Hall Management System (HMS)

System Requirement Specification (SRS) Document

Avikalp Srivastava (14CS10008)

Madhav Datt (14CS30015)

Group 19

Software Engineering Lab

Table of Contents

List of Figures

1.0 Introduction

1.1 Purpose

The purpose of this document is to present a detailed description of the Hall Management System (HMS) for IIT Kharagpur. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react to external stimuli. This document is intended for both the stakeholders and the developers of the system.

1.2 User Document

The IIT students' Hall Management Center (HMC) has requested development of the following software to automate various book-keeping activities associated with its day to day operations.

- After a student takes admission, he/she presents a note from the admission unit, along with his/her name, permanent address, contact telephone number, and a photograph. He/she is then allotted a hall, and also a specific room number. A letter indicating this allotted room is issued to the concerned student.
- Students incur mess charges every month. The mess manager would input to the software the total charges for each student in a month on mess account.
- Each room has a fixed room rent. The newly constructed halls have higher rent compared to some of the older halls. Twin sharing rooms have lower rent.
- Each hall provides certain amenities to the students such as reading rooms, play rooms, TV room, etc. A fixed amount is levied on each student on this count.
- The total amount collected from each student of a hall towards mess charges is handed over to the mess manager every month. For this, the computer needs to print a sheet with the total amount due to each mess manager is printed. Printed cheques are issued to each manager and signatures are obtained from them on the sheet.
- Whenever a student comes to pay his dues, his total due is computed as the sum of mess charge, amenity charge, and room rent.
- The students should be able to raise various types of complaints using a web browser in their room or in the Lab. The complaints can be repair requests such as fused lights, non-functional water taps, non-functional water filters, room repair, etc. They can also

register complaints regarding the behavior of attendants, mess staff, etc. For this, round-the-clock operation of the software is required and down-time should be negligible. Considering that about 10,000 students live in hostels, the response time of the web site should be acceptable even under 1000 simultaneous clicks.

- The HMC receives an annual grant from the Institute for staff salary and the upkeep of the halls and gardens. The HMC chairman should be provided support for distribution of the grant among the different halls. The Wardens of different halls should be able to enter their expenditure details against the allocations.
- The controlling warden should be able to view the overall room occupancy.
- The warden of each hall should be able to find out the occupancy of his hall. He should also be able to view the complaints raised by the students and post his Action Taken Report (ATR) to each complaint.
- The halls employ attendants and gardeners. These temporary employees receive a fixed pay on a per day basis. The Hall clerk enters any leave taken by an attendant or a gardener from at the terminal located at the hall office. At the end of every month a consolidated list of salary payable to each employee of the hall along with cheques for each employee is printed out.
- The HMC incurs petty expenses such as repair works carried out, newspaper and magazine subscriptions, etc. It should be possible to enter these expenses.
- Whenever a new staff is recruited his details including his daily pay is entered. Whenever a staff leaves, it should be possible to delete his records.
- The warden should be able to view the statement of accounts any time. The warden would take a print out of the annual consolidated statement of accounts, sign and submit it to the Institute administration for approval and audit verification. The software should be very secure to prevent the possibility of various types of frauds and financial irregularities.

1.3 Scope of Project

This software system will be a Management System for the HMC, Students, Wardens and Hall Staff of IIT Kharagpur. This system will be designed to maximize the ease of data management by providing tools to assist in automating various book-keeping activities associated with HMC's day to day operations, which would otherwise have to be performed manually.

More specifically, this system is designed to allow HMC to manage and communicate with a group of halls through their wardens and managers to accommodate and manage students of IIT Kharagpur.

The software provides convenient means to manage daily wage based hall staff, such as attendants and gardeners and their payrolls. It also enables students to lodge complaints about issues they face relating to their halls through a portal and get them addressed by their wardens.

1.4 Definitions, Acronyms & Abbreviations

Term	Definition
HMC	The Hall Management Committee of IIT Kharagpur. It controls allotment of halls to students, student payments, decides on hall grants and status.
ATR	Action Taken Report - filed by the Warden in response to the complaint raised by the student of their hall.
ID	Unique Identification Numbers to identify students, halls, wardens, workers etc.

1.5 Clarifications from User / Assumptions

Clarifications

1. Who determines room rents and amenity charges for a particular hall? The HMC or the warden for that hall?
2. Does the controlling warden enjoy the functionalities of a warden? If yes, then does he posses controlling authority for all halls?
3. While entering annual expenditure details against annual HMC grant, does the warden account for the expenditure split in mess charges, worker salaries, amenities etc. or just enters the total expenditure?
4. Who decides whether the student gets a single/double room? Student/Warden/HMC?

Assumptions

- Workers' removal from hall is controlled by the warden. A request by worker to leave the hall will be accepted by warden only by triggering the "fire worker" option.
- The appointment of Mess Manager and Clerks for hall is managed by the warden.
- All students eligible for admission have received a unique ID and password for logging in to the software and updating their details.
- HMC uses an 'Activate Payment Link' option to open window for student payments.

1.6 Overview of Document

The next chapter, the Overall Description section, of this document gives an overview of the functionality of the software. It describes the informal requirements and is used to establish a context for the technical requirements specification in the next chapter.

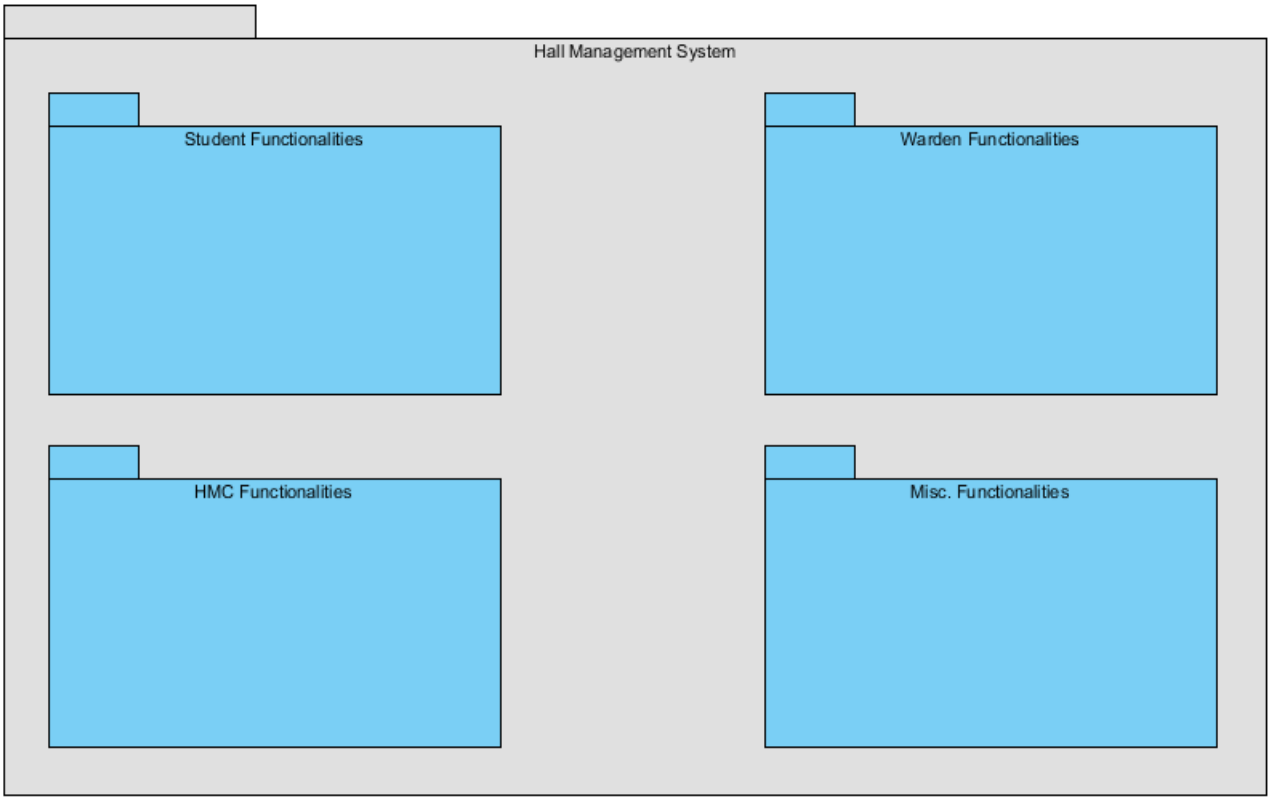
The third chapter, Requirements Specification section, of this document is written primarily for the developers and describes in technical terms the details of the functionality of the product.

Both sections of the document describe the same software product in its entirety, but are intended for different audiences and thus use different language.

2.0 Overall Description

2.1 System Environment

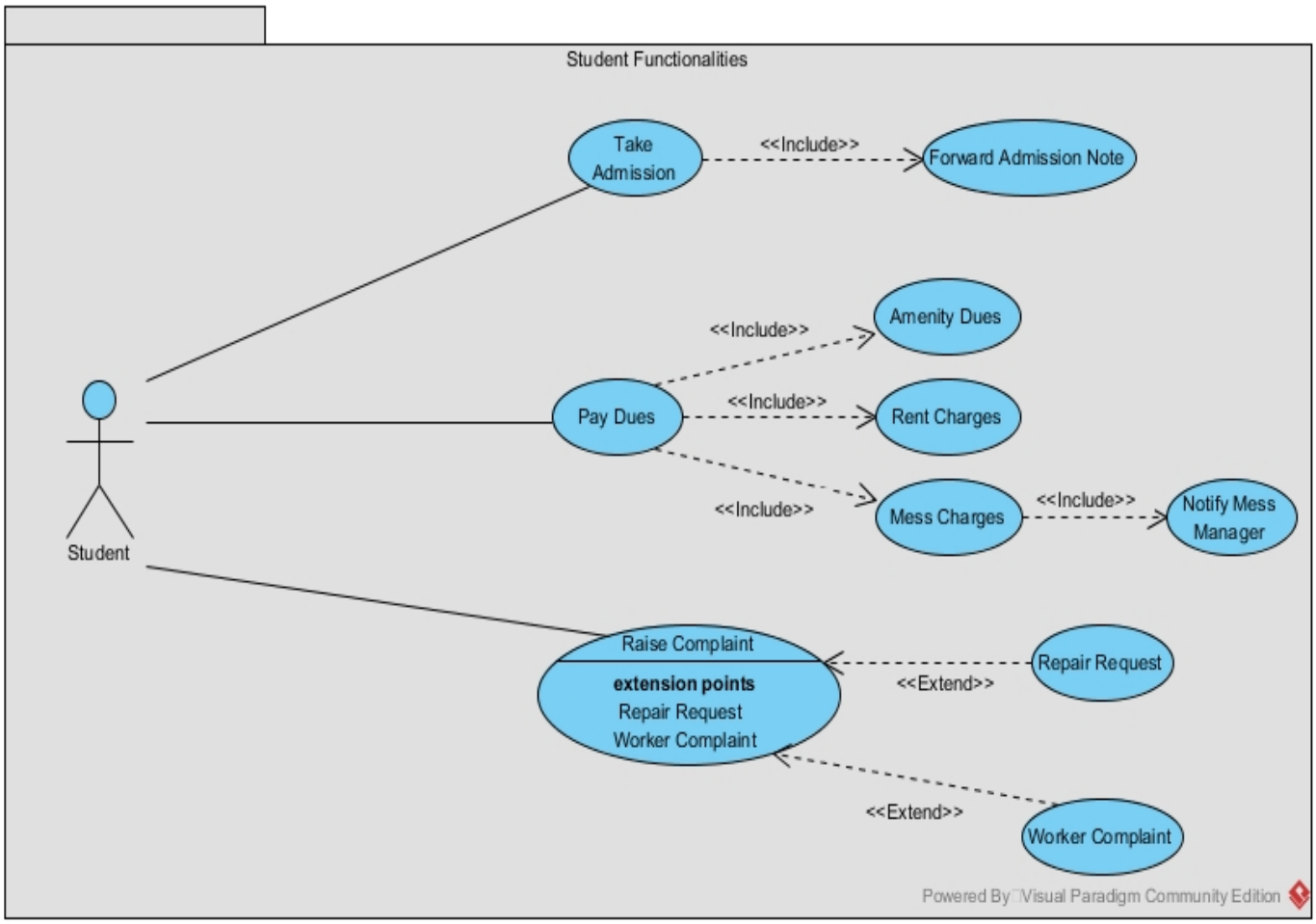
The Hall Management System has three prominent active actors - the student, the warden and the HMC. Active actors other than these include workers (clerk, gardener etc.), mess manager and 'printer' is the sole inactive actor.



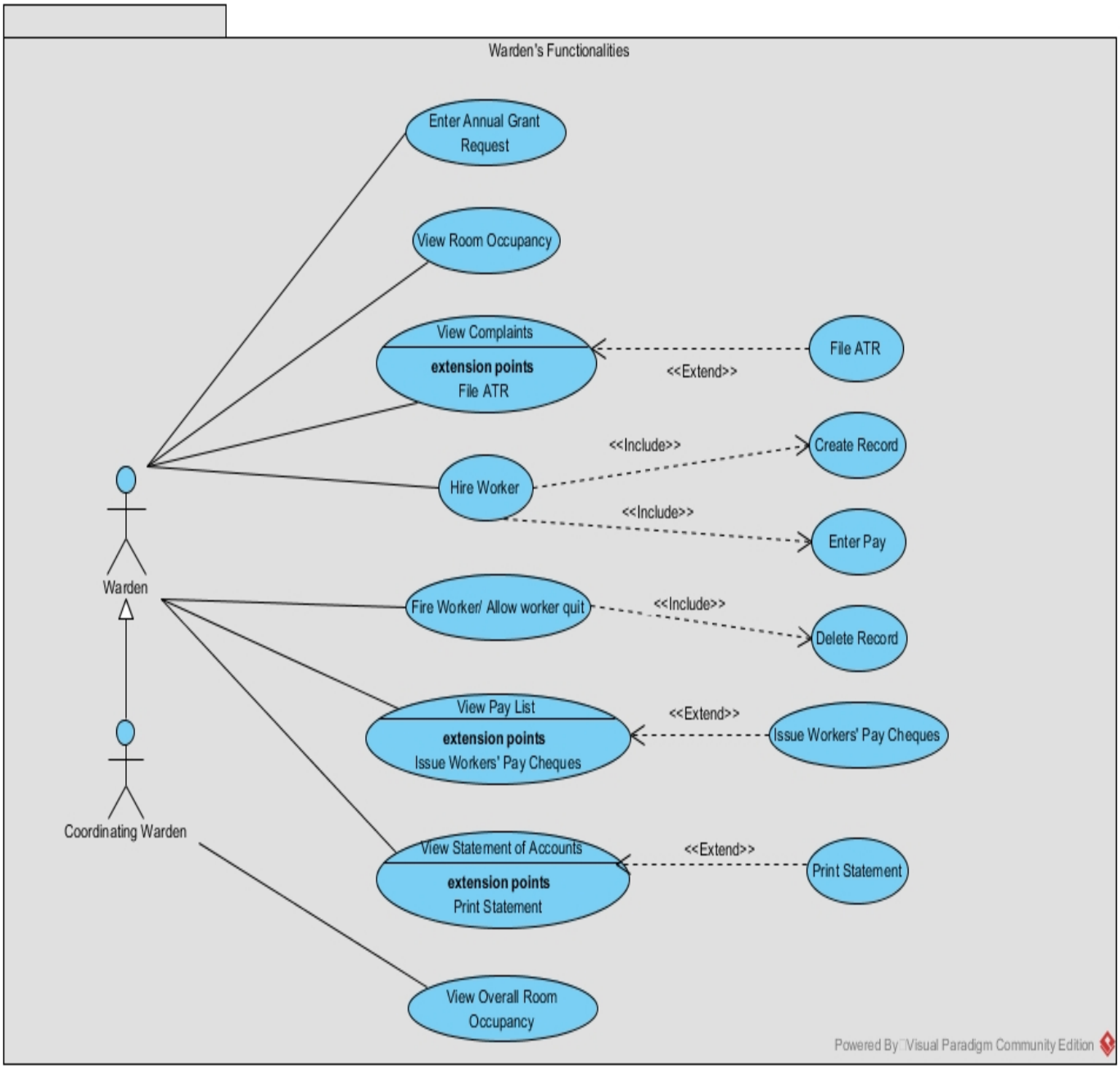
2.2 Functional Requirement Specifications / Use Cases

The Use Case Diagrams have been partitioned on the basis of actors and functional cohesion.

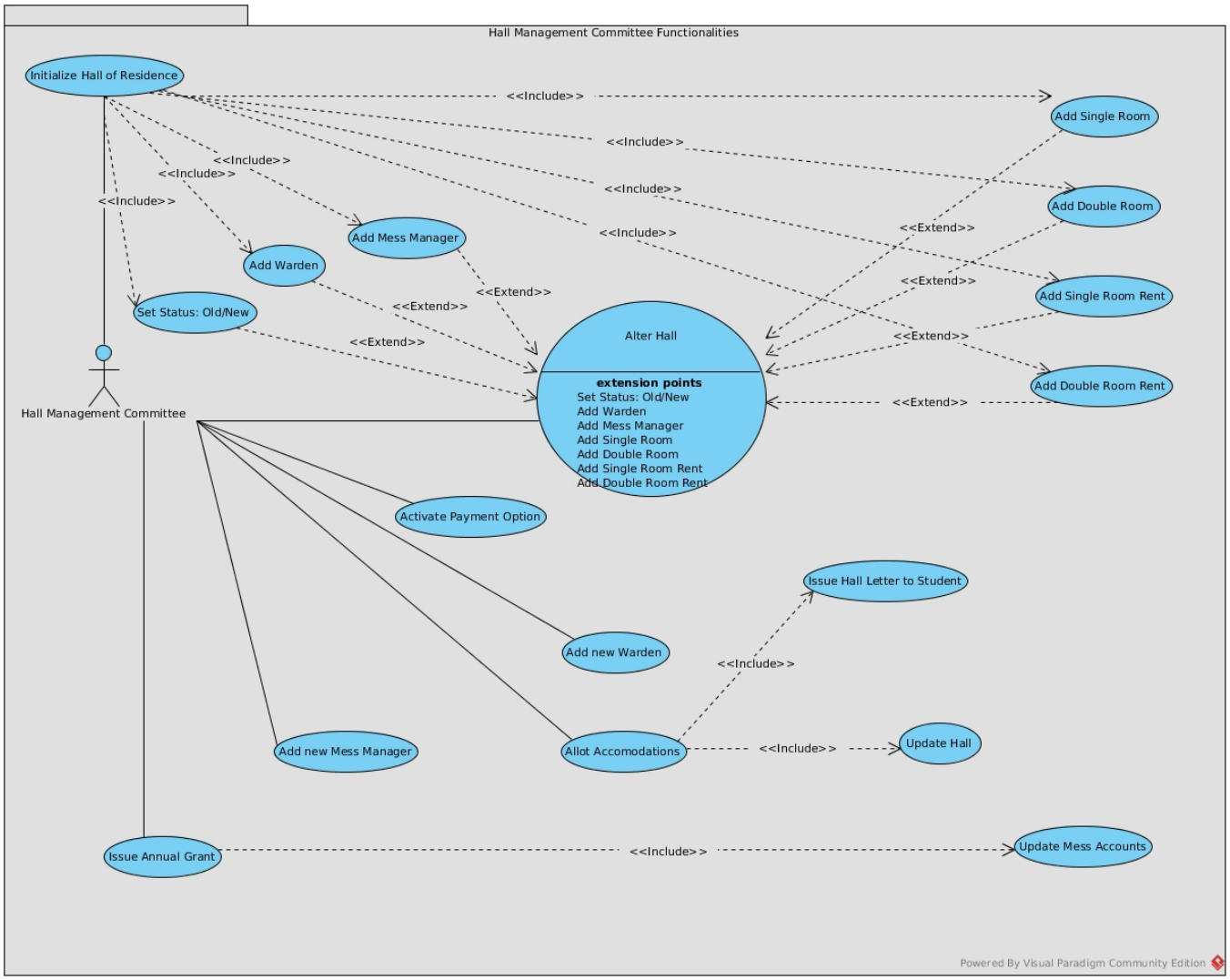
2.2.1 Student Use Case Diagram



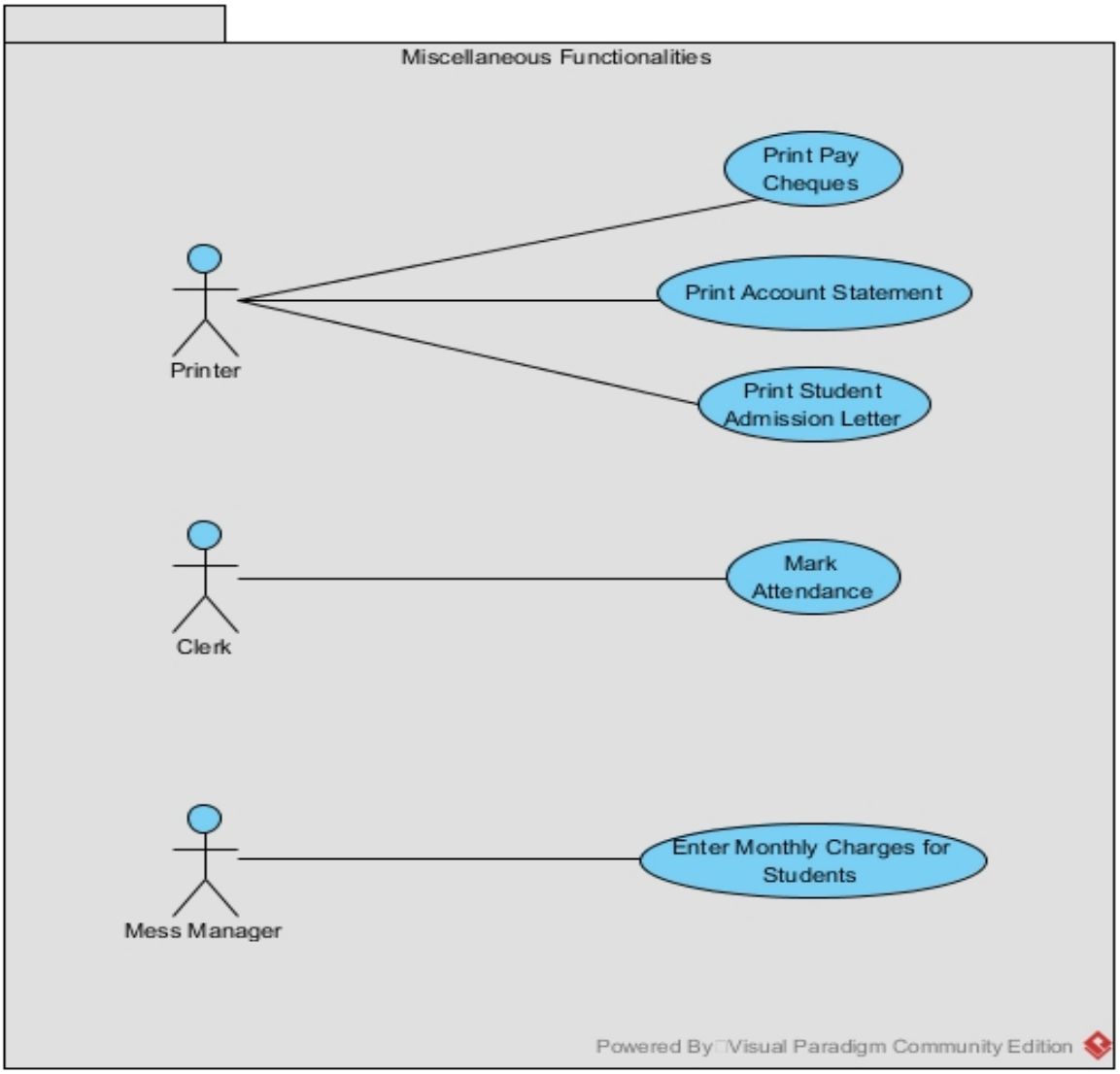
2.2.2 Warden Use Case Diagram



2.2.3 HMC Use Case Diagram



2.2.4 Miscellaneous Use Case Diagram

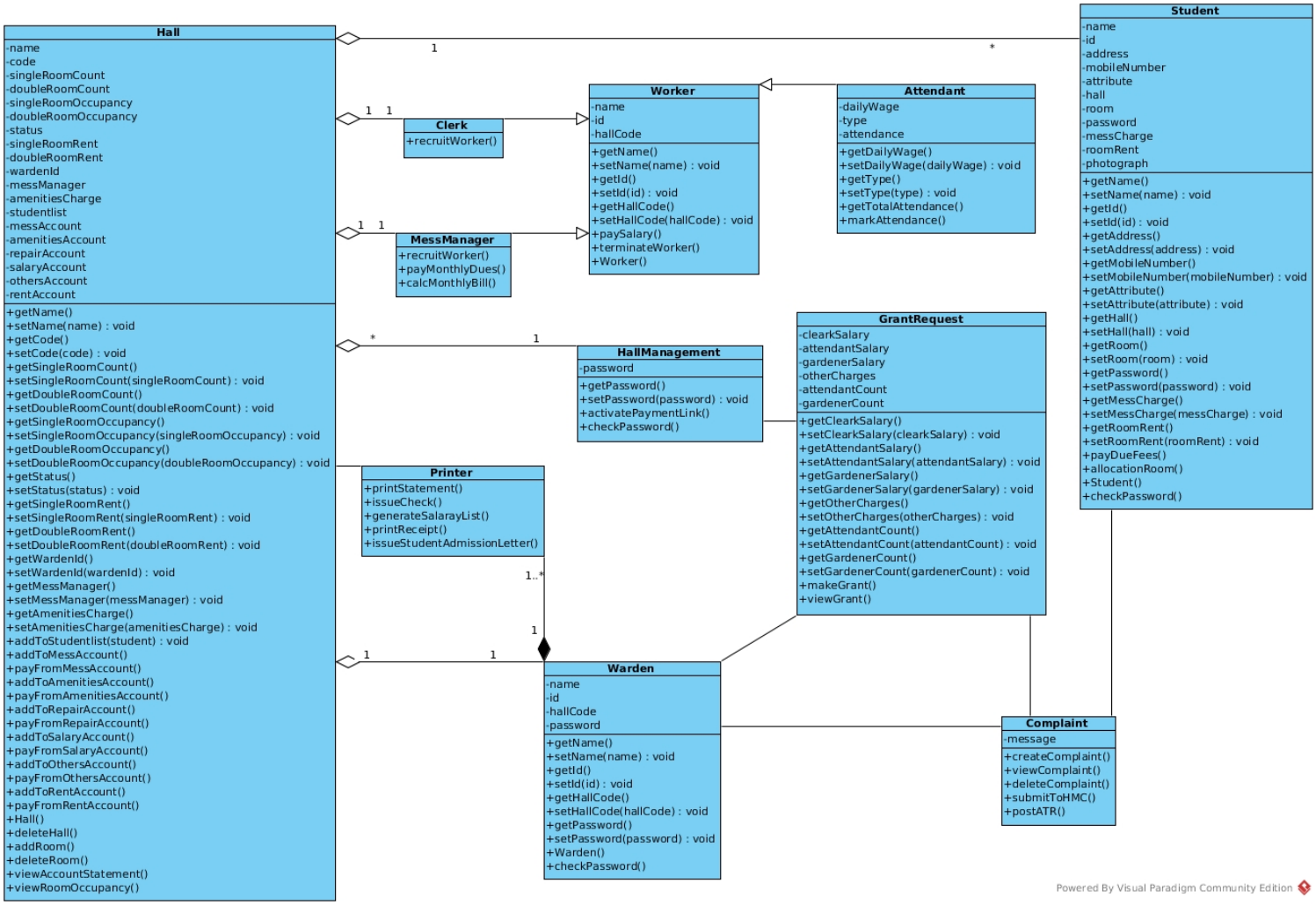


2.3 Non Functional Requirements

Considering that about 10,000 students live in hostels, the response time of the web site for students to lodge complaints, should be acceptable even under 1000 simultaneous clicks.

Since the software deals with hall accounts, wage payments to workers, and various payables by students, it should be very secure to prevent the possibility of various types of frauds, mismanagement of money and financial irregularities.

2.4 Class Diagram



2.5 Interface Description - Model UI

The software is made up of multiple components for different stakeholders and purposes. Interfaces and UIs of each of these components are described as follows:

2.5.1 Web Interface for Complaints

Log-in area where student signs in using their Student ID and password. After successfully logging in, the student is presented with an option to either write and submit a new complaint or view ATRs (if available) from previous complaints.

2.5.2 Hall Office Terminal for Attendance

The Hall Clerk is presented with a list of workers and the options to mark each of them present or absent for the current date only. No retroactive attendance marking is possible, for security and fraud prevention purposes. Once marked, attendance cannot be changed for the worker in question.

2.5.3 HMC Software Interface

The HMC Chairman will have the software initiate with a login screen, where only a password is required for authentication. After successfully logging in, the HMC interface will contain multiple tabs for different functionalities - Adding Halls, Altering Halls, Adding new Wardens and Mess Managers, Student Functions, Issuing Annual Grants.

For either of the two options - Adding and Altering Halls, text fields for various details will need to be filled out before the form can be submitted to make the necessary additions/changes. Student Functions include options to issue Student Admission Letters, thus creating a student in the system, and activating payment links for total amount due from the student.

2.5.4 Mess Managers Terminal

The Mess Manager can find a student through their Student ID or Name and add the monthly total mess charges due for each student. This can be done at any time during the month. Entered charges may be changed/altered/corrected during this period by the Mess Manager if necessary. However, for security reasons, no retroactive changes will be allowed from previous month's accounts.

2.5.5 Warden's Software Interface

The Warden would be presented with a login option where they would have to enter their Warden ID and Password. On successful login, it would automatically be determined if the warden who has signed-in, is the controlling warden or not. Based on this, an option to view overall room occupancies will be available.

The Warden's Interface contains tabs pertaining to different parts of the Warden's role. These tabs are for Complaints, Workers, Rooms and Payments. On selecting the Complaints tab, the warden has the option to view complaints and file ATRs. The Workers tab has options to hire, fire workers, and view and issue their payments. The rooms tab contains options to view room occupancies for the hall associated with the warden. The Payments tab contains options to view account statements for hall expenditures and file annual grant requests with the HMC.

3.0 Requirement Specifications

3.1 Functionality and Documentation

3.1.1 Student Use Case

3.1.1.1 Get Admission

Input: Student presents a note from the admission unit, along with their name, address, contact number and a photograph.

Output: Student gets an admission letter and the flow is passed forward.

Process: HMC verifies details provided by the student and provides an admission letter to the student.

3.1.1.2 Submit Admission Letter and Give Room Choice

Input:

- Admission Letter is provided by the student.
- Student gives his room preference {Single, Double}.

Output:

- Student is allotted a hall.
- Student is allotted a room in said hall.

Process: HMC checks for availability of rooms in halls preferably according to the student's choice and allots accordingly. If the room is unavailable according to the said choice, the HMC allots room as per vacancies in halls.

3.1.1.3 Pay Dues

Input:

- Room rent payable by Student.
- Mess charge payable by Student.
- Amenity charge payable by Student.

Output: A receipt is generated confirming that the student has made the payment

Process: student approaches the warden to pay his dues. Hall Warden generates a bill for the respective payments to be made by said student. The student pays their dues and the money is deposited in the appropriate account.

3.1.1.4 Register complaint

Input: Students register complaints relating to amenities, the hall, worker behavior etc. via the web portal.

Output: A new complaint ID is created for each complaint raised by the student.

Process:

- The student logs-in to the website with his roll no.
- He raises the complaint.
- A new complaint id is generated.

3.1.2 Hall Management Committee Use Case

3.1.2.1 Setup Hall

Input: name of the hall to be setup

Output: flow is directed to the use cases

Process: HMC enters the name of the hall he wants to set up and then the aforementioned use cases are invoked.

3.1.2.2 Set New/Old status

Input: Use Case included in 3.1.1.1.

Output: New/old status of the hall is set.

Process: HMC specifies whether the hall is new or old

3.1.2.3 Add room rent

Input: room rent is specified.

Output: room rents of the hall are updated.

Process: Use cases 3.1.2.8 and 3.1.2.9 are invoked.

3.1.2.4 Add Mess Manager

Input: name of the mess manager of the Hall.

Output: name of the mess manager of the Hall is updated.

Process: HMC enters the name of the mess manager of the Hall and it is updated accordingly.

3.1.2.5 Add Warden

Input: ID of the warden of the hall.

Output: warden of the hall is updated.

Process: HMC enters the ID of the warden of the hall and it is updated accordingly.

3.1.2.6 Add Single Room

Input: number of single rooms to add is specified.

Output: specified number of single rooms is added to the hall.

Process: HMC enters the number of single rooms of the hall and the same is updated in the records of the Hall.

3.1.2.7 Add Double Room

Input: number of double rooms to add is specified.

Output: specified number of double rooms is added to the hall.

Process: HMC enters the number of double rooms of the hall and the same is updated in the records of the Hall.

3.1.2.8 Add Single Room Rent

Input: rent of single rooms to add is specified.

Output: rent of the single rooms of the hall is updated.

Process: HMC enters the single room rent of the hall and the same is updated in the records of the Hall.

3.1.2.9 Add Double Room Rent

Input: rent of double rooms to add is specified.

Output: rent of the double rooms of the hall is updated.

Process: HMC enters the double room rent of the hall and the same is updated in the records of the Hall.

3.1.2.10 Modify Hall

Input: ID of the hall the HMC chooses to update.

Output: details of the Hall which the HMC chooses to update is updated.

Process: Use cases 3.1.2.2 to 3.1.2.6 are invoked.

3.1.2.11 Add New Warden

Input: name of the warden the HMC chooses to add.

Output: A new warden is added to the database.

Process: HMC enters the name of the warden. His ID is generated and the records are updated accordingly.

3.1.2.12 Allot Accommodation

Input: admission letter and room preference of the student.

Output: new student is allotted a hall and a room.

Process: Use cases 3.1.2.14 and 3.1.2.15 are invoked.

3.1.2.13 Issue Letter to the Student

Input: student has been allotted a hall and a room in it.

Output: A letter regarding the room and the hall allotted to the Student is issued to him/her.

Process: HMC looks at the preferences entered by the student, searches for availability in the halls and does the allotment accordingly.

3.1.2.14 Update Hall

Input:

- The ID of the Hall which the student has been allotted.
- The ID of the student who has been allotted the hall.
- The type of room which has been allotted.

Output: details of the Hall is updated.

Process: HMC provides the details as mentioned in the input and the records are updated accordingly.

3.1.2.15 Give Annual Grant

Input: grant estimate provided by the warden of the Hall.

Output: Annual grant is added to the account of the Hall.

Process: HMC looks at the grant request which has been sent by the warden of the hall and decides the grant which will be provided to the Hall accordingly. The use case 3.1.2.17 is also invoked.

3.1.2.16 Update mess accounts

Input: Grant provided by the HMC to the hall.

Output: Details of mess accounts of the Hall updated.

Process: HMC specifies the amount which shall be granted to the mess account of the hall after reviewing the estimate sent by the warden of the Hall and grants it accordingly following which the mess accounts of the hall are updated.

3.1.2.18 Activate Payment Link for Students

Output: Payment link for students is activated so that the students can pay their dues.

3.1.2.19 Add New Mess Manager

Input: Name of the mess manager.

Output: A new mess manager with his ID is created.

3.1.3 Warden Use Case

3.1.3.1 Make Annual Grant Request

Input: Grant Request Details - number of workers, annual expenses etc.

Output: Grant request forwarded to HMC for approval.

Process: Warden generates estimated figures of the number of workers he wishes to employ in the year and also other miscellaneous charges he might incur. He sends the grant request accordingly. Use cases 3.1.3.2 and 3.1.3.3 are invoked.

3.1.3.2 Enter misc. charges

Input: misc. charges the warden feels he might incur.

Output: misc. charges are added as a part of the grant request.

Process: warden generates a rough estimate of the misc. charges he might incur and enters them.

3.1.3.3 Enter number of workers

Input: number of workers the warden feels he might employ.

Output: number of workers are added to the grant request.

Process: warden enters a rough estimate of the number of workers he feels he might employ and includes it as a part of the grant request.

3.1.3.4 Enter Amenity Charges

Input: warden knows about the TV rooms, common rooms and other amenities provided to the students of the hall.

Output: amenity charge payable by each student residing in the hall is set.

Process: warden enters the amenity charge payable by each student residing in the hall based on his knowledge of the common rooms, games rooms in the hall.

3.1.3.5 View Room Occupancy

Input: Warden-ID of the login user decides the hall whose room occupancy is to be shown.

Output: room occupancy of the hall as in the number of vacant rooms, details of the occupants of various rooms are shown.

Process: warden logs-in with his ID and can choose to view the room occupancy of the Hall at any point of time.

3.1.3.6 Pay Salary

Input: Warden-ID of the login user decides the hall whose room employee salary is to be paid. The input is taken from use case 3.1.3.7.

Output: salary amount of all employees is paid from the account of the hall and control is passed to use case 3.1.3.8.

Process: warden logs-in with his ID and chooses to pay the salary of the employees.

3.1.3.7 Generate Salary List

Input: Hall-ID is decided from use case 3.1.3.6 and accordingly a salary list of all employees of the hall is generated.

Output: salary list of all employees of the hall is passed to use case 3.1.3.6.

Process: salary is calculated based on the attendances of the workers and accordingly a file is generated.

3.1.3.8 Issue Cheques to Employees

Input: Warden-ID of the login user decides the hall whose room occupancy is to be shown.

Output: Printed cheques are issued to all the employees of the Hall.

Process: input is taken from use case 3.1.3.6 and cheques are issued accordingly.

3.1.3.9 View Complaints

Input: Warden-ID and hence the Hall-ID of the login user decides the hall whose complaints are to be shown.

Output: complaints posted by the students residing in that Hall are displayed.

Process: warden logs-in with his ID. He chooses to view the complaints. According to the Hall-ID associated with the warden, the complaints are displayed.

3.1.3.10 Post ATR

Input: complaint ID of which the warden is posting the action taken report.

Output: action taken report of the warden is posted against the respective complaint.

Process: warden after he has taken the action against the respective complaint posts the ATR for the same.

3.1.3.11 Print Account Statement

Input: Warden-ID and associated Hall-ID.

Output: complete account statement of the hall is printed.

Process: warden logs-in with his ID and chooses to print the account statement of the hall at any point of time.

3.1.3.12 Recruit Worker

Input: Warden-ID, hence the associated Hall-ID of the hall for which the worker is being recruited.

Output: A worker is added to the database of the hall.

Process: warden logs-in with his ID and exercises his option to recruit a worker for the hall.

3.1.3.13 Enter Daily Salary

Input: Worker-ID of the worker whose salary is to be entered.

Output: salary of the worker is entered.

Process: warden logs-in with his ID and enters the daily salary of the worker.

3.1.3.14 Fire Worker

Input: Worker-ID of the worker who is to be fired.

Output: workers details are removed from the database.

Process: warden logs-in with his ID and chooses the worker who is to be fired and accordingly use case 3.1.3.15 is invoked.

3.1.4 Clerk Use Case

3.1.4.1 Make Attendance

Input: Worker-ID of the worker who is to be marked present.

Output: Attendance record of the worker is modified.

Process: Clerk logs-in and gives attendance to the worker.

3.1.5 Mess Manager Use Case

3.1.5.1 Enter Mess Charge for Student

Input:

- Mess Manager ID and Hall-ID.
- Mess charge of the student.

Output: Mess charges for the student are updated.

Process: Mess manager logs-in and enters the mess charge payable by the students of the Hall.

3.1.6 Printer Use Case

3.1.6.1 Print Account Statement

Input: Hall-ID, whose account statement is to be printed.

Output: Details of all accounts are printed.

Process: Warden logs-in with his ID and enters the option to print the account statement. The accounts of the concerned hall are then printed.

3.1.6.2 Print Cheques

Input:

- Worker-ID of the worker whose cheque is to be printed.
- Wage payable to said worker.

Output: Cheque for the worker is printed.

Process: Warden logs-in and exercises his option to print cheques for all workers of the Hall and accordingly cheques are printed.