System Design and Implementation of a Mobile Application Named Bachelor's Solutions for Hostel Living Bachelors

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Supervised by
Khadija Islam

Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Computer Science and Engineering

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SONARGAON UNIVERSITY (SU)**
January 2023

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APPROVAL

The project titled **"System Design and Implementation of a Mobile Application Named Bachelor's Solutions for Hostel Living Bachelors"**submitted by Md. Shohedujzaman Soykot (CSE1901016118), Md.Sagor Hossain (CSE1901016176), Juel Chandro Das (CSE1901016180) and Mazharul Haque Emon (CSE1901016084) to the Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents.

Board of Examiners

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Engineering   **Examiner 2**

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Department of Computer Science and Engineering   **Examiner 3**

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DECLARATION

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Khadija Islam. Lecturer,** Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

Countersigned   Signature

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ABSTRACT

Now a days our regular life is more busy and full of complexity but there is something like mobile application can simplify humans life. Technology is now part of our day to day life. Consequently, our life is fully influenced by modern technology-based devices like mobile phones. In this project we tried to find out the best uses of our electronic devices like mobile. After download this application users of this application can make their life easier and avoid complexity, time consuming work can be done simply. Thereby the number of hostels is also increasing for the accommodation of the students studying in this institution. And hence there is a lot of strain on the person who are running the hostel and software's are not usually used in this context. This particular project deals with the problems on managing a hostel and avoids the problems which occur when carried manually. Identification of the drawbacks of the existing system leads to the designing of computerized system that will be compatible to the existing system with the system which is more user-friendly and more GUI oriented. We can improve the efficiency of the system, thus overcome the drawbacks of the existing system.

ACKNOWLEDGMENT

At the very beginning, we would like to express my deepest gratitude to the Almighty Allah for giving us the ability and the strength to finish the task successfully within the schedule time.

We are auspicious that we had the kind association as well as supervision of **Khadija Islam**, Lecturer, Department of Computer Science and Engineering, Sonargaon University whose hearted and valuable support with best concern and direction acted as necessary recourse to carry out our project.

We would like to convey our special gratitude to **Prof. Dr Md Alamgir Hossain,** Dean, Faculty of Science and Engineering for his kind concern and precious suggestions.

We are also thankful to all our teachers during our whole education, for exposing us to the beauty of learning.

Finally, our deepest gratitude and love to my parents for their support, encouragement, and endless love

LIST OF ABBREVIATIONS

AI   Artificial Intelligence
DFD   Data Flow Diagram
ER   Entity Relationship
MVT   Model View Template
NFR   Non Functional Requirements
SDLC   Software development life cycle

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CHAPTER 1

INTRODUCTION OF BACHELOR'S SOLUTION

1.1 Introduction

In our country a big number of bachelor lives in all around the country. We all know that bachelors faces different and complex problems like meal calculation, buy groceries, find seats If they can solve these problems then their bachelor life will be much easier .This is where a "Bachelor Solution" application can be play an important role and help bachelors in every single problem what they faces and simplify their day to day work.

1.2 Proposed System

The proposed system (Bachelor's Solution) is an android mobile app which can be used in any kind of android mobile or tablet using internet connection like mobile data or Wifi. By using this app : (1). Bachelor can track their regular expenses like spending on grocery, how many meals provided in everyday, who give how much money in a month. (2). They can find a seat if they need from the feature of "Find seats" ,also using this feature anyone can post a seat also. (3) Members or users can communicate with each other by using the feature " Message". (4) Buy or sell used product: users can buy their needed used products and also can sell their used product. At last it can be said that "Bachelor's Solution will be work as a all in one solution of a bachelor life . This system will provide full information about a member in the hostel. It will show rooms available or not and number of people in a particular room. This will also provide information on members who have paid in full or are still owing. This system will also provide a report on the summary detail regarding bills members are owing. Also included is a user module for employees or the hostel manager. There will also be an administrator module which will accessed by the administrator and has the ability to delete, add and edit manager's records. This system will be developed based on Software Development Life Cycle (SDLC).

1.3. Encountered Difficulties

We developed this application thinking different difficulties in mind such that a hostel manager face a lot of problem like managing every room ,room billing, managing every members of a hostel. This is such a complex work for him. For this kind of difficulties we develop this application. This application helps him a lot to maintain or manage this problem regularly. On the other hand bachelor or member of this application can't communicate with the managers anytime by using this application member can communicate with the manager anytime or if he need to send any messages. A bachelor has to sell or buy different products for their day to day life. Bachelor can't find a proper platform to sell or buy their desired products. This application can be a reliable platform as a solution of this problem.

1.4. Objectives

1. We develop this website to maintain or organize every single problems is bachelor life.
2. An admin can manage every managers and members .
3. Provide the functionality to make their (member) own booking.
4. It tracks all the information of Allotters, Beds, Rooms.
5. Manage the information of Allotters.
6. Shows the information and description of the rent, hostel.
7. To increase efficiency of managing the Rent.
8. It deals with monitoring the information and transactions of rooms.
9. Manage the information of rent.

1.5. Goal of this project

In this modern time mobile application is much needed terms for every smart phone user. Mobile application makes it easier to maintain our regular or day to day work. We are very busy now a days and we faces different kinds of problems in our daily life such as bachelors who lives without family members , they faces different sorts of problem like problem with daily meals, maintain expenses, buying their own groceries ,find seats ,buying or selling their needed products. Which is very time consuming. That is why we present here a all in one solution "Bachelor's solution" .Project's goal is save bachelor's time and simplify their regular life.

CHAPTER 2

PROJECT BACKGROUND

2.1 Background basic

Project background should include information about the process of development a project like ,why we want to implement this specific "Bachelor's solution", how it can be work etc.

2.2 Discussion with bachelor

Before making this project we have discussed with some bachelor, to find out that what is their requirement? Why they need this kind of solution? We did this discussion because there is not enough application at the market to solve their regular day problem. Good user communication often involves actively listening to your users to interpret their emotions and better care to their needs. Being transparent with a client helps facilitate trust. Users may appreciate learning more about the development process so they can use this application easily. Open client communication can also help limit misunderstanding, lead to greater customer satisfaction and make clients more likely to recommend a business to other.

2.3 Software development life cycle

The Software Development Life Cycle (SDLC) is a structured process that enables the production of high-quality, low-cost software, in the shortest possible production time. The goal of the SDLC is to produce superior software that meets and exceeds all customer expectations and demands. SDLC or the Software Development Life Cycle is a process that produces software with the highest quality and lowest cost in the shortest time possible. SDLC provides a well-structured flow of phases that help an organization to quickly produce high-quality software which is well-tested and ready for production use.

Stage 1. Project Planning:
The first stage of SDLC is all about "What do we want?" Project planning is a vital role in the software delivery lifecycle since this is the part where the team estimates the cost and defines the requirements of the new software.

Stage 2. Gathering Requirements & Analysis: The second step of SDLC is gathering maximum information from the client requirements for the product. Discuss each detail and specification of the product with the customer. The development team will then analyze the requirements keeping the design and code of the software in mind. Further, investigating the validity and possibility of incorporating these requirements into the software system. The main goal of this stage is that everyone understands even the minute detail of the requirement.

Stage 3. Design: In the design phase (3rd step of SDLC), the program developer scrutinizes whether the prepared software suffices all the requirements of the end-user. Additionally, [1] if the project is feasible for the customer technologically, practically, and financially. Once the developer decides on the best design approach, he then selects the program languages like Oracle, that will suit the software.Once the design specification is prepared, all the stakeholders will review this plan and provide their feedback and suggestions. It is absolutely mandatory to collect and incorporate stakeholder's input in the document, as a small mistake can lead to cost overrun.

Stage 4. Coding or implementation: Time to code! It means translating the design to a computer-legible language. In this fourth stage of SDLC, the tasks are divided into modules or units and assigned to various developers. The developers will then start building the entire system by writing code using the programming languages they chose. This stage is considered to be one of the longest in SDLC..[1] The developers need certain predefined coding guidelines, and programming tools like interpreters, compilers, debugger to implement the code. The developers can show the work done to the business analysts in case if any modifications or enhancements required.

Stage 5. Testing: Once the developers build the software, then it is deployed in the testing environment. Then the testing team tests the functionality of the entire system. In this fifth phase of SDLC, the testing is done to ensure that the entire application works according to the customer requirements.After testing, the testing team might find some bugs or defects and communicate the same with the developers. The development team then fixes the bugs and send it to QA for a re-test. This process goes on until the software is stable, bug-free and working according to the business requirements of that system.

Stage 6. Deployment: The sixth phase of SDLC: Once the testing is done, and the product is ready to deployment, it is released for customers to use. The size of the project determines the complexity of the deployment. The users are then provided with the training or documentation that will help them to operate the software. Again, a small round of testing is performed on production to ensure environmental issues or any impact of the new release.[1]

Stage 7. Maintenance:
The actual problem starts when the customer actually starts using the developed system and those needs to be solved from time to time. Maintenance is the seventh phase of SDLC where the developed product is taken care of. According to the changing user end environment or technology, the software is updated timely.

2.4 Our used SDLC model

The V-model is an SDLC model where execution of processes happens in a sequential manner in a V-shape. It is also known as Verification and Validation model. The V-Model is an extension of the waterfall model and is based on the association of a testing phase for each corresponding development stage. When the requirement is well defined and not ambiguous. The V-shaped model should be used for small to medium-sized projects where requirements are clearly defined and fixed. The V-shaped model should be chosen when sample technical resources are available with essential technical expertise. Also known as the verification and validation model, the V-model guides where testing needs to begin as early as possible in the SDLC life cycle. Testing is not only an execution-based activity. It also involves various activities that must be covered before the end of the coding phase.

In this project we uses here V Model (SDLC: Software development life cycle), because V-Model is easy to understand ,Testing method like planning ,testing designing happens well before coding, By using V-Model we can saves a lot of time ,success chance of V-Model is more than waterfall model. We can avoids the downward flow of the defects. This software development life cycle model (V-Model) works well with any kind of project.
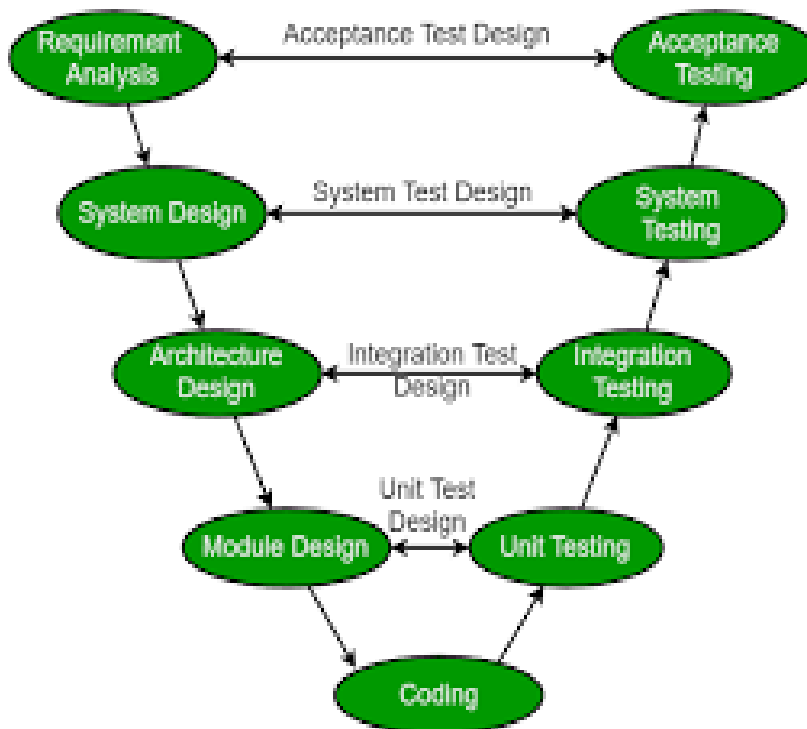

Fig: 2.1 (SDLC Model)

2.5 V Model

The advantage of the V-Model method is that it is very easy to understand and apply. The simplicity of this model also makes it easier to manage. The disadvantage is that the model is not flexible to changes and just in case there is a requirement change, which is very common in today's dynamic world, it becomes very expensive to make the change.

The advantages of the V-Model method are as follows −

- This is a highly-disciplined model and Phases are completed one at a time.
- Works well for smaller projects where requirements are very well understood.
- Simple and easy to understand and use.
- Easy to manage due to the rigidity of the model. Each phase has specific deliverables and a review process.

2.6 Process of V Model

1. First of all we analysis the project requirements, like bachelor faces what kind of problem and how these problems can be solved. 2. After we that designed our system like we design flow charts, where we indicated the way of use our application. 3. After designing of our system we design our architecture part, in this part we design kinds of diagram like ER Diagram, Use case diagram and block diagram, 4. Then we design our module or main features like we design login interface for user, User dashboard or user home page, Where we include the features for user like a user can see notification from manager, he can find a seat for him, also can buy or sell his unused products, can pay monthly bill, In manager home page we design room create options, room management, user management, calculation section. In Admin dashboard or admin home page we design the admin activity like how an admin can control managers. 5. After completing module design we started coding to implement every module. In V-Model Requirement analysis is related with our final or acceptance testing, System design is related with system testing, Architecture design is related with integration testing, Module design is related with Unit testing like every module can be tested unit by unit, and at the end coding established the whole process.[1]

2.7 Testing Method

Software testing is the process of evaluating and verifying that a software product or application does what it is supposed to do. The benefits of testing include preventing bugs, reducing development costs and improving performance. In general, testing is finding out how well something works. In terms of human beings, testing tells what level of knowledge or skill has been acquired. In computer hardware and software development, testing is used at key checkpoints in the overall process to determine whether objectives are being met. Software testing identifies bugs and issues in the development process so they're fixed prior to product launch. This approach ensures that only quality products are distributed to consumers, which in turn elevates customer satisfaction and trust.

There are many different types of testing

- **Unit testing:**
  Unit testing is part of the software development process in which small parts of an application, called units, are individually tested for proper operation. Unit testing can be done manually but is often automated in Agile and DevOps projects.

- **Integration/System Testing:**
  Integration testing is the part in software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before functional testing.

- **Functional Testing:**
  After the integration tests are performed, more complex levels of tests are used. The functional test process in which software is tested to ensure that it conforms with all business requirements and to ensure that it has all the required functionality for the software to be used by the end user without issues.

- **Regression testing:**
  Regression testing verifies that software which was developed in previous releases still performs correctly after it was changed, changes may include software enhancements, compliance, bug fixes etc.

- **Acceptance Testing:**
  Acceptance Testing is where a system is tested for acceptability by the end user. The purpose of this test is to evaluate the system's compliance with the business requirements and assess whether it is acceptable for delivery into production.

2.8 Testing Method we have used (Unit Testing)

Unit testing ensures that all code meets quality standards before it's deployed. This ensures a reliable engineering environment where quality is paramount. Over the course of the product development life cycle, unit testing saves time and money, and helps developers write better code, more efficiently. Reduces Defects in the Newly developed features or reduces bugs when changing the existing functionality. Reduces Cost of Testing as defects are captured in very early phase. Improves design and allows better refactoring of code.

According to V-Model we use here Unit testing. Unit Testing is a software testing technique by means of which individual units of software group of computer program modules, usage procedures, and operating procedures are tested to determine whether they are suitable for use or not.[1] It is a testing method using which every independent module is tested to determine if there is an issue by the developer himself. It is correlated with the functional correctness of the independent modules. Unit testing is defined as a type of software testing where individual components of software are tested.
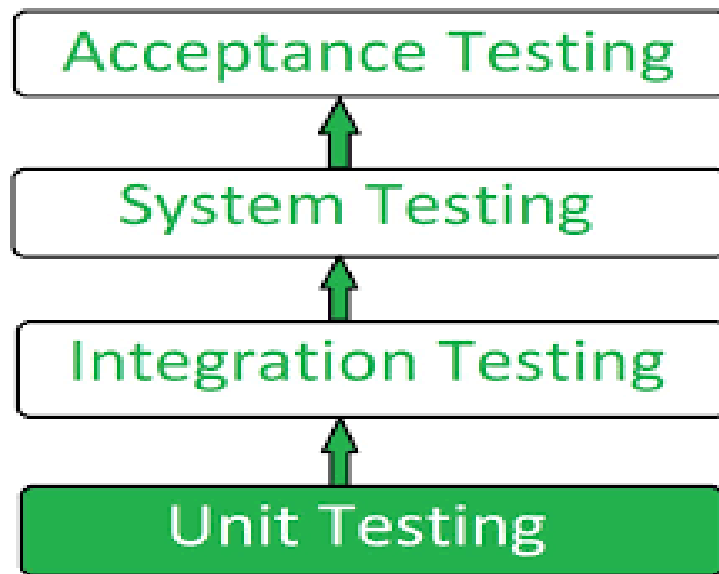

Fig:2.2 (Unit Testing)

2.9 Different Method Of Unit Testing

There is 3 types of unit testing we use in our application:

1. **Black Box Testing:** This testing technique is used in covering the unit tests for input, user interface, and output parts. Black box testing is a powerful testing technique because it exercises a system end-to-end. [2] Just like end-users "don't care" how a system is coded or architect ed, and expect to receive an appropriate response to their requests, a tester can simulate user activity and see if the system delivers on its promises. Along the way, a black box test evaluates all relevant subsystems, including UI/UX, web server or application server, database, dependencies, and integrated systems[2]. Black box testing is an effective way to decide if a system's design meets its requirements and to avoid errors in implementation. It does not require any knowledge of the inner logic or source code and can be performed by any tester. The importance of functional tests is well-known.

2. **White Box Testing:** This technique is used in testing the functional behavior of the system by giving the input and checking the functionality output including the internal design structure and code of the modules. By using white box testing we test our inner workings of a software system—its code, infrastructure, and integrations with external systems. This unit testing method help us to organize our system code, code infrastructure. [2] White box testing can uncover structural problems, hidden errors and problems with specific components. Black box testing checks that the system as a whole is working as expected.

3. **Gray Box Testing:** This technique is used in executing the relevant test cases, test methods, test functions, and analyzing the code performance for the module. Gray-box testing (International English spelling: Grey-box testing) is a combination of white-box testing and black-box testing. The aim of this testing is to search for the defects, if any, due to improper structure or improper usage of applications.

CHAPTER 3

SYSTEM REQUIREMENTS AND SPECIFICATIONS

3.1 System requirements

System technical requirements is a process that identifies the functionality that is needed by a system in order to satisfy the users requirements [4] .System requirements are a broad and also narrow subject that could be implemented to many items. Without system requirements, the project will be a failure and the company will fail. If the customer has system requirements that will satisfy their needs, then that company will have a higher percentage of success. Not only will they have success, but they will also have better chance of saving money and time. Without system requirements, the project will be a failure and the company will fail. If the customer has system requirements that will satisfy their needs, then that company will have a higher percentage of success. Not only will they have success, but they will also have better chance of saving money and time.

3.1.1 Software Configuration

A major element in building a system is the section of compatible software since the software in the market is experiencing in geometric progression. Selected software should be acceptable by the firm and one user as well as it should be feasible for the system. This document gives a detailed description of the software requirement specification. The study of requirement specification is focused specially on the functioning of the system. It allow the developer or analyst to understand the system, function to be carried out the performance level to be obtained and corresponding interfaces to be established.

1. Technology Implemented: Django Server

2. Language Used: Dart and Django

3. Database: Django.

4. User Interface: Flutter.

5. Operating system: Android and iOS.

3.1.2 Front-End (Flutter V:3.3.4)

For our application we are using flutter, which is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase. We are also using GetX (Flutter package) for state management and route management, Dio (Flutter package) for calling API requests.
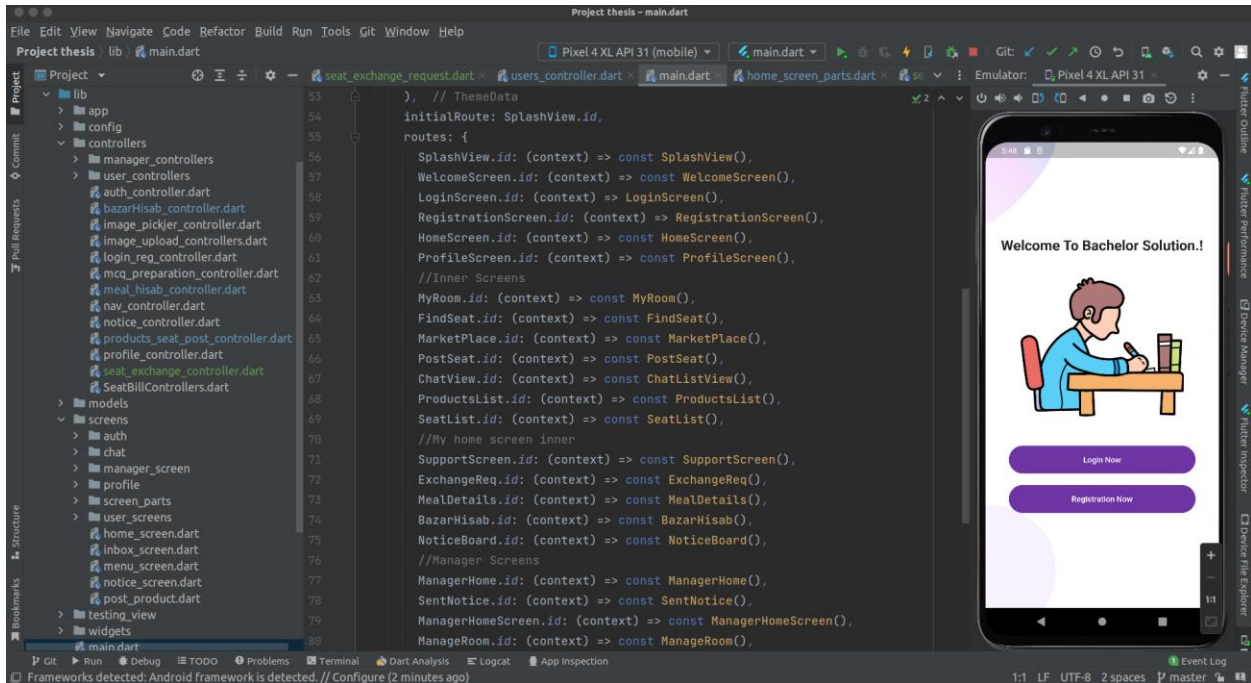
Fig:3.1 (Development Environment)

Now a days flutter is one of the most popular platform for apps developer .Flutter is a mobile app development platform created by Google. It allows developers to create web, desktop, and cross-platform apps that run on Android and iOS devices. [5] Flutter uses a reactive programming language called Dart, making development faster and easier than traditional methods. Flutter apps are written in the Dart language and make use of many of the language's more advanced features. While writing and debugging an application, Flutter runs in the Dart virtual machine, which features a just-in-time execution engine. [3]

Fig:3.2 (Flutter)

3.1.3 Advantages of Flutter

Beside React native now a days flutter is one of the most popular platform for apps developer .Flutter makes apps developer life easier. Developer can make a perfect UI using Flutter Widgets. In Flutter developer use Dart programming language which is very easy to learn and implement .Developer can use Hot Reload Function to get instant updated result. Flutter have great developers community which is very effective and helpful for flutter developer. Flutter gives high performance apps . One of the benefits of using Flutter is that you can modify or customize widgets with ease. In addition, it provides UI widgets that meet key web application design requirements. Flutter, as an open-source framework, has attracted a broad and active community of developers since its release. [5]

3.1.4 Back-End (Django V:4.1.4)

Django is one of the most popular back-end language which is a framework of Python. The Django web framework is a free, open source framework that can speed up development of a web application being built in the Python programming language.[6] Django—pronounced "Django," named after the famous jazz guitarist Django Reinhardt—is a free, open source framework that was first publicly released in 2005. Django facilitates "rapid development and clean, pragmatic design." The Django web framework, deployed on a web server, can help developers quickly produce a web front-end that's feature-rich, secure and scalable.

Starting with the Django web framework is more efficient way to build a web app than starting from scratch, which requires building the back-end, APIs, java-script and sitemaps. With the Django web framework, web developers can focus on creating a unique application and benefit from greater flexibility than using a web development tool.[6]

Fig:3.3 (Django Rest Framework)

3.1.5 Advantages Django

Django has MVT (Model View Template) is a software design pattern. It is a collection of three essential components Model, View, and Template. These three layers are responsible for different things and can be used independently. When we make web applications in Django, it makes sure that developers don't commit any mistakes related to security. It will be pretty difficult to find security loopholes in Django, even in the user authentication system.[7]

The framework has protection against the most common security attacks like XSS and CSRF (Cross-Site Request Forgery) attacks, SQL injections etc. The user authentication system of Django is also solid, to manage usernames and passwords. Python is one of the most top-notch programming languages due to its ease of learning, popularity, and power. It is the most popular language at the present time, and for all those Pythonistats, Django is the perfect web development framework.

3.2 Functional requirements

Functional requirement will describe a particular behavior of function of the system when a specific conditions are met. To use this application users must be download this application from Google play store, in order to use it first of all users has to register then complete the login process.

3.2.1 Registration

Manager and users can register into this apps which will be supervised by an admin. If admin approve them then they will be able to login into this app.

3.2.2 Login

After completing registration process and approved by admin manager and user can login into this app ,admin also can login and maintain or supervise this app.

3.2.3 Create room (Manager)

Manager can create a room and define or specified the number of seats of this room with details like cost, services.

3.2.4 Assign member in the room (Manager)

Manager can assign members or users into the different rooms with details.

3.2.5 Post seats (Manager)

After login manager can post seat in the seat finding section. Which will be show to the user's dashboard and user can choose their seats from here.

3.2.6 Post Notification (Manager)

Post Notification is another part of manager. Manager will be able to post notification like monthly billing notice.

3.2.7 Monthly billing calculation (Manager)

Manager can calculate the monthly billing from billing section. He will be able to see the total expenses and total earning.

3.2.8 Post sell post (User or Member)

After completing login process a user can post their unused products for sell into the apss marketplace.

3.2.9 Post request (User or Member)

User can make a request to the manager like exchange seats, request for guest etc.

3.2.10 Search seats (User or Member)

Search function will be for user or members who can search seats .

3.3. Non Functional Requirements

Nonfunctional Requirements (NFRs) define system attributes such as security, reliability, performance, maintainability, scalability, and usability. They serve as constraints or restrictions on the design of the system across the different backlogs Nonfunctional Requirements (NFRs) define system attributes such as security, reliability, performance, maintainability, scalability, and usability. They serve as constraints or restrictions on the design of the system across the different backlogs. They serve as constraints or restrictions on the design of the system across the different backlogs. Also known as system qualities, nonfunctional requirements are just as critical as functional Epics, Capabilities, Features, and Stories. They ensure the usability and effectiveness of the entire system.

3.3.1 Response time of this apps

Application response time is the time the application or server takes to respond to the requestor query done at the front end by the end-user. The response time of the server depends on several factors: number of requests, number of users, caching, internet speed, DNS. Response time includes the time taken to transmit the inquiry, process it by the computer, and transmit the response back to the terminal. Response time is frequently used as a measure of the performance of an interactive system.

3.3.2 Maintenance

Application maintenance is the process of keeping an application up-to-date and running smoothly as well as performing optimally. Application maintenance includes tasks like ensuring all the links on your site are working, regularly updating content, and fixing any broken links. In

order to make sure that your website is achieving its purpose, web maintenance is essential. Website maintenance includes tasks like monitoring web traffic, updating content, and ensuring that the website is secure. If you're a small business owner, you know that maintaining a website is necessary for your success.

There is a several types of maintenance:

1. Corrective Maintenance

Corrective maintenance is often associated to breakdowns or reactive maintenance and can include troubleshooting, disassembly, adjustment, repair, replacement and realignment. Corrective maintenance is important as it allows a facility to return to full efficiency following an equipment failure. Maintenance tasks involve the replacement or repair of items after they have failed and can be prioritized according to how critical they are. It is type of maintenance action that is required only when it is needed. CM is generally required only when failure or breakdown of assets occurs. CM Process does not extra tools to identify problems before they occur. Therefore, it is simple process that is easy for one to understand and perform.

2. Preventive Maintenance

Preventive maintenance is the act of performing regularly scheduled maintenance activities to help prevent unexpected failures in the future. Put simply, it's about fixing things before they break . It is the process of locating and correcting breakdowns that are preventing equipment to perform its function normally. Advantages: It does not require a large technical setup or high analytical capacity. Corrective maintenance maximizes the use of the equipment's useful life. A preventive maintenance program is an important part of successful facility management. It keeps equipment operating efficiently, increases the safety of your employees, and helps you avoid large and costly repairs down the road.

3. Perfective Maintenance

Perfective software maintenance aims to adjust software by adding new features as necessary and removing features that are irrelevant or not effective in the given software. This process keeps software relevant as the market, and user needs, change. Perfective software maintenance is performed in order to improve the quality of the software to better align with the company's process in the real world. This can include things like adding new features, improving performance, application integration, and so on. Perfective software maintenance aims to adjust software by adding new features as necessary and removing features that are irrelevant or not effective in the given software. This process keeps software relevant as the market, and user needs, change

4. Adaptive Maintenance

Adaptive maintenance is concerned with the change in the software that takes place to make the software adaptable to new environment such as to run the software on a new operating system. adaptive software maintenance becomes important when the environment of your software changes. This can be brought on by changes to the operating system, hardware, software

dependencies, Cloud storage, or even changes within the operating system. Adaptive software maintenance becomes important when the environment of your software changes. This can be brought on by changes to the operating system, hardware, software dependencies, Cloud storage, or even changes within the operating system.

3.4 System Specification

App specification or testing is process of test every features of a application that every features works properly also this is a detailed and consistent document about the application requirements that will align your development team and owner's vision .It helps to clearly understand what needs to be done if we can do it properly, we will be able to prevent any unpleasant surprises at the end.

This apps will be used for hostel management where an admin can supervised everything ,under admin there will be a manager who can mainly control or manage everything about hostel like seat post ,user manage ,billing ,give notice to the users. A user can find seats here, can post a sell post of his unused products in the marketplace of this apps. User can also pay the monthly bill ,can see notification from manager ,user also able to make a request to the manager ,like change seats ,guest request etc. Overall by using this apps a hostel can be manage easiest way.

All the results of system specification are systematized analyzed and form the basis of custom software development in order to get the optimal, apt software solution. Moreover, the system specification allows estimating the cost of further development and the time of the whole project implementation.

CHAPTER 4

SYSTEM DESIGN

4.1 Flow-chart

A flowchart is a diagram that shows an overview of a program . Flowcharts normally use standard symbols to represent the different types of instructions . These symbols are used to construct the flowchart and show the step-by-step solution to the problem. Flowcharts are sometimes known as flow diagrams.
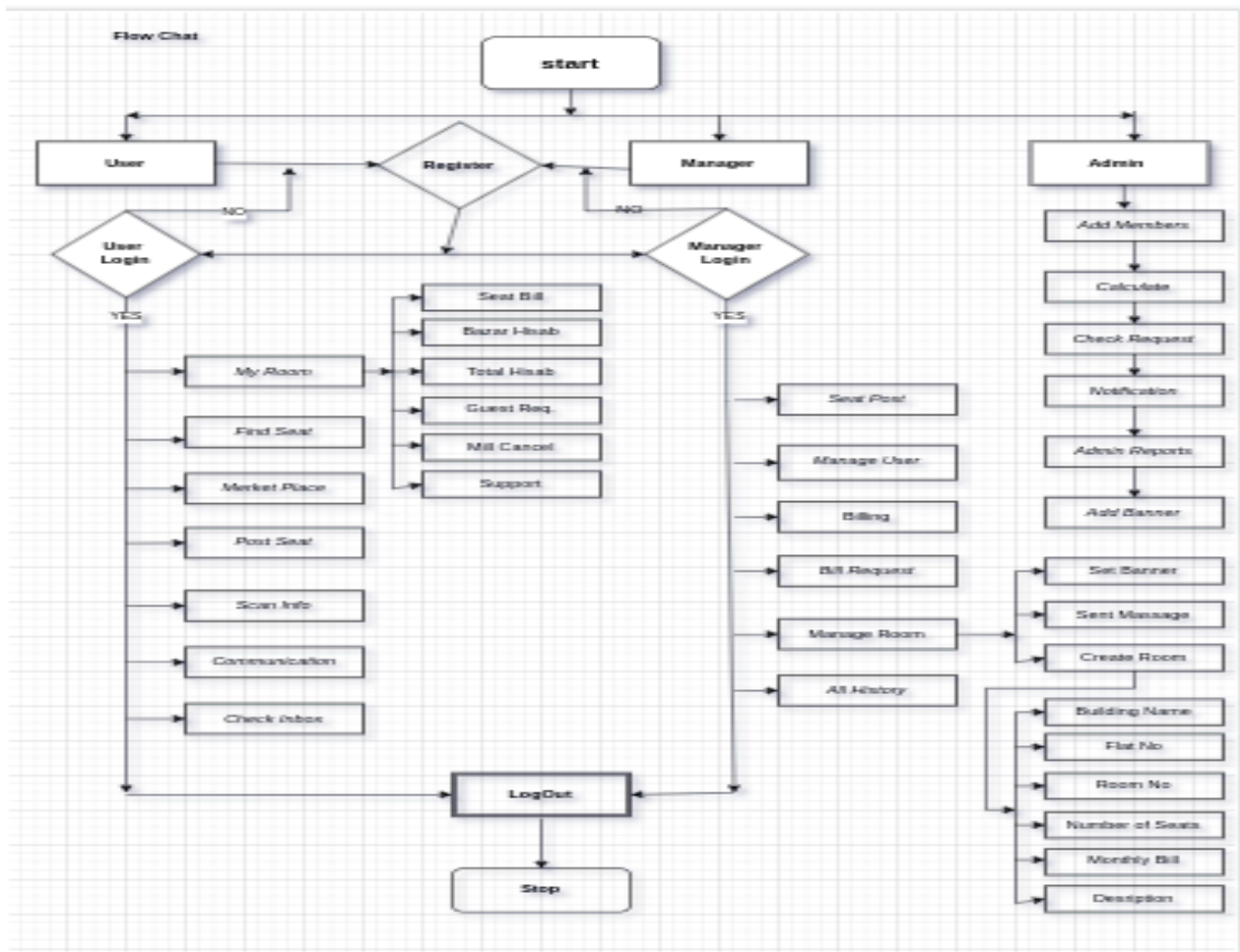
Fig:4.1 (Flow Chart)

4.2.1 Data flow diagram (level 0)

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.[10]
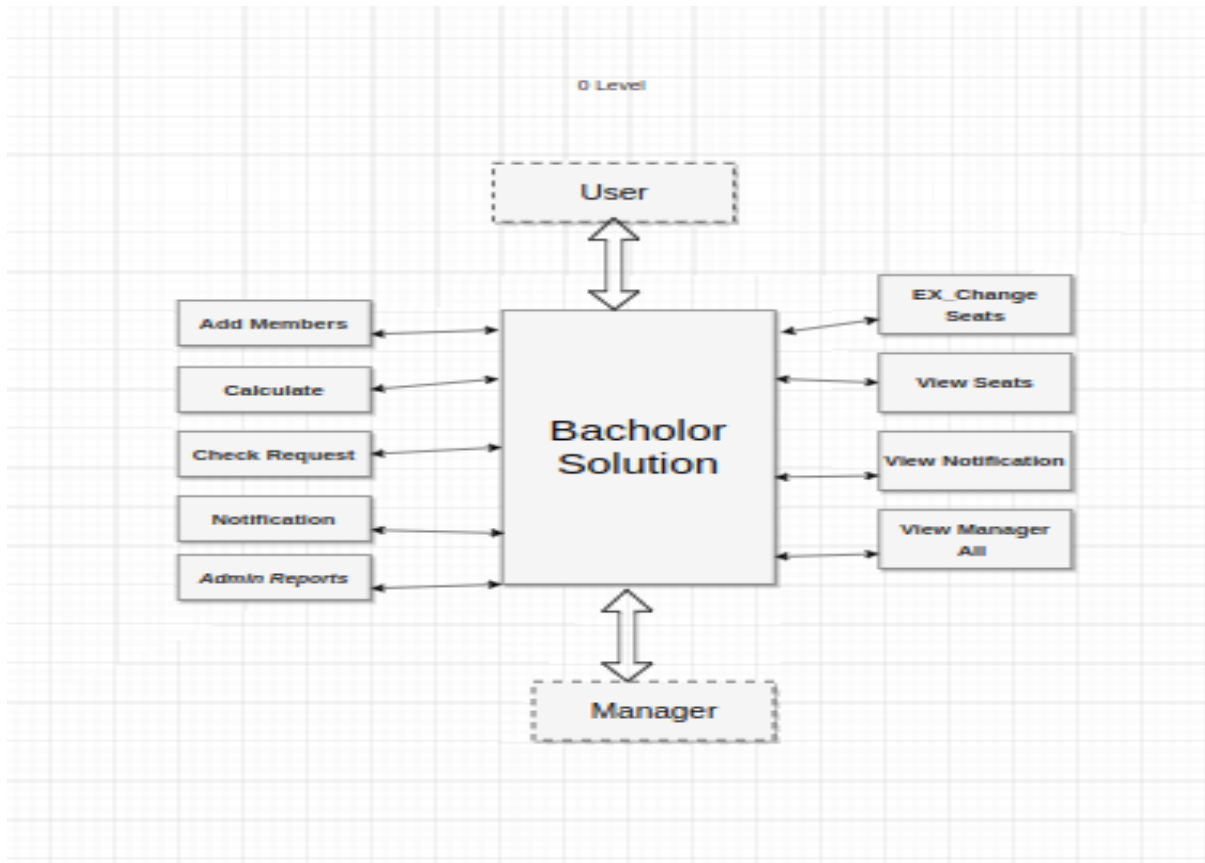
Fig:4.2.1 (Data Flow Diagram level 0)

4.2.2 Data flow diagram (level 1)

Level 1 DFDs are still a general overview, but they go into more detail than a context diagram. In level 1 DFD, the single process node from the context diagram is broken down into sub-processes. As these processes are added, the diagram will need additional data flows and data stores to link them together.[10]

Fig:4.2.2 (Data Flow Diagram level 1)

4.3 Relationship diagram

An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how "entities" such as people, objects or concepts relate to each other within a system. This model is used to define the data elements and relationship for a specified system. It develops a conceptual design for the database. It also develops a very simple and easy to design view of data[9]

Fig:4.3 (Relationship Diagram)

4.4 Activity diagram

An activity diagram shows business and software processes as a progression of actions. These actions can be carried out by people, software components or computers. Activity diagrams are used to describe business processes and use cases as well as to document the implementation of system processes. An activity diagram visually presents a series of actions or flow of control in a system similar to a flowchart or a data flow diagram. Activity diagrams are often used in business process modeling. They can also describe the steps in a use case diagram

Fig:4.4 (Activity Diagram)

4.5 Use case diagram

A use case diagram is a way to summarize details of a system and the users within that system. It is generally shown as a graphic depiction of interactions among different elements in a system. Use case diagrams will specify the events in a system and how those events flow, however, use case diagram does not describe how those events are implemented.[9]

Fig:4.5 (Use case diagram)

CHAPTER 5

IMPLEMENTATION AND OUTCOME

In this project we have we 3 sections (1)Admin section ,(2)Manager section and (3)User section or member section.

5.1 Admin dashboard

In this an admin dashboard .From here admin can control everything about this application. From here admin can control his every user and manager ,operate meal calculation ,products, Bill request, monthly billings, monthly expenses ,manager banner notice ,messages and notification.
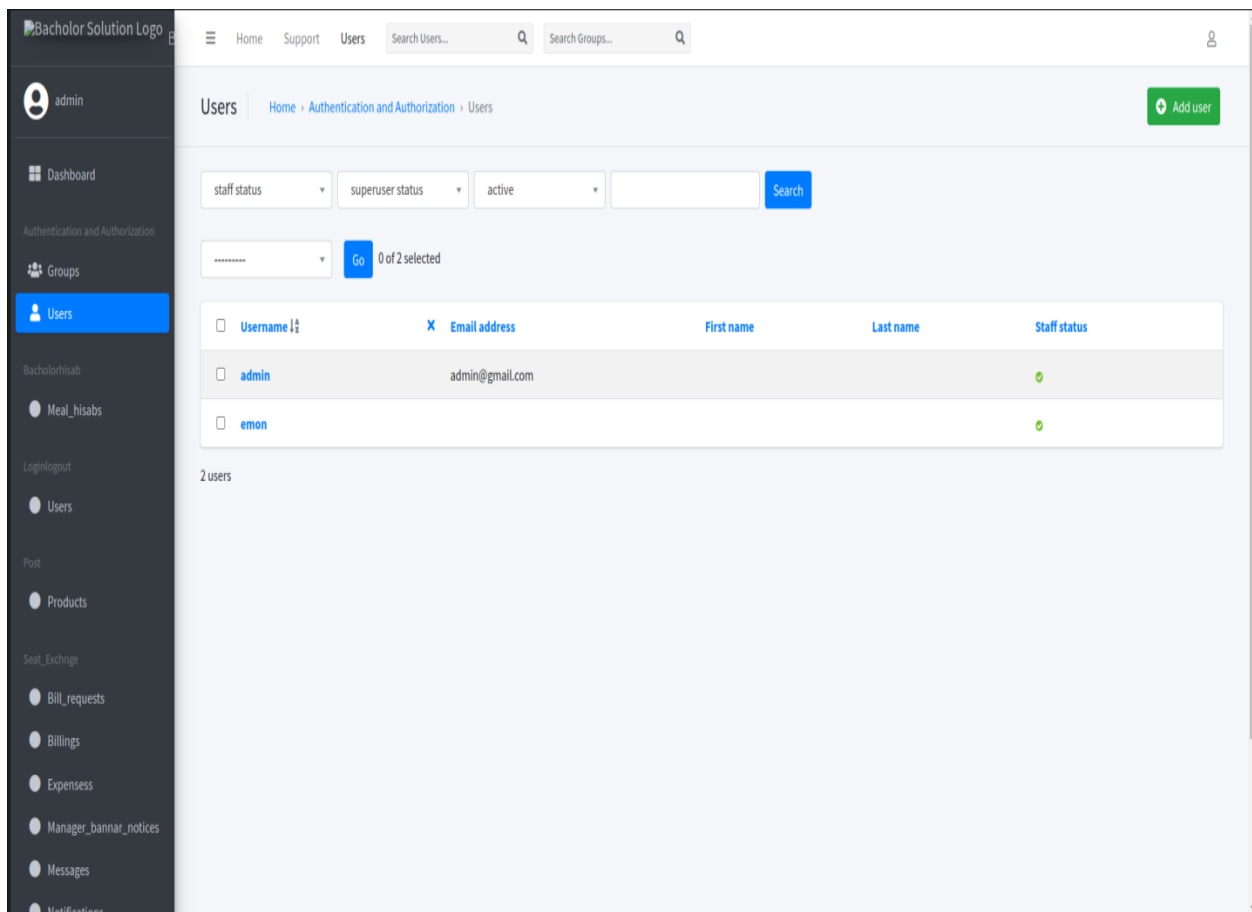
Fig:5.1 (Admin Dashboard)

5.2.1 Manager login dashboard

In this a manager login dashboard .From here manager can login to his main dashboard using email and password and do his application related activity. If he don't have any account ,he can also register using Name, Email, Phone, Hostel name, Hostel address.
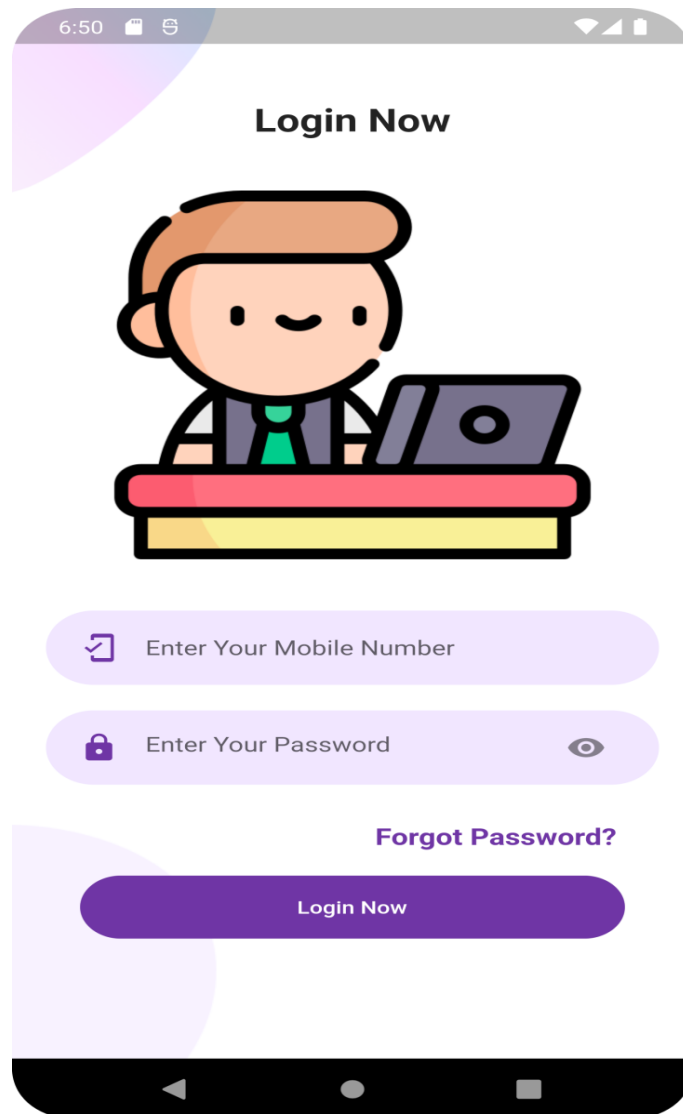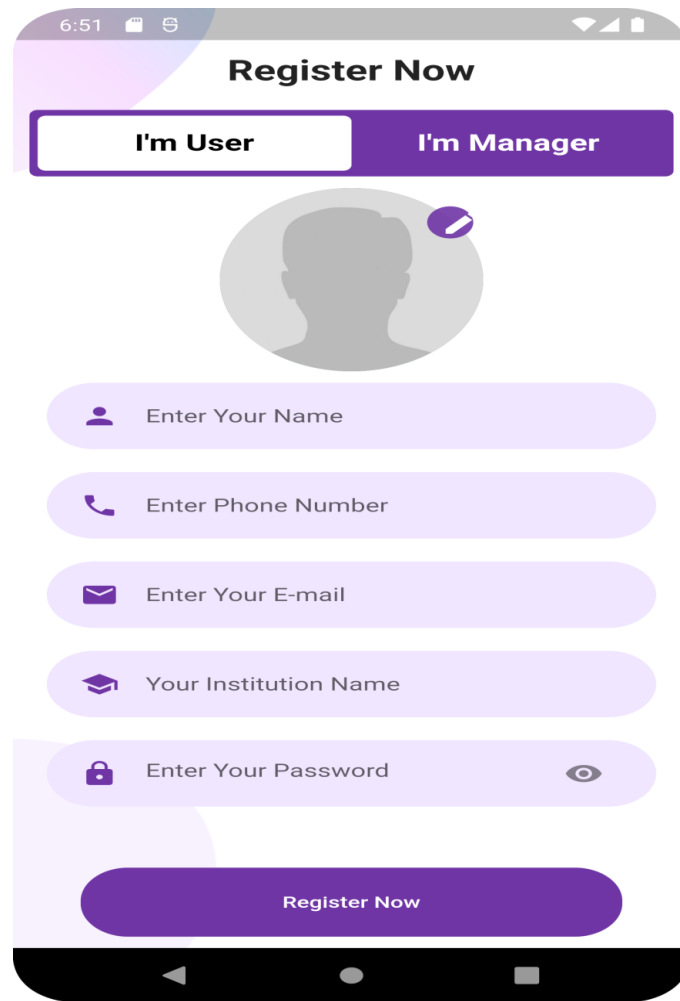
Fig:5.2 (Manager Login)

5.3.2 Manager Registration

In this an member registration dashboard .From here member can register to use this main application. By using Name, Email, Phone, Institution name, permanent address member can register.

Fig:5.2(Manager Registration)

5.2.2 Manager dashboard

From this dashboard manager can manage every single room, from manage room section manager can create room, assign the number of seats per room and also add members to the room individually. Manager can control or overlook every single user, their details like name, phone number, address etc. Manager can post seat vacancy into the application seat marketplace from this manager dashboard section, Manager will be able to sent a notification for seat bill per month, buy request like how much things a member buy from the market. Can exchange seat, Can see overall calculation and also can see the all the history from this dashboard.
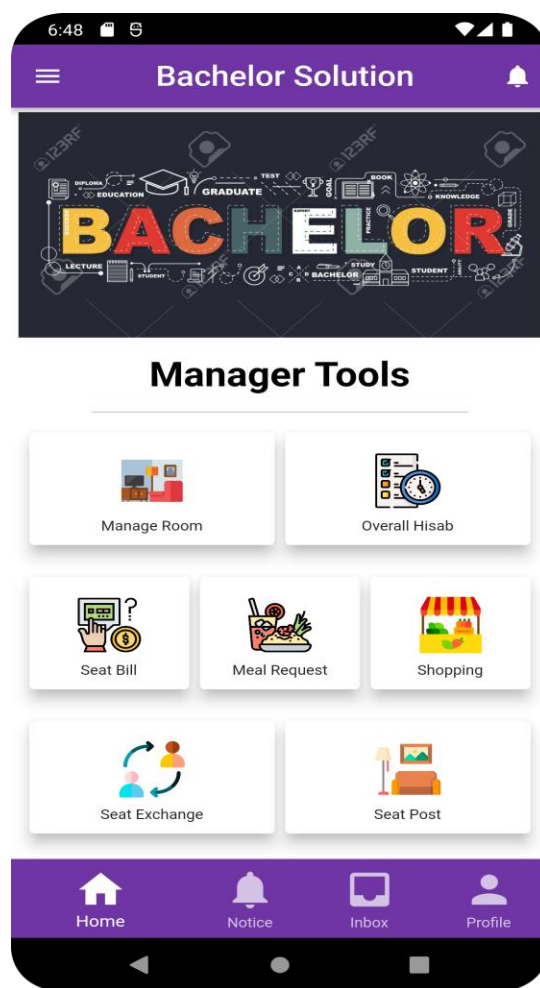
Fig:5.3 (Manager Dashboard)

5.2.3 Manage Room

From this page manager can manage room like manager can create room , assign the number of seats in every room. When manager create a room he can assign the number of seats in this room and add the description about this room like rent per month, benefits of this room .Manager can decide or assign the number of member for every seat of this room. Manager will also able to sent a notice to the every member of this room .The notice will be sent to every member dashboard, at the last manager can set a banner on the room to organize the room section.
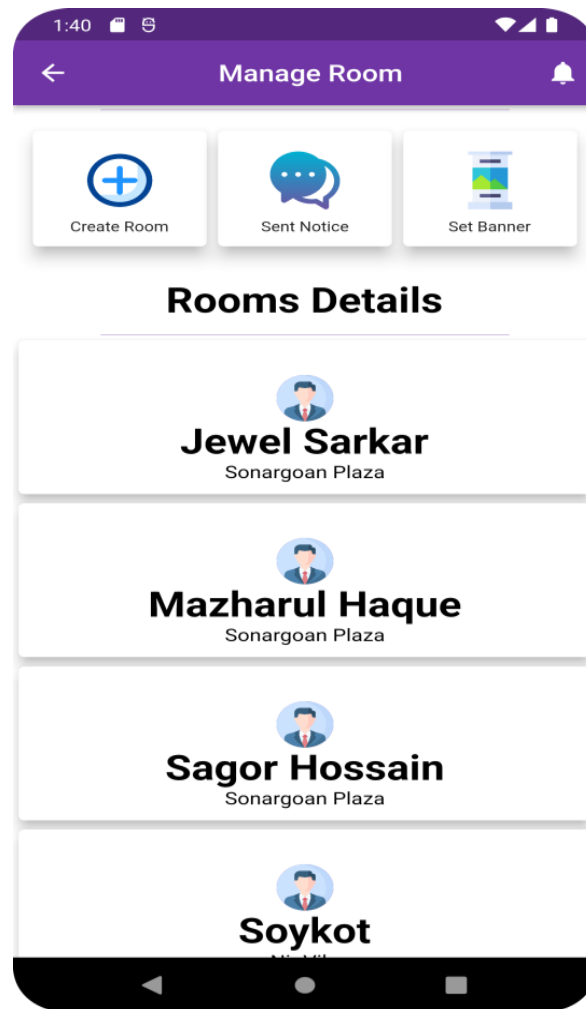
Fig:5.4 (Manage Room)

5.2.4 Post Seat

In this page manager can post their empty seats into this applications marketplace. When a seat will be empty manager can post a seat vacancy to the application find seat section using seat title seat rent per month add some description about this seat and also can add a picture of this seat to make this more proficient. User can see the post from the seat market place and can communicate with the member using messaging system.
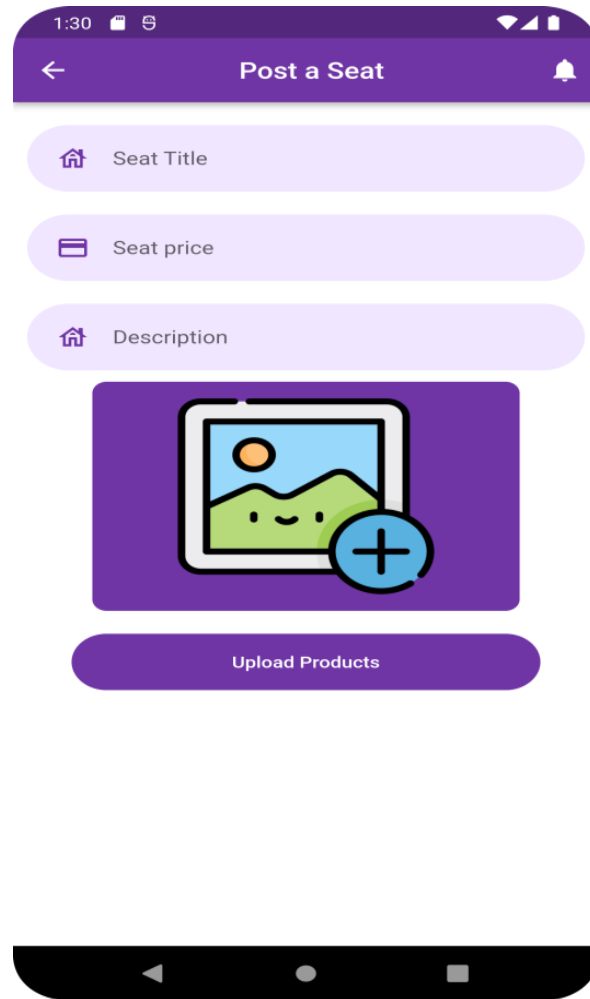
Fig:5.5 (post seat)

5.2.5 Billing Request

From this page manager can manage billing section like push notification to the members for monthly bill and can accept or reject members billing request.
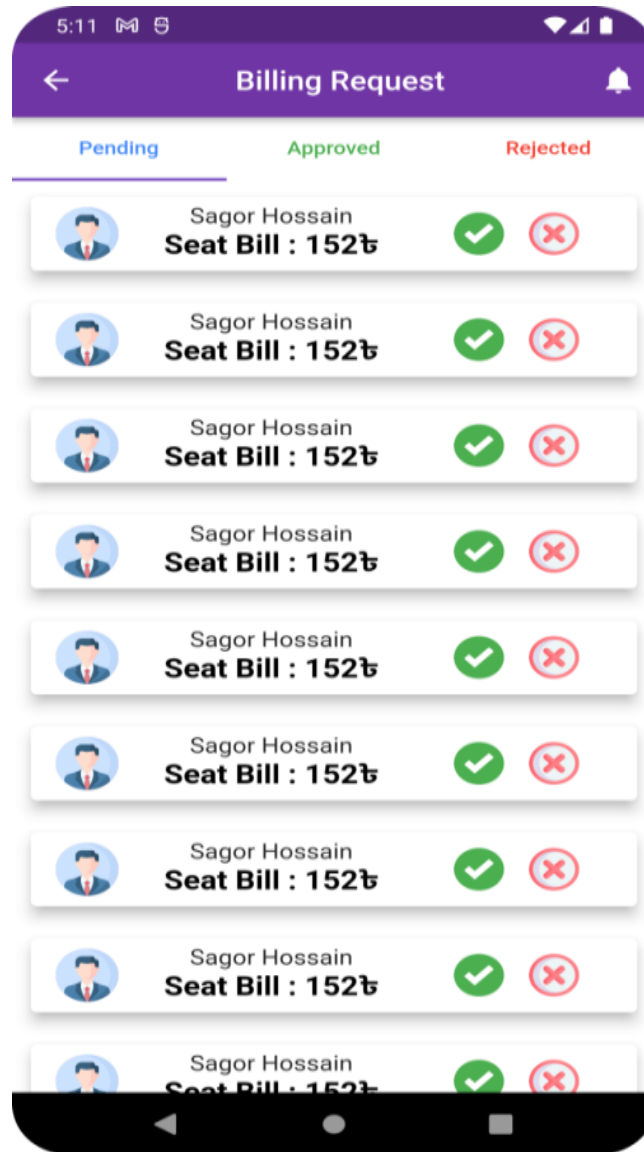
Fig:5.6 (Billing request)

5.2.6 Meal Request

From here manager can check the meal request from members and take a action like meal request accept ,meal request reject.
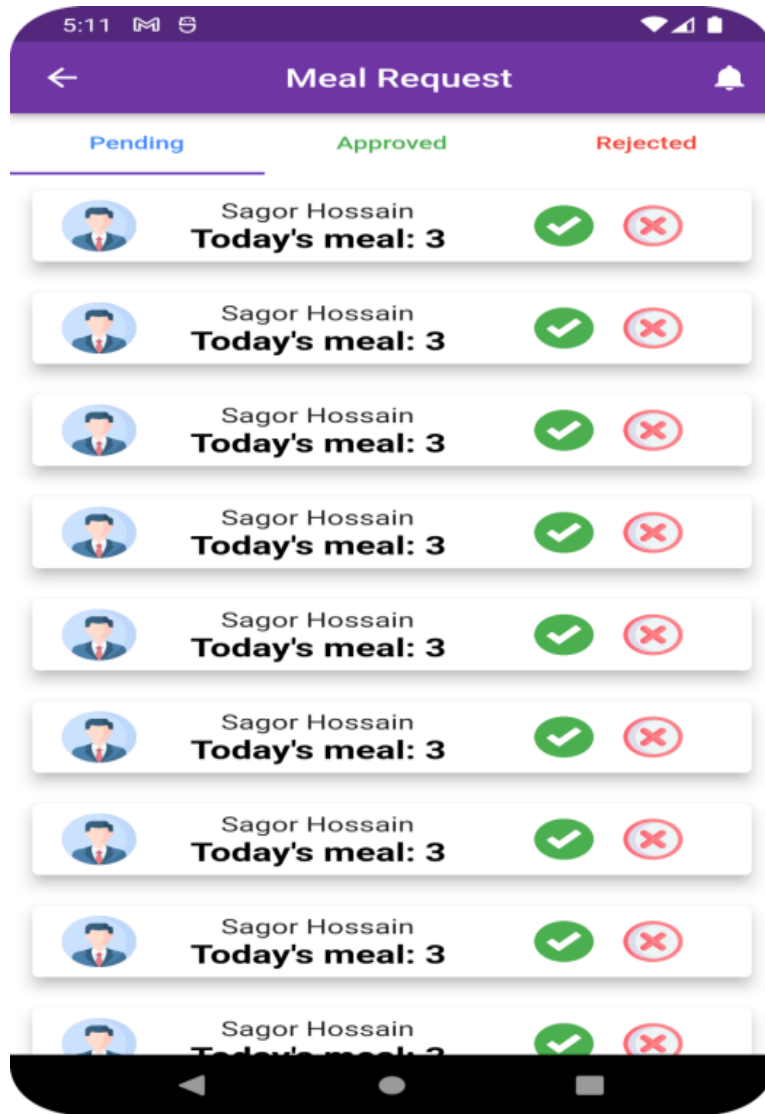
Fig:5.7 (Meal request)

5.2.7 Bazar request

From here manager can check the bazar request from members like which member buy how much things (rice, fish, beef, vegetables etc), when a member buy this kind of things he will make a request to the manager and manager will be able to see the request from this dashboard, after review the request from the member, manager can be accept the request or also can reject the request. If he accept the request then this request will be go to the approved history section otherwise this will be go to the rejected history section.
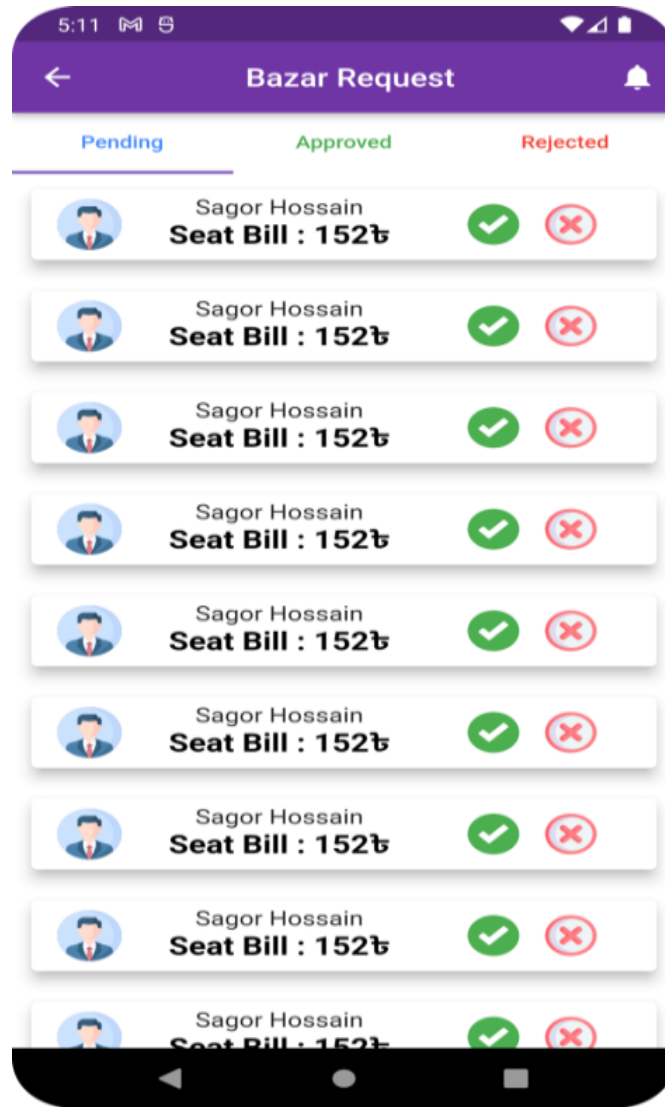
Fig:5.8 (Bazar request)

5.2.8 Overall calculation

In this page manager can check his overall or monthly cost or expenses. Manager can see how much every member make buy, how many meals every user or member eat. He can see the automatic calculation of meal rate ,average costing ,total number of days and also the average meal. By using those information a manager can easily calculate the cost of every member bill per month without facing any difficulties.
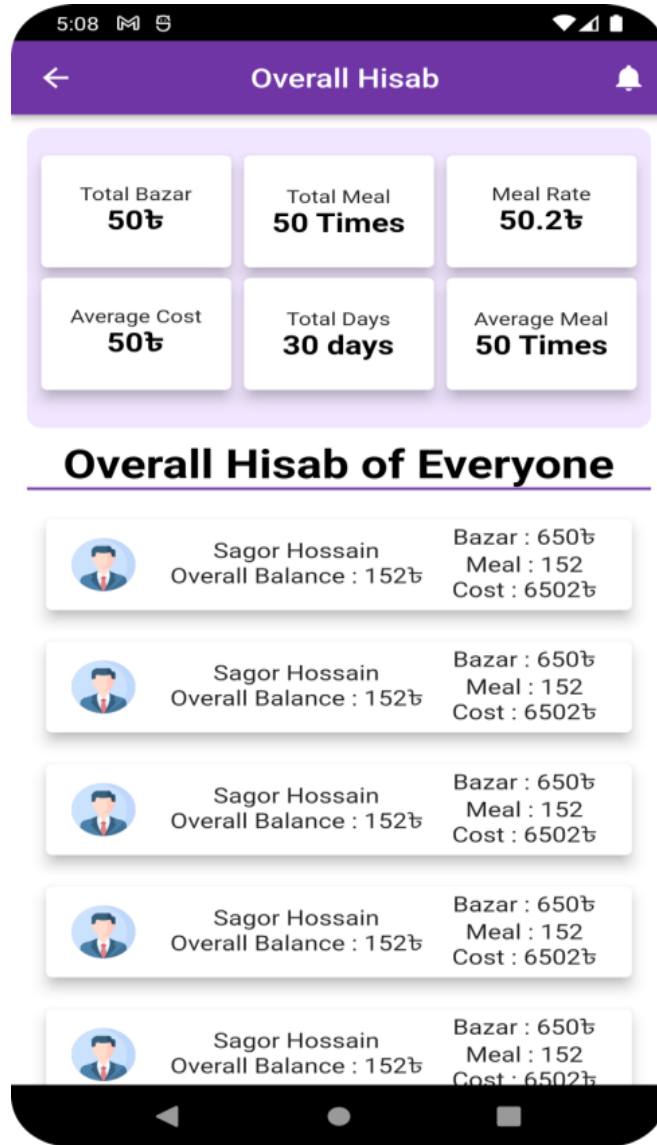
Fig:5.9 (Overall calculation)

5.3.1 Member login

In this an member login dashboard .From here member can login to his main dashboard using email or phone number and password and do his application related activity. If he don't have any account ,he can also register using Name, Email, Phone, Institution name, permanent address.
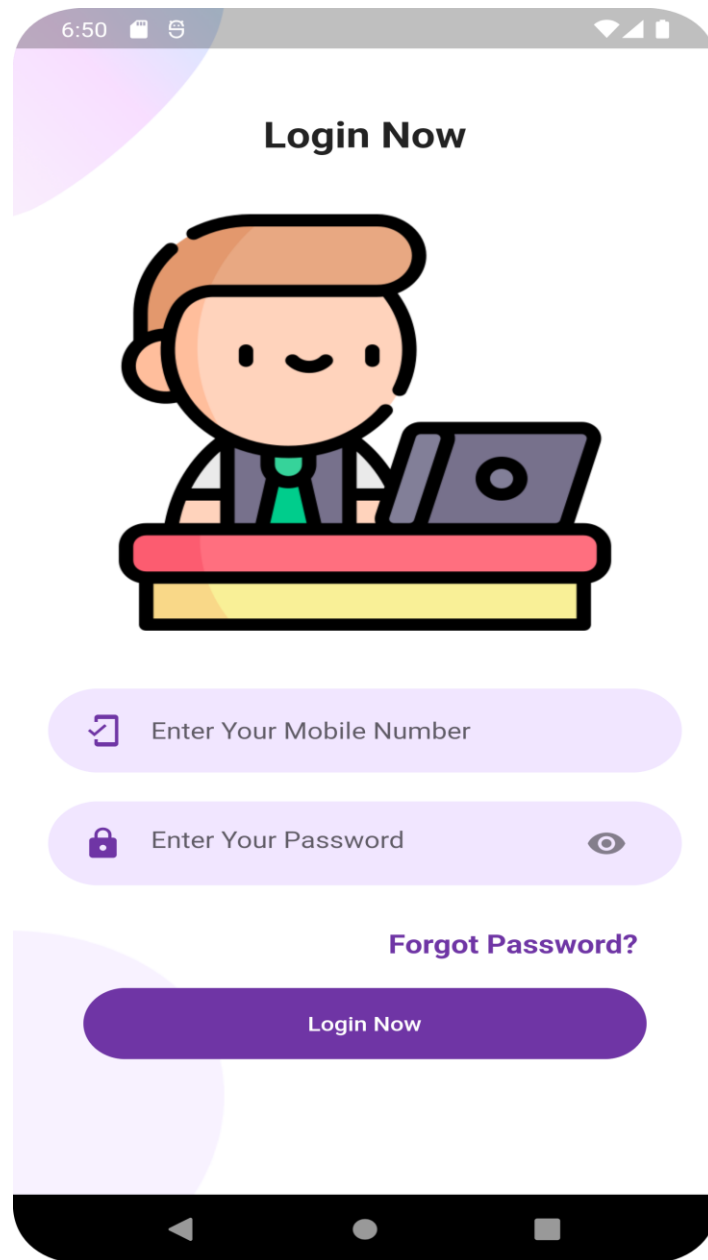
Fig:5.10 (member login)

5.3.1 Member Register

In this an member login dashboard .From here member can also register using Name, Email,Phone, Institution name, permanent address.

Fig:5.11 (member registration)

5.3.2 Member Dashboard

From this dashboard member can see their room details like seat cost ,room member's details, When a member looking for a seat in a different hostel or mess member can find seats from the application market place, where he can find out wide number of seats with seat rent, seat details with seat picture and communicate with the post providers, From this dashboard member can see the notification from the manager and messaging between any members or managers of this apps. Member will also able to see the marketplace of this application, from this marketplace section member can see the details of every product and buy their desired products after communicate with the product owner if he needed.
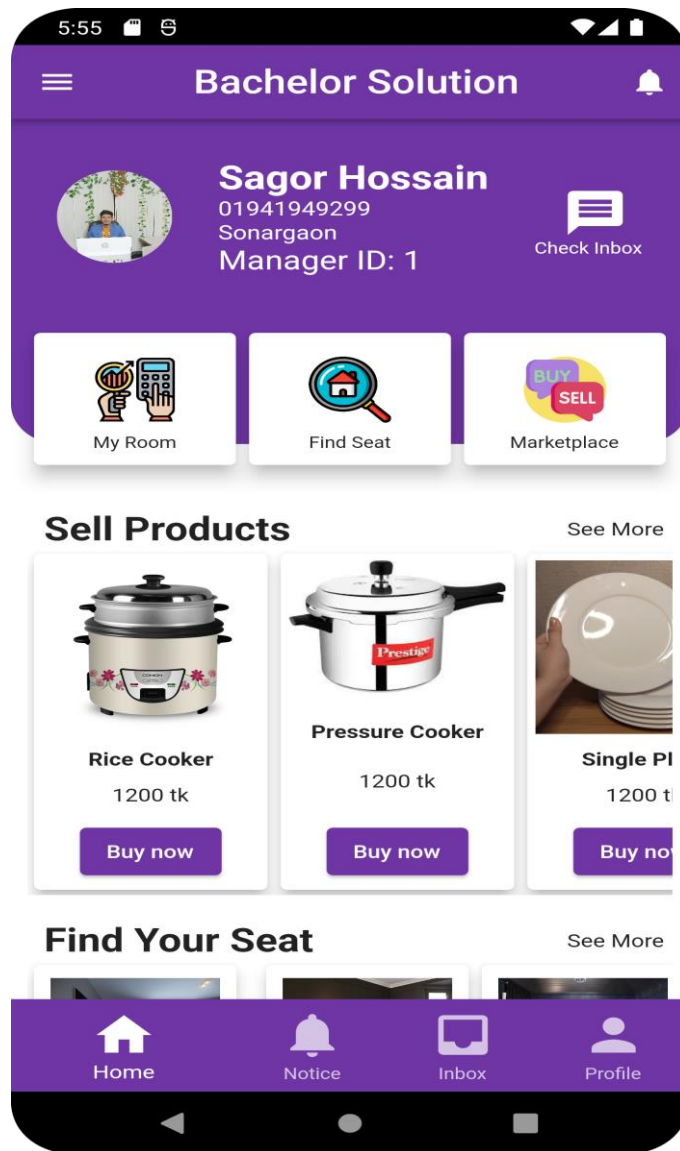

Fig:5.12 (member dashboard)

5.3.3 Member profile

From this page member can see his details like name, phone number, email address, institute which information he was given in the registration time. Member can also edit his profile information from this section of this application.

Fig:5.13 (member profile)

5.3.4 My Room

From this page member can see the room details like meal details, how much meals he eat in every month, meals rate, he can see shopping or buying details like how much things he buy for the mess or hostel from the market, a member can see the overall calculation from this dashboard. If any member need to exchange his seat for any kind of reason he can make a request to the manager for exchanging his seat to the another room. When a member will not want stay his existing hostel or mess he can also leave this room or seat by using leave button of this section.
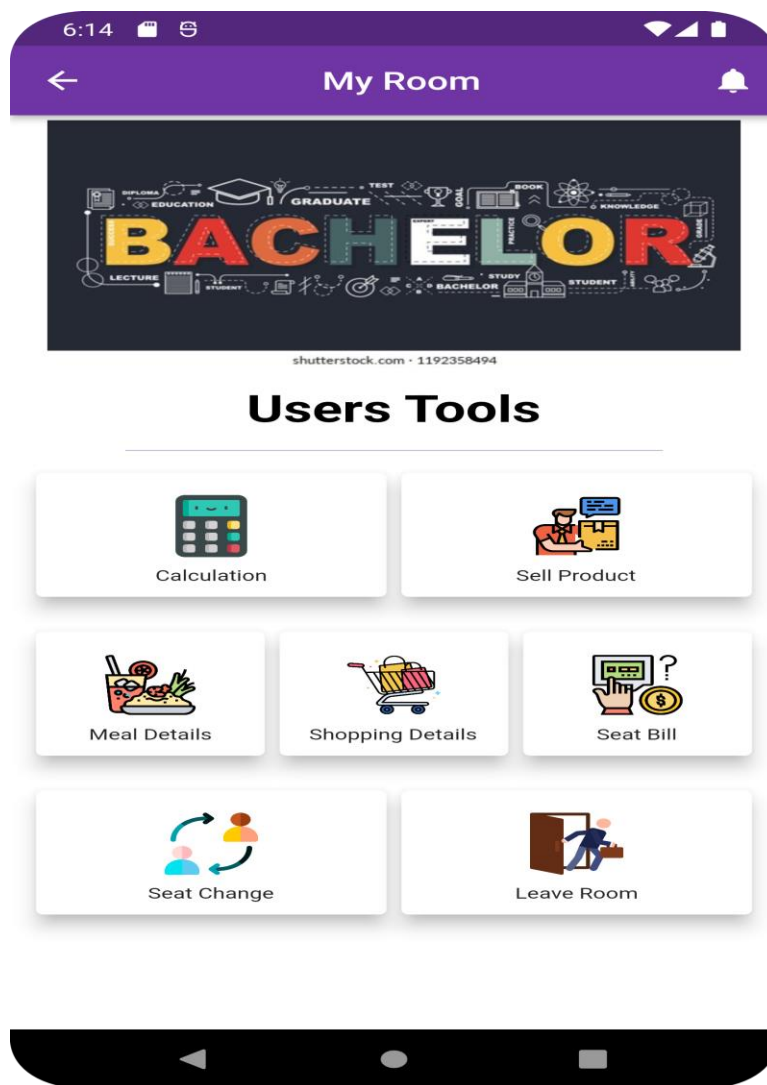

Fig:5.14 (My room)

5.3.5 Find Seats

When a member need to move to the another mess or hostel for any kind of reason, he can easily find wide number of seat vacancy from this section of this application
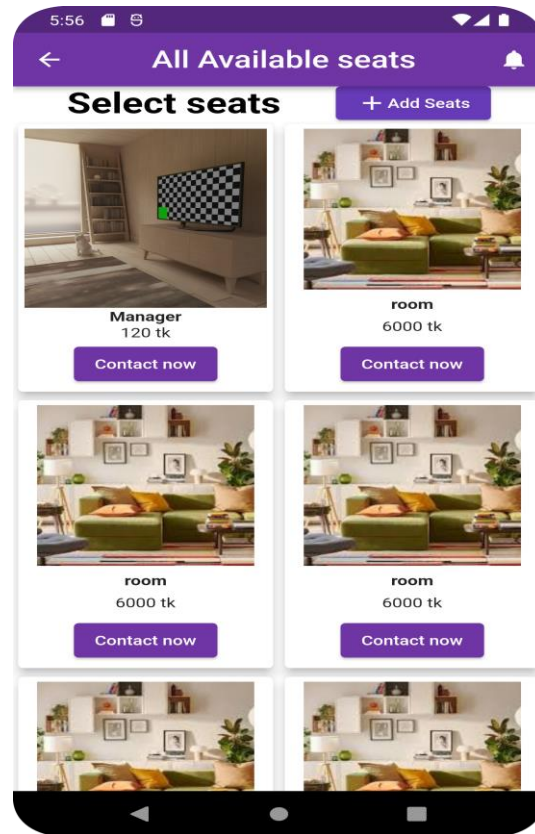

Fig:5.15 (Find seats)

5.3.6 Market Place

From this section of this application member can find their desired day to day products. If any member need any product then he can browse this marketplace section to find out his desired product from wide number of available products, which will be posted by another user of this application. Member can see the product details like product price, usage of the specific product and also can see the description of the specific product. If he convinced with the information he can communicate with product owner and confirm his desired product.
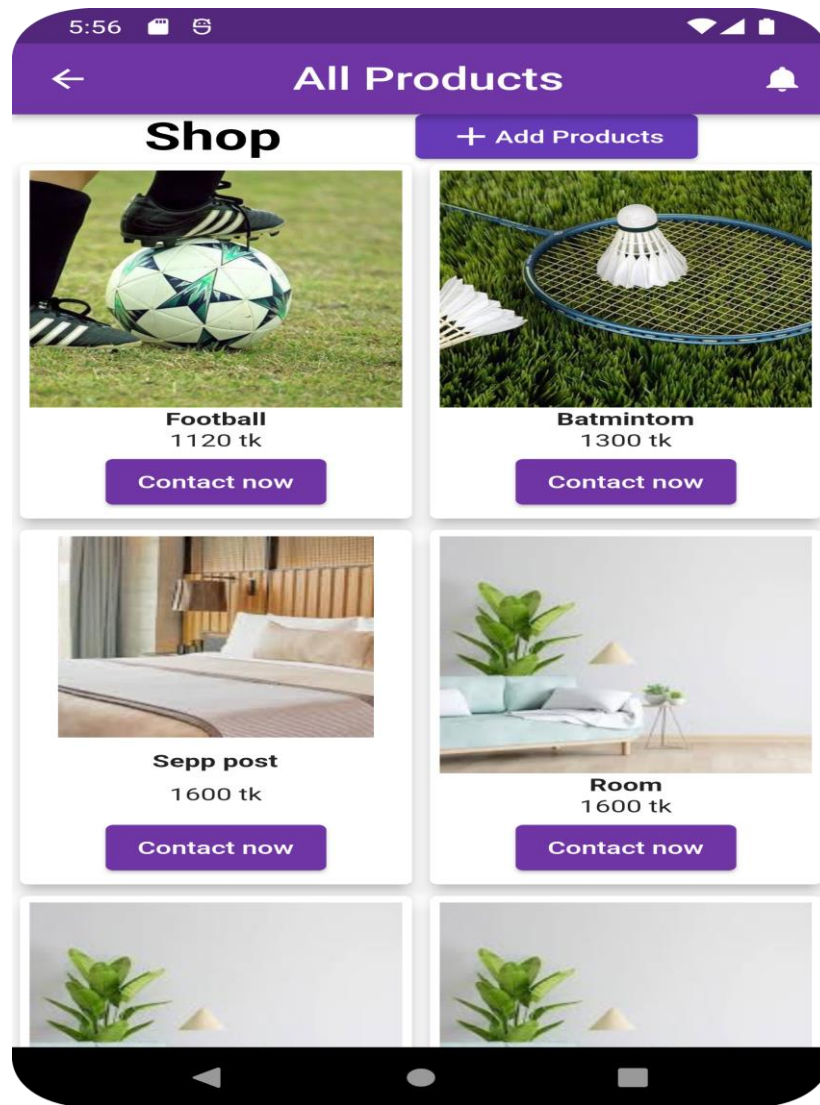

Fig:5.16 (Marketplace)

5.3.7 Notification

From this page members can see the notifications which is given by the manager. Manager can give any kind of necessary notice to his every member. From this section members can see the notice bar and after clicking on the latest notice he will able to see the notice details with time and date. He can see his monthly bill request accepted or not, buy request accepted or not and also can see the meal request accepted or rejected by the manager.
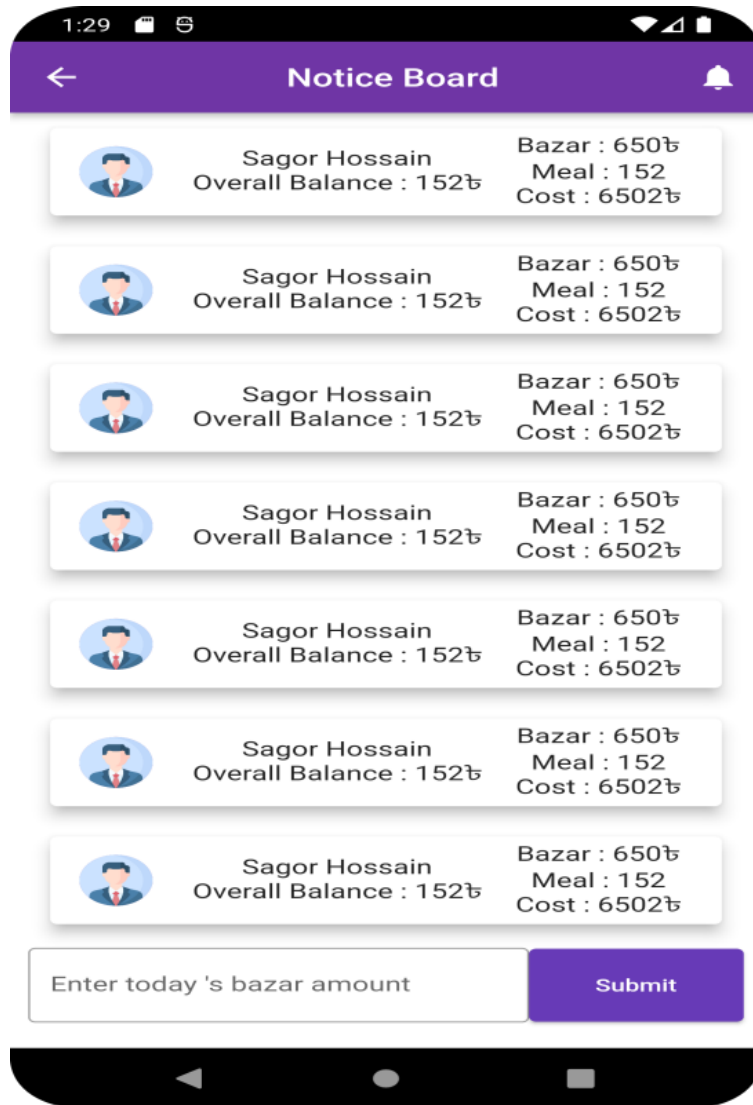

Fig:5.17 (Notice board)

5.3.8 Messaging

From this section of this application members can communicate with the other members and managers through this messaging system of this application. This messaging system will be available for every section of this application like member can communicate with his room member or room manager through this messaging system, member also communicate with outside member of his room. When a member choose any seat from the seat finding section, he can communicate with the seat post provider by using this messaging system. On the other hand when he need any product from the application marketplace he can communicate with the product owner directly through this messaging system any can final the deal.
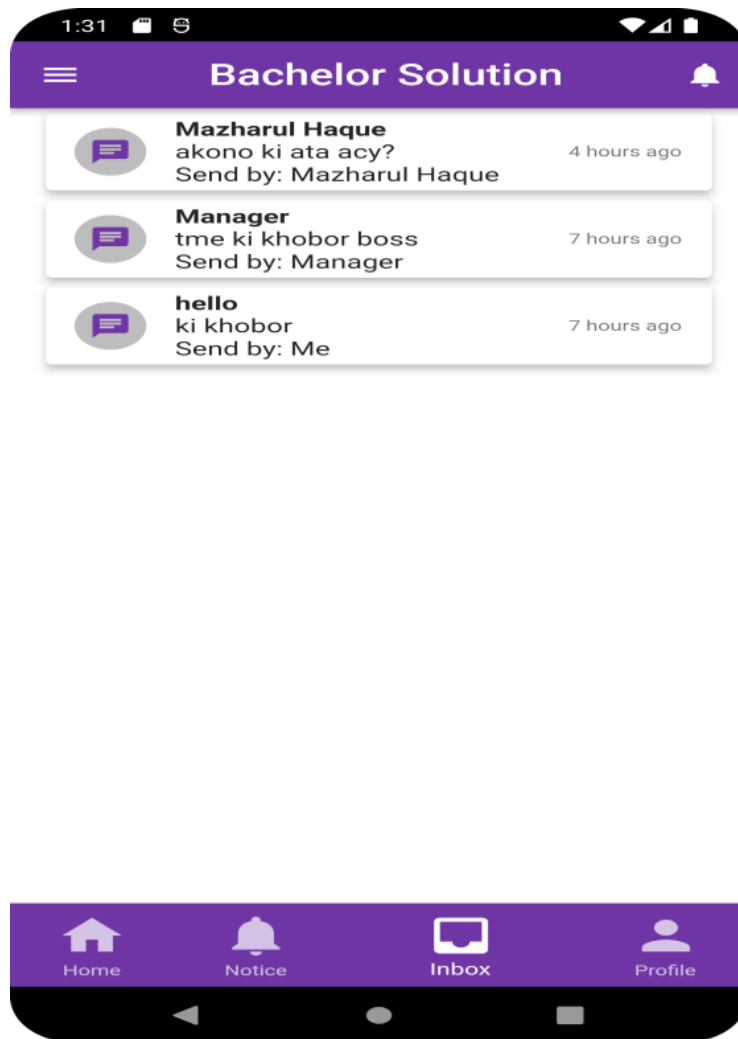

Fig:5.18 (Messaging)

5.3.9 Sell Products

From this section member can sell their unused products. When a member need to sell any product, he can easily post a sell post with product title, product price, some product description and a picture of this product on this application marketplace
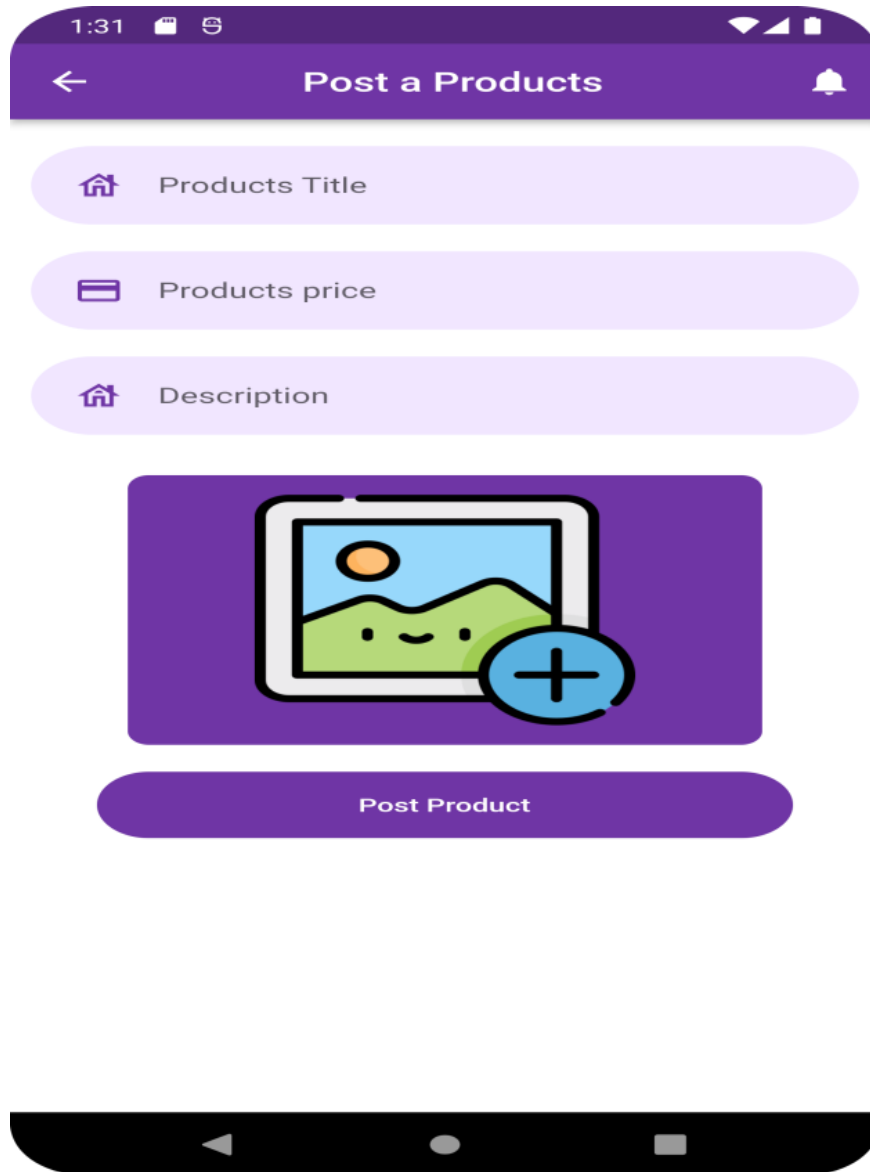

Fig:5.19 (Sell products)

5.3.10 Support

Member would need an kind of help or support from the admin panel. From this section member can communicate with the application provider by using messaging system or using application admin contact information.

Fig:5.20 (Support)

5.3.11 Seat Exchange

Member would need an kind of help or support from the admin panel. From this section member can communicate with the application provider by using messaging system or using application admin contact information.
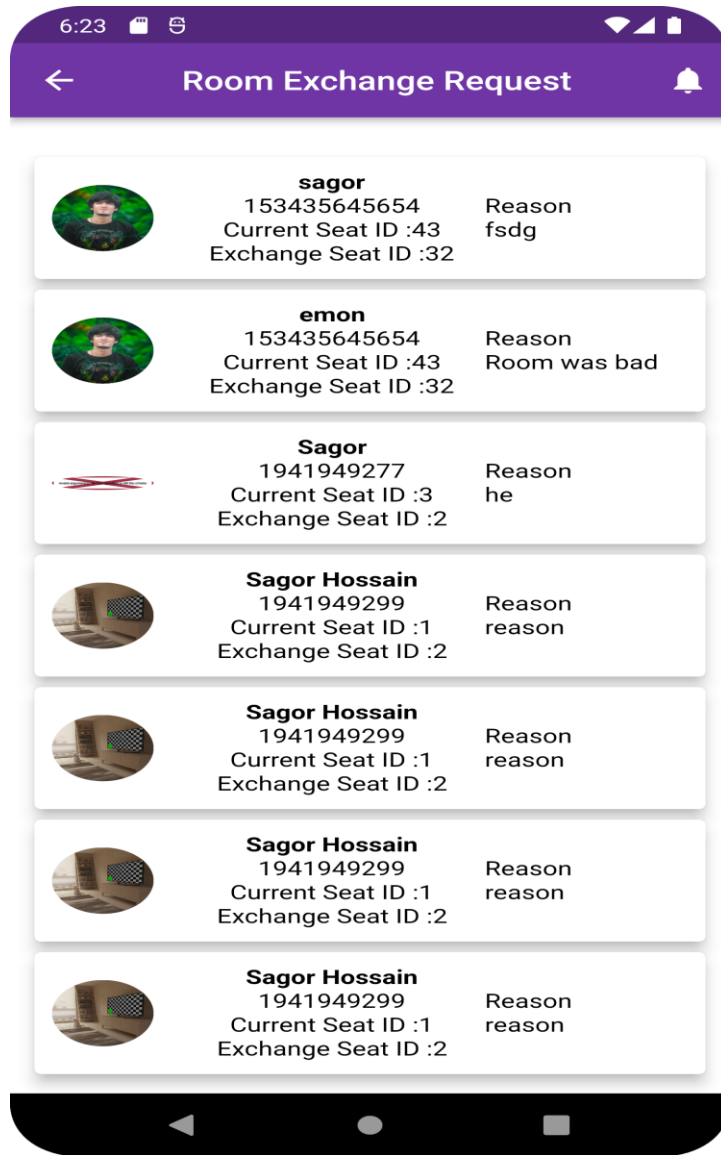

Fig:5.21 (Seat Exchange)

CHAPTER 6

CONCLUSION AND FUTURE WORKS

In this chapter we will discuss about limitations and future implements, what we have done till now and the conclusion regarding this project or application.

6.1 Limitations and future work

6.1.1 Limitations

There are a lot of drawbacks in keeping and maintaining a hostel. Especially with a manual system. Since most hostels are being run by only one hostel manager, the number of member in a room are sometimes not known by the manager. He has to go room by room to ensure that a room is occupied or not. We faces different limitations like that. We developed this application keep in mind of those drawbacks.

6.1.2 Future work

1. **Integrating AI (Artificial Intelligence)**

AI (Artificial Intelligence) can check the members identity by scanning his face and match with the member's National ID card picture. If scanner will not find any matches between user and ID card, then member can't create a account to this application.

2. Direct calling system

Between members to members or members to managers. By using this application manager can get a proper calling system like audio and video both. Because of this audio and video calling system every users of this application can communicate with every users.

3. Automatic costing

For manager panel, manager of any hostel can see the overall expenses and earning automatically from this application for each and every month. Manager will not need to calculate every expenses or earnings individually.

4. Payment gateway

There will be include different payment gateway like Bkash, Nagad, Rocket etc, This system will be more helpful for the users and managers. When a manager push a notification to the user or member of his room, member can easily pay the room rent with these payment system easily and get a confirmation message. Manager's task also will be easier.

6.2 Conclusion

This android application "Bachelor's Solution" will be helpful for every hostel related person like hostel manager who can manage everything related about a hostel, hostel member who can find here a proper guideline for him. Our project is a very helpful and important project that will manage various activities in the hostel like accommodation, rents, member records and many

other things that are very useful for a well-managed hostel. The scope of this project is to provide the facility of the living to the student of rural areas, who are unable to study further in their area. They will be able to have affordable rates of living in hostel and they will be fully provided the environment which they need for their studies. Another benefit of this project is that all the hostel managing works can be done easily through it by saving our time and also by saving the human efforts. This management system will be an errorless or bugs free management system and will be able to show the records of even years without any conflict-ion.

REFERENCES

[1] Lean Software Development" Software development life cycle, because V-Model is easy to understand,"SDLC, vol. 11, no. 5, 2017, pp.21-23.

[2] Clean Code " Unit Testing is a software testing technique by means of which Individual" Testing, vol. 1, 2008, pp.09.

[3] Learn Google Flutter Fast" Flutter runs in the Dart virtual machine, which features a Just -in-time execution engine", vol. 1, 2019, pp.10-13.

[4] System Requirement Analysis" System technical requirements is a process that identifies the functionality that is needed by a system in order to satisfy the users requirements", 2, 1993, pp.18-20

[5] Learn Google Flutter Fast" It allows developers to create web, desktop, and crossplatform apps that run on Android and iOS devices.", vol. 3, 2019, pp.30-33.

[6] Mastering Django" The Django web framework is a free, open source framework that can speed up development of a web application being built in the Python programming vol. 1, 2015, pp.3-8.

[7] Django Unleashed" . It will be pretty difficult to find security loopholes in Django, even in the user authentication system", vol 3, 2015, pp.23-28.

[8] Smartdraw, "Entities are objects or concepts that represent important" 22, 2017, [Online]. Available: https://www.smartdraw.com

[9] Lucidchart, "A data flow diagram show the way information" 3, 2015, [Online].Available https://www.lucidchart.com/blog/data-flow-diagram-tutorial..