Software Requirements Specification

for

Hostel Management system

Indian Institute of Technology, Kanpur
CS253: Software Development and Operations
Assignment 6A

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Contents

Chapter 1

Introduction

1.1 Purpose

The purpose of this SRS document is to provide a detailed overview of the minimum requirements that need to be fulfilled by this project, its parameters and goals. The aim of the project is the creation of an automated system for properly carrying out day to day activities for proper hostel management.

1.2 Document Conventions

documentation as such.
Abbreviations used:
SQL - Structured Query Language
IEEE - Institute of Electrical and Electronics Engineers
OS - Operating System
HMS -Hostel Management System
No special conventions were used for this

- The words *staff* and *employees* have been used interchangeably in this document. Both of these refer to hostel employees that are not Admin.
- *Admin* or *Administrator* is used for the highest functioning authority in the hostel.
- *Product* and *HMS* have been used for the final product expected.
- *Student credentials* refers to student ID and room number, date of joining etc. unless it is explicitly states as CC Credentials/ payment credentials. Similarly *Employee credentials* refers to employee ID, department, date of joining etc.

1.3 Intended Audience and Reading Suggestions

The intended audience of the SRS document: consists of all the project developers working with this project directly or indirectly, the software designers, the software testers, database administrators and Software analysts. The SRS has been organized into various sections to enable the readability of the document so that various sections of developers can read the sections of interest to them from the document. The developers need an idea of the system requirements so that they can design their allotted modules and integrate them. The testers need to have an idea of system features so that they can develop meaningful test cases for properly testing the features.
Intended audience/ users of product: are the students of the particular hostel, staff members and Admin.

1.4 Product Scope

The scope of the project consists of development of an automated system for proper management of the hostel in Indian Institute of Technology Kanpur replacing the old pen and paper system and it would store, maintain and record information in an organized manner. It will automate all calculations and make accurate accounting.
a residential student could apply a request forexample for cleaning or send a complaint regarding carpentry, plumbing defects, etc and a notification should be sent to the appropriate department in the above cases housekeeping, carpentry, plumbing. The students can provide a feedback regarding how well the compliant was resolved. Mess feedback and suggestions too should be able to be given on this platform.

Objectives and goals

- Checking eligibility of students to see whether students are to be allocated rooms.
- Storage and Maintenance of student records
- Generation of electricity bill, mess bill of students.
- The software should be able to **take requests** from students regarding the type of work needed to be done or any compliant for e.g. room cleaning, furniture repair.
- Software should have provision for **notifying** the appropriate staff section about the request as well as the room number from which the request originated and allot a person to mitigate the problem and when the job is done the staff member can communicate to the software that the problem has been resolved.
- Software should allow provision for receiving feedback from the student once the problem has been mitigated and terminate the request after that.
- Software can receive feedback about the mess through forms having various fields consisting of appropriate questions related to taste and hygiene, and also receive suggestions for improvement in food and the data collected should be weekly conveyed to the mess manager in appropriate visual representations of data.
- Provide a user friendly interface so as to make it easier for people with less familiarity regarding computers to operate on this system with ease.
- Provide a secure and restricted access to the staff as well as the students so that they can't view outside their domain or any other data regarding that student. The system should not be vulnerable to various kinds of attacks.

1.5 References

- IEEE SRS Format Std 830-1998
- `https://www.slideshare.net/FahadChishti/hostel-management-system-software-engineering-srs`

Chapter 2

Overall Description

2.1 Product Perspective

The product finally formed will be a web based hostel management system implementing client server based model which the user can open and then sign up if it is the first time if he/she is opening it otherwise can directly log in with log in details.

There are four kind of users:

- **Administrator**
  Admin needs to have full access regarding details of all students and all staff members and he/she must have right to, add or authenticate a new user(both staff or student) modify details or delete any existing user(both staff or student).
  Admin can control the status of fee payment by a student, and change status of rooms to vacant or full based on whether any student is residing in it.
  Admin must receive the feedback weekly both the feedback of students regarding the resolution of complaints and also about the mess, in the form of a .csv file.
- **Students**
  All the students who reside in the hostel have an account through which they can access their personal details and pay their dues along with viewing their mess details.
  They can give feedback about the taste of food and hygiene at mess.
  They can register complaints about issues like furniture, electricity, plumbing, cleanliness through this platform. They can provide feedback about how early and how well their registered complaint has been resolved.
- **Hostel staff**
  All the hostel staff have their own accounts having their personal details.

  The portal consists of their availability, if they have been assigned a job (based on students' complains and feed-backs) or not, if yes, if they have managed to resolve it on the due date. If they are not assigned the system has the ability to assign them roles based on the complaint stack of the students if it is of the department as the staff member. .
- **Mess Manager**
  Mess manager has the ability to modify the mess dues of the students which gets added in the dues of the students.
  Mess manager receives the weekly feedback in the form of a pie chart (with each sector representing percentage of ratings that are taken on a scale of five) for the taste and hygiene from the students and acts upon the suggestions given by them to improve the conditions

These four kind of users combined make up the whole system

2.2 Product Functions

The functions that need to be performed by this product:

- It must be able to create new login IDs of both staff and students by using the sign-up provision by using their staff or student ID number and CC credentials given at the time of admission to IIT Kanpur.
- It must be able to maintain information about the residents(student names, parent's names, student IDs, room allocated to students, mess details of student, pending complaints), maintaining dues and updating it when the students pay securely and successfully using online banking, credit or debit cards of all the banks prevalent in India.
- Maintenance of room information (data of room occupancy and of the occupants) which can be modified by the Admin when a student is either allocated a room or sent away from the hostel.
- Handle monthly mess expenditure of each student which gets added to his/her dues. The Admin should be able to edit this information.
- It should maintain employees records (credentials, department, availability to address complaints)
- It should accept requests and complaints by the students in the various categories mentioned above.
- Should be able to redirect a new request to the specific department as per the category and allot the task to be resolved to an , without any error. Upon assignment of a task, the status of that employee should be changed to unavailable
- The system should take feedback from the student only after the task is resolved, store and redirect it to the appropriate department and the Admin, in appropriate format, on a weekly basis.
- Mess feedback should be received and stored appropriately and redirected to the mess manager as well as Administrator weekly in .csv format
- If the dues are not paid by students within ten days after the due date, the studens' detais are sent to the admin.

2.3 User Classes and Characteristics

Administrator

- Allot different rooms to students on new entry and changing room status to empty of a student when he/she leaves the hostel.
- Authenticate the user during signing up in the portal
- Ability to create, delete, modify details about any user be it a student or staff.
- Control the status of fee payments.

Staff

- Credentials (staff ID, department, account details) should not be visible to anybody else other than that particular staff member and the Admin.
- Each staff should have an account through which they can access these details about themselves.
- They are assigned various jobs based on the student's complaints along with that student's room number and contact details.

Student

- Details of all students residing in hostel should be in the database. Students should be able to access these through their own student accounts having login details same as CC credentials. The CC credentials must be properly encrypted and inaccessible to Admin.

- Should be able to lodge complaints and provide feedback when the complaint(s) get resolved. Should be able to provide feedback on the mess.
- Should be able to see mess and electricity dues and should be able to clear them through online banking, credit and debit cards from all banks prevalent in India.

Mess Manager

- Should have access to the mess details and mess dues of students, including monthly mess expenditures.
- Should receive feedback from students about various food items.

2.4 Operating Environment

- **Operating system:** Windows, macOS and Linux
- **Database:** SQL+ Database
- **Platform:** Java/ PHP
- Should operate on all popular web browsers, Google Chrome, Mozilla Firefox, Safari, Microsoft internet explorer etc.

2.5 Design and Implementation Constraints

- During the development stage of the software it shall be restricted by the available web servers and database system in Indian Institute of Technology Kanpur.
- The application must be highly secure to allow secure transfer of money, prevent unauthorized data viewing and alteration or denial of service.
- Student login data should be stored in database and should be inaccessible to Admin, other students etc.
- Only admin should be able to edit student data.
- The user interface should be user friendly and pleasant with a high accuracy without much error. The user should be able to navigate the system without detailed instructions.

2.6 Assumptions and Dependencies

Technical Knowledge: The user is expected to have a basic knowledge about operating the computer and familiarity in usage of internet.

Educational qualification: All users of this product are expected to have a knowledge of English.

- The admin is already created in this database and the login details of the admin is known by the person who is in charge of the hostel.
- Employee tasks are pre-designated based on employee skill set.

Chapter 3

External Interface Requirements

3.1 User Interfaces

The user interfaces are maintained such that users with less familiarity with computers can comfortably navigate and thus get the job done. It is assumes that the user has been given guidelines about how to use the portal once he/she has signed up.

3.1.1 Adminstration user interface

Admin needs to have full access to students and staff credentials and data. He/she should have the ability to add or authenticate a new user modify or delete any existing user. The admin must receive the details of the defaulters. Admin must receive the feedback weekly, in the form of a .csv file.

3.1.2 Staff user interface

After the account is authenticated by the Admin, the employees can log in using their username and password.

- On the homepage, the operations and information given by the HMS is present like the staff ID, personal details.
- This consists of the availability of the staff and the department of that staff member like electrical, carpentry, housekeeping, AC repair, plumbing.
- Should contain the next assigned job of the staff (if any) and the contact details and the room number of the student who has lodged the complaint so that the staff can contact the student if he/she is not available in the room.
- If the complaint is not resolved on the assigned date there should be a provision to check a box for 'unresolved' and a text field to state the reason for it. This complaint should get priority to be resolved.

- If the complaint is resolved then the staff member can tick the check box for 'resolved' and the pending compliant in the student's account gets removed and comes to the feedback section of that student's account where the student is requested to give feedback regarding how well the complaint has been resolved.

3.1.3 Student user interface

- After the account is authenticated by the Admin, the students can log in using their username and password.
- The homepage should contain student credentials (student ID and room number, date of joining etc.).

- A report should be generated for the student consisting of the dues, fines, mess bills, electricity bills, etc.
- There should be a provision to accept online payment securely using HTTPS for the dues of the students.
- There will be a provision to register a complaint. It consists of the unresolved complaints lodged by the student and a provision to lodge new complaints
- On selecting the option for lodging new complaint a prompt should appear to select the category of complaint like electrical,housekeeping, AC, furniture, plumbing or others. After selecting the appropriate option, the compliant is lodged and the appropriate staff members are alerted to resolved it at the earliest (preferably within 2 business days). If the complaint is unresolved within that time, it should be added to the pending list and the tasks shall be prioritized to be completed at the earliest.
- There should be a provision to provide feedback on how a complaint was resolved or about the mess.
  - On selecting 'feedback regarding resolution of complaint' a rating provision should be included, along with a text field for a review. These feed backs should be sent to the staffs of appropriate departments and Admin weekly.
  - On selecting 'feedback regarding the mess' a form should appear for the student to fill with fields on 'hygiene and cleanliness', 'taste of food' with a five point rating system. A text box should be present for additional suggestions. This feedback should be sent to the Admin and the Mess manager on a weekly basis.

3.1.4 Mess Manager interface

- Mess manager on login has the ability to modify the mess dues of the students which gets added in the dues of the students. He/she should also receive the weekly feedback in the form of a pie chart to get the ratings of the taste and hygiene from the students and acts upon the suggestions given by them to improve the conditions.

3.2 Hardware Interfaces

- Stable bandwidth internet connection (min. 100KBps).
- A computer can be used to access this product with the help of an internet connection. User should have atleast 15 bit monitor and a mouse and keyboard. Requires a minimum ram of 4 GB.
- A smartphone or a tablet with the help of an internet connection can also be used to access this product.

3.3 Software Interfaces

- Software is developed using basic controls and classes using java and SQL.
- An SQL database server to store, modify and retrieve data from it.
- A web browser for browsing the internet and accessing this product.

Chapter 4

System Features

4.1 Use Cases and Scenarios of Administrator

Table 1: Search Student In Database

Name	Search Student In Database
Description	The administrator wants to search the student.
Actor	Administrator
Precondition	The administrator wants to search the student.
Successful Completion	1.The Administrator login with database. 2.He opens the profile page. 3.He searches the student in database. 4.If the student found in the database then the student is found successfully.
Post Condition	The student is found successfully.

Table 2: Check the availability of room

Name	Check the availability of room
Description	Check room availability
Actor	Administrator
Precondition	Checking room availabity by admin
Successful Completion	1.The administrator log in. 2.He/She can access the room details. 3.Checks the availability of vacant room. 4.The administrator logs out the database
Post Condition	The administrator has checked the room availability.

Table 3: Add students

Name	Add Students
Description	Addition of a new student.
Actor	Admin/Student
Precondition	Addition of new student in hostel Database.
Successful Completion	1.The administrator successfully logs in with database. 2.Check hostel's room availability 3.Generation of student profile and entering it into database. 4.Allotment of rooms to student and its number.
Post Condition	addition of student in database of hostel.

Table 4: Add Hostel staff and Mess manager

Name	Adding new Hostel staff or Mess Manager
Description	Addition of Hostel Staff members.
Actor	Admin/Hostel Staff or Mess Manager
Precondition	To add the Staff member or Mess Manager in Database record of hostel.
Successful Completion	1.The administrator successfully logs in with database. 2. Addition of hostel staff member in database along with the personal details(Name, Phone Number, Department) **OR** He adds the Mess Manager into the database along with his/her personal details (Name, Pho
Post Condition	The hostel staff member or mess manager has added in database of hostel.

Table 5: Login with database

Name	Login with database
Description	Process of login with database.
Actor	Administrator/Student/system/Hostel Staff member
Precondition	To login with system or database of hostel.
Successful Completion	1.User goes to this website. 2.User enters the credentials. 3.If the username and password matches the credentials stored in database the user logs in w 4.The user perform his/her tasks.
Post Condition	User logged in with database.

Table 6: Room Allocation

Name	Room Allocation
Description	Process of room allocation.
Actor	Admin
Precondition	To allocate the room to students.
Successful Completion	1. Administrator logs in with database. 2.On successfully logging in, check for availability. 3.On availability of room allocate the room and room number to the student.
Post Condition	The room has allocated to the student

Table 7: Generate student profile

Name	Generate student profile
Description	Generation of student profile process.
Actor	Administrator
Precondition	To generate the student profile.
Successful Completion	1.The administrator logs in with database and selects new profile page using mouse. 2.A blank profile page opens up with fields. 3.Admin makes the entry of student's name, phone. no, room no. 4.The profile of student is created.
Post Condition	Successfully created student profile.

Table 8: Delete Student

Name	Delete Student
Description	Deletion of student profile from database.
Actor	Administrator
Precondition	To delete the student from database
Successful Completion	1. Administrator logs in successfully with database. 2. administrator searches the student. 3.If search is successful and the record of student appears then checks his/her dues. 4.After clearing all the dues from the student, Admin deletes the student from system or dat
Post Condition	Successfully deleted student profile.

Table 9: Generate Mess Account

Name	Generate Mess Account
Description	Creation of mess account.
Actor	Administrator
Precondition	Generating mess account of student.
Successful Completion	1.Admin successfully logsin with database. 2.Generate a new mess account of student only if the student exists on searching 3him/her in the database.
Post Condition	The mess account is created through this procedure.

Table 10: Change the hostel dues of student.

Name	Change the hostel dues of student.
Description	The scenario describes the changing of hostel dues of student
Actor	Administrator/ System
Precondition	Changing status of payment if the hostel dues of students when the student pays his/her pay
Successful Completion	1.The Administrator logs in successfully to system or database for changing of hostel dues of 2.If login is successful, administrator checks profile, hostel dues & current dues. 3.On payment of dues by student through the secure payment gateway, the status of dues pa After the status changes to paid, the dues of student is updated to zero by administrator.
Post Condition	The dues of student has changed or updated by administrator.

Table 11: Eectricity Bill Calculation

Name	Electricity Dues addition
Description	The Scenario describes the process of electricity Dues addition to student profile.
Actor	Administrator
Precondition	The administrator calculates the mess bill.
Successful Completion	1.The Administrator open the dues section. 2.He checks the mess bill detail. 3.The administrator calculates the electricity bill and enters the dues of the electricity bill for each student which gets updated (added) in the dues section of each student profile.
Post Condition	The electricity bill has been calculated successfully.

Table 12: Receive feedback from students about resolution of complaint and mess

Name	Receive feedback
Description	The process to receive weekly feedback about mess and complaint resolution.
Actor	Administrator
Successful Completion	1.The administrator login with database. 2.If the Login successful then he checks the feedback about complaint resolution and mess from feedback_complaint.csv and feedback_mess.csv
Post Condition	The administrator has checked the feedback about complaints resolution and mess.

4.2 Use Cases and scenarios of Hostel Staff members

Table 13: Getting assignments

Name	Getting assigned to a job
Description	The process for a hotel staff member to be assigned to resolve a student's complaint.
Actor	Hotel staff member/System
Successful Completion	The student makes a complaint in a particular category like cleanliness, plumbing, furniture and electricity . 2. The system checks among the hostel staff members' belonging to that department (like cleanliness, plumbing, furniture and electricity) availability and whether he has been already assigned or not, if there exists an available person of that specific department as the complaint who has not been assigned yet, then that person is given the task of resolving the job 3. Display the room number and contact details of the student along with the job description if details have been given by student on the profile of the hotel staff member thus assigned. 4.Make the status of the hotel staff member as unavailable and already assigned to a job.
Post Condition	The system has assigned the staff member the task of complaint resolution .

Table 14: Resolving a complaint

Name	Resolving a complaint
Description	The process for a hotel staff member for resolution of the complaint .
Actor	Hotel staff member/System
Successful Completion	1.After being assigned for the job the staff member goes on the due date to resolve the issue. After that the staff member logs in. 2.If the complaint is resolved the worker ticks the checkbox saying it is resolved thus removing the task from the pending tasks of that student sending task to the feedback section of the task resolution and making status of staff member to available and unassigned. 3. If the complaint is unresolved the staff member can check the box next to unresolved and gives the reason for the task to be unresolved the task gets priority to be resolved and is reassigned again .
Post Condition	The system has assigned the staff member the task of complaint resolution .

4.3 Use Cases and scenarios of student

Table 15: Pay Bill

Name	Pay Bill
Description	This scenario describes the process of bill payment of dues.
Actor	Student/ Administrator.
Precondition	The student wants to pay the dues
Successful Completion	1.The student logs in by entering correct credentials and goes to option for payment of dues. 2.The student gets redirected to payment gateway. 3.Student selects the mode of payment from UPI, Card payment or online banking of any of the prevalent banks in India. 4.The student pays the bill.
Post Condition	The student had paid the bill successfully.

Table 16: Check profile

Name	Check profile
Description	Checking of profile of student.
Actor	Student
Precondition	Student wants to check his/her profile.
Successful Completion	1.Student enters the CC credentials that is the username and password allotted for login. 2.if successfully logs in, The profile page will open. 3.The student checks his /her profile. And also logs out it.
Post Condition	Student checked his/her profile.

Table 17: Check mess bill

Name	Check mess dues
Description	Student wants to checks his/her mess dues.
Actor	Student
Precondition	The student wants to check his/her mess dues.
Successful Completion	1.Student enters the CC credentials that is the username and password allotted for login. 2.if successfully logs in, The profile page will open. 3.The student checks his/her mess dues. 4.The student logs out of his/her account
Post Condition	The student has checked his/her mess dues.

Table 18: Lodge a complain regarding a category

Name	Lodging a complaint
Description	The student wants to lodge a complaint.
Actor	Student
Precondition	The student wants to make a complaint about a service or facility.
Successful Completion	1The student enters password and login his/her profile. 2.The student goes to the section for lodging complaint. 3.The student selects a category among furniture, electricity, plumbing, cleanliness for filing a complaint and describes it. 4.Complaint gets added to pending complaints and job assignment to hoste staff is done. The student logs out of his profile.
Post Condition	The student has made the complaint.

4.4 Use cases and scenarios of Mess Manager

Table 19: Mess Bill Calculation

Name	Mess Dues addition
Description	The Scenario describes the process of mess Dues addition to student profile.
Actor	Mess Manager
Precondition	The mess manager calculates the mess bill.
Successful Completion	1.The mess manager open the dues section. 2.He checks the mess bill detail. 3.The mess manager calculates the mess bill and enters the dues of the mess bills for each student which gets updated (added) in the dues section of each student profile.
Post Condition	The mess bill has been calculated successfully.

Table 20: Receive feedback from students about mess

Name	Receive feedback
Description	The process to receive weekly feedback about mess .
Actor	Mess Manager
Successful Completion	1.The Mess Manager login with database. 2.If the Login successful then he checks the weekly feedback in terms of rating of taste of food and hygeine presented in form of pie chart. 3. The suggestions given by students are also presented in a systematic manner.
Post Condition	The mess manager has checked the feedback about mess.

Chapter 5

Other Nonfunctional Requirements

5.1 Performance Requirements

The product is based on Java and is platform independent and the performance is browser independent. The performance of this product should not be laggy and each query should be responded within 2 seconds.
The language of this product shall be English

5.2 Safety Requirements

To prevent data from getting lost due to sudden shutdown of database, the database should be regularly backed up.

5.3 Security Requirements

- The product must use a secure database
- The students and the staff members cannot modify the database. They can only view some parts of the database i.e. the portions containing data related to that users (as specified in Section 2.3).
- System will have different kind of users each kind will have different access right to the database (Section 3.1).
- Unauthorized access to read modify or delete entries of the database should be prohibited.
  This is of utmost importance important and should cover areas of hardware reliability fail, physical security of the data, as well as the back up of the database and proper method for detection of fraud and exploitation.
- The payment procedure should be under secure HTTPS to prevent sensitive banking information from being revealed or modified by malicious attackers or third party.
- The login details of users must be encrypted to keep it safe from third party or a malicious users.
- The admin should not have the right to create another admin.

5.4 Software Quality Attributes

- The HMS has to be OS independent and browser independent
- Flexibility of system to add new features easily

- The product should have the capability to backup the database periodically and in case of a shutdown restore from the backup database so as to restore services again.
- An efficient system is required consuming less resources yet satisfying all the above requirements.

5.5 Business Rules

The system handles the activity of the students, hostel staff, mess manager as well as the administration. The product shall have the ability to search details of the users, like the personal details of student. All of this combined gives rise to the hostel management system. The software should not be outsourced to any third party without prior permission.
IIT Kanpur reserves all the applicable rights of the project licenses and permissions are applicable before any industrial use.