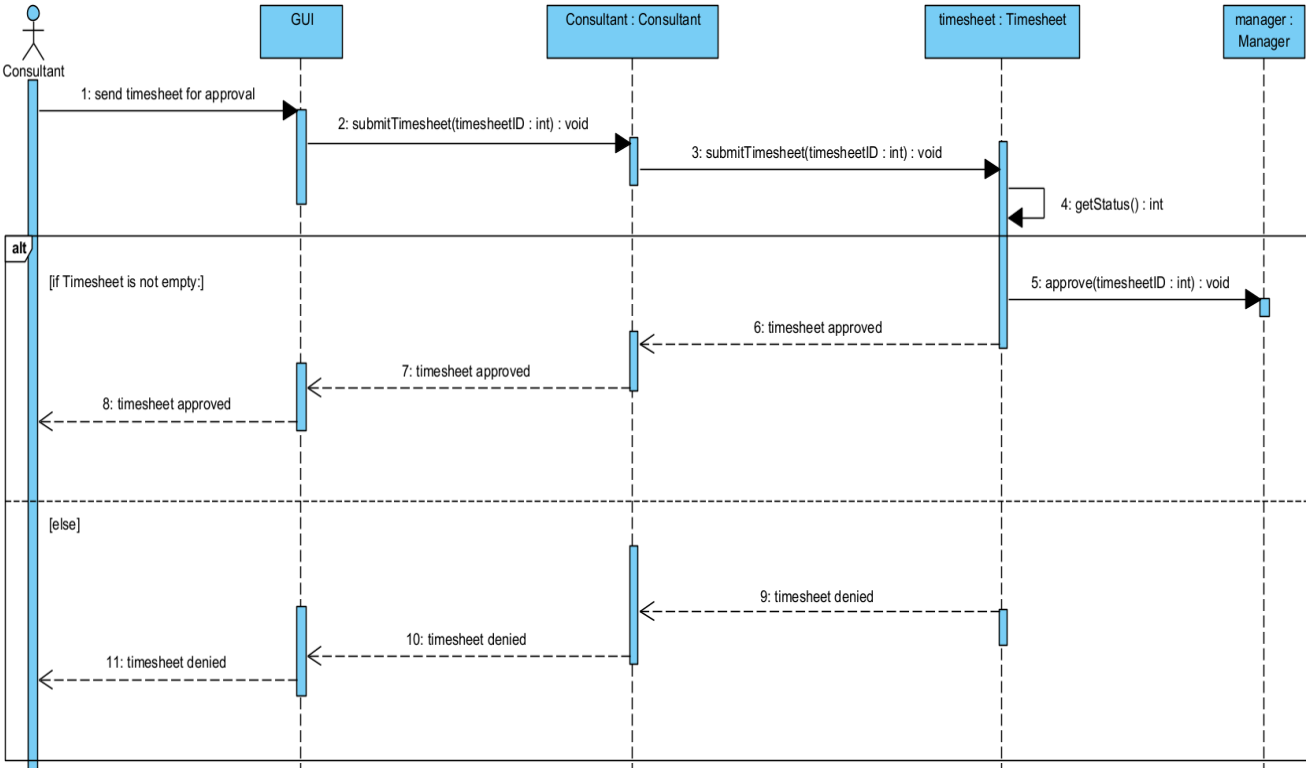
Prerequisites: The manager must be already logged in and FDM consultants have already submitted their timesheets



Submit Timesheet:

Scenario: FDM consultant wants to submit a timesheet. Submitting the timesheet allows the system to check whether the timesheet is empty/incomplete or not. If it's empty the system will send back the timesheet to be completed and if it's not empty the system will send the timesheet to the manager for approval.

Prerequisites: FDM consultant must already be logged into the system and must have already edited the timesheet.



Export Timesheet:

Scenario: A manager wants to export a timesheet to the finance team, after already approving the timesheet. The timesheet is exported as a PDF and sent to the finance team via email. If the manager notices a mistake, they can cancel the export and reject the timesheet.

Prerequisites: The manager is logged in. The manager has approved at least one timesheet so they have timesheets to select from.