

## House Rental Management System

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**Abstract:** House is place for gathering of human beings that can improve the quality of life for human economically and socially. However, to reduce the cost of the expenses for a person, the person needs to rent a rental house first rather than continue to buy the house. Thus, the person who wants to rent a house must follow the price that has been measured by House Index Price (HPI) and must follow all the requirements set by Malaysia that is to make a contract between the owner and the tenant. There are some issues with the current approach, such as tenants not knowing which rental houses are available in their desired location. The tenants have no idea how to make an online rental payment, and there is no contract between the tenants and the landlord. As a result of this dilemma, a rental house management system was created to handle all aspects of renting a home. Users simply need to log into the system to reserve a rental house that is available in the system. The methodology that used in developing this system is prototyping. The programming languages that used in this system are Hypertext Preprocessor (PHP) and Hypertext Mark-up Language (HTML) and MySQL database. It is hoped that this system is successfully developed and can facilitate tenants and owners in managing rental house.

**Keywords:** Rental Management System, Web Based System, Structured Approach System

### 1. Introduction

The main importance of having a home is to improve the quality of life from an economic, social, and personal perspective [1]. The requirement in renting a house is to make a contract on behalf of the tenant and the owner of the rental house depending on the contract act which is Contract Act, 1950 (Act 136) which has been set by the country of Malaysia [2]. In the current process, the tenants will find the rental house by going to a rental house that is still available. Then, the tenants will contact the landlord and ask if the house is still available or not. The tenants also ask the landlord about the details and the prices offered monthly by the landlord. If the tenants are satisfied to rent the house, the tenants will inform the owner for the booking process. For the booking process, the tenants will give the information details to the owner such as payment details and the date of entry into the rental house. However, the implementation of the current process for renting a house has some difficulties that affect the tenants and the landlord. The tenants have difficulty for finding a rental house that matches the salary and the expenses of the tenants. There is also no documented agreement between the tenants and the landlord

about the rental house. The tenants also cannot see the payment record that has been paid on the rented house. The main objectives of this project are:

1. To design the House Rental Management System based on structured approach.
2. To develop the effectiveness of management in the House Rental Management System.
3. To conduct a user acceptance testing as the complete system tested by the administrator.

This system has several modules as shown as in Table 1.

**Table 1: Functional model**

| System Module               | Function   | User                               |
|-----------------------------|--|------------------------------------|
| Authentication Module       | <ul style="list-style-type: none"> <li>• Tenants, agents, administrator can register and login into the system</li> </ul>  | Tenants, agents, and administrator |
| Customer Information Module | <ul style="list-style-type: none"> <li>• Tenants, agents, and administrator can view the tenant details</li> </ul>   | Tenants, agents, and administrator |
| House Details Module        | <ul style="list-style-type: none"> <li>• Tenants can view and book the available rental house.</li> <li>• Agents can add, delete, and edit all the rental house details.</li> </ul>  | Tenants and agents                 |
| Booking Module              | <ul style="list-style-type: none"> <li>• Tenants can view their own booked rental house.</li> <li>• Agents can update and view all the booked rental.</li> </ul>   | Tenants and agents                 |
| Agreement Module            | <ul style="list-style-type: none"> <li>• Tenants can check and sign the contract agreement.</li> <li>• Agents can check and sign the contract agreement.</li> <li>• Administrator can insert all the details about tenants and house details into the contract agreement.</li> </ul> | Tenants, agents, and administrator |
| Payment Module              | <ul style="list-style-type: none"> <li>• Tenants can give and view their own payment details of the rental house.</li> <li>• Administrator can view all the payment details from tenants.</li> </ul>   | Tenants and administrator          |
| Feedback Module             | <ul style="list-style-type: none"> <li>• Tenants can give and view their own feedback details.</li> <li>• Administrator can view and update all the feedback from tenants.</li> </ul>  | Tenants and administrator          |

Hence, this system will be developed to solve the current problem. The user scope for this project is the tenants as a user, agents as landlord and an administrator.

## 2. Related Work

### 2.1 Rental House Management System

Current rental house management is performed manually by recording all the data such as rental house details, booking management, and payment details by using logbook. By using the existing process, the tenant information and the house information will be more easily to lost. Other than that, the tenants do not pay the rented house monthly because the tenants do not know how to pay the rented

house using online payment. Thus, a system known as house rental management system has been proposed to solve the problem.

## 2.2 Web Based Information System

Information management system that developed properly can assist the organizations in managing and administering procedures become better and more effective [3]. Different information management process levels can be improved apart from leveraging information technology [4]. The features in the information management system are the administrator can manage all the rental house details, manage the booking details by the tenants and manage all the payment details.

The proposed system is developed by using web-based technology, that the system involves multiple users or tenants and an administrator that can access the system. This system is also more manageable as users and an administrator that can access the system by using an internet connection, a common browser and do not need to install the system to a computer or handphone.

## 2.3 Comparable Existing System

Three existing systems was investigated and Table 2 gives the summary of the features that are available in the existing system.

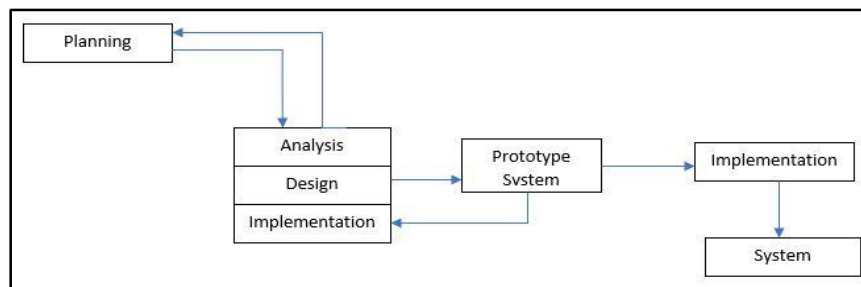
**Table 2: System's Comparison**

| Features                    | iProperty     | Mudah.my                   | PropSell      | Rental House Management System |
|-----------------------------|---------------|----------------------------|---------------|--------------------------------|
| System Type                 | Web-based     | Web-based and applications | Web-based     | Web-based                      |
| Authentication Module       | Available     | Available                  | Available     | Available                      |
| Customer Information Module | Available     | Available                  | Available     | Available                      |
| House Details Module        | Available     | Available                  | Available     | Available                      |
| Booking Module              | Not available | Not available              | Not available | Available                      |
| Agreement Details Module    | Not available | Not available              | Not available | Available                      |
| Payment Module              | Not available | Available                  | Not available | Available                      |
| Feedback Details Module     | Not available | Available                  | Not available | Available                      |
| Software Development        | -             | -                          | -             | Prototyping Model              |

From a summary of comparisons between existing and proposed systems, the proposed system has more features that existing systems do not have. Therefore, the proposed system has a better and unique functionality.

## 3. Methodology

Prototype model is where the project is built, tested, and redesigned to aid learning and improve decision making [5]. The model chosen to develop the proposed system is the prototyping model. This model contains several levels of activity in the software development process to be developed which are planning phase, analysis phase, design phase, implementation phase and testing phase. Figure 1 shows the phases in the prototyping model.



**Figure 1: Prototyping model**

### 3.1 Planning Phase

In this phase, the project planning is done by determining the problem faced and the estimated time to complete the project. This phase also can figure out the objectives and the scope for developing house rental management systems. Then, software and hardware that was used in this project was determined in this phase.

### 3.2 Analysis Phase

The analysis phase is the phase that determines the functional requirement and non-functional requirement of the system. Collection and analysis information will be carried out after determining the aspects of the planning phase that have to determine the requirement of the system. The data flow diagram (DFD) and entity relationship diagram (ERD) are then created in this stage using the information obtained from the requirement.

### 3.3 Design Phase

Design phase involves the process of the design which is the flowchart of the system, user interface and design database. The system design is basically based on the information that was collected during the planning and analysis phase.

### 3.4 Implementation Phase

The implementation phase is the phase where system development is carried out. This phase is important to test the system that will be conducted repeatedly to achieve the objectives desired. The process of programming code and testing will be conducted twice to identify errors that occur and repair the system.

### 3.5 Prototype Phase

Prototype phase is where the phase for improvement process that will be carried out if any error in previous system development. The supervisor and the users will run the testing of the developed prototype and provide some recommendations to fix the problem of the prototype system. Then, the analysis phase will be repeated until the second prototype to ensure that this system can be used as well and can be accepted by users.

### 3.6 Testing Phase

In this phase, the prototype model has been transformed into the system that is ready to be implemented. The modules in this system have been tested well. The users will test the system to ensure it matches with needs and the requirements of the user. Full testing will be done on this system for the last time before it can be used by users.

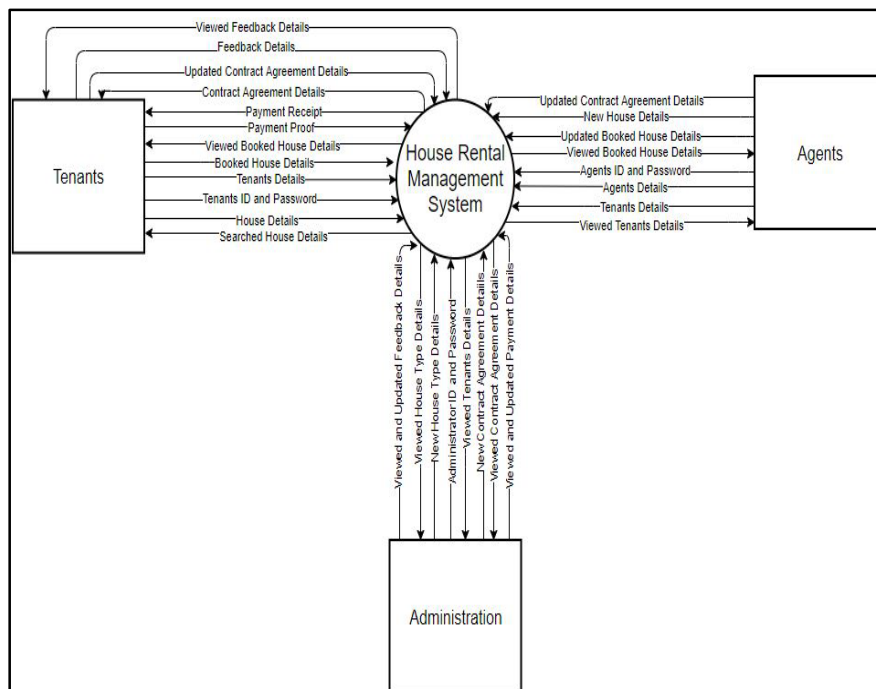
As a conclusion, there are six phases in the prototyping model. Table 3 shows the system development activities and the deliverables for each phase.

**Table 3: System development phases activities**

| Phase          | Activities   | Deliverables  |
|----------------|--|---|
| Planning       | Work scheduling, problem identification, scope, and objective  | Gantt chart and proposal  |
| Analysis       | Collect and analyze information  | System requirements, software, hardware requirement, DFD and ERD      |
| Design         | Design user interface with the suitable programming language   | Flowchart, database schema, data dictionary and user interface design |
| Implementation | Carry out the testing system and fix the errors  | System program code   |
| Prototype 1    | Identify the problems that exist in the system and repair the existing system<br>Repetition of the planning phase until the implementation phase | System prototype  |
| Prototype 2    | Problem identification and repair the existing system  | System prototype  |

### 3.7 System Analysis

System analysis is a process where it has a set of system requirements that determine the details in terms of features, attributes and functions that obtained from the supplier [6]. Figure 2 shows the context diagram that showing the methods for the data flow in the house rental management system.



**Figure 2: Context diagram**

Figure 3 shows the Data Flow Diagram level 0 for the system to be developed for house rental management system.

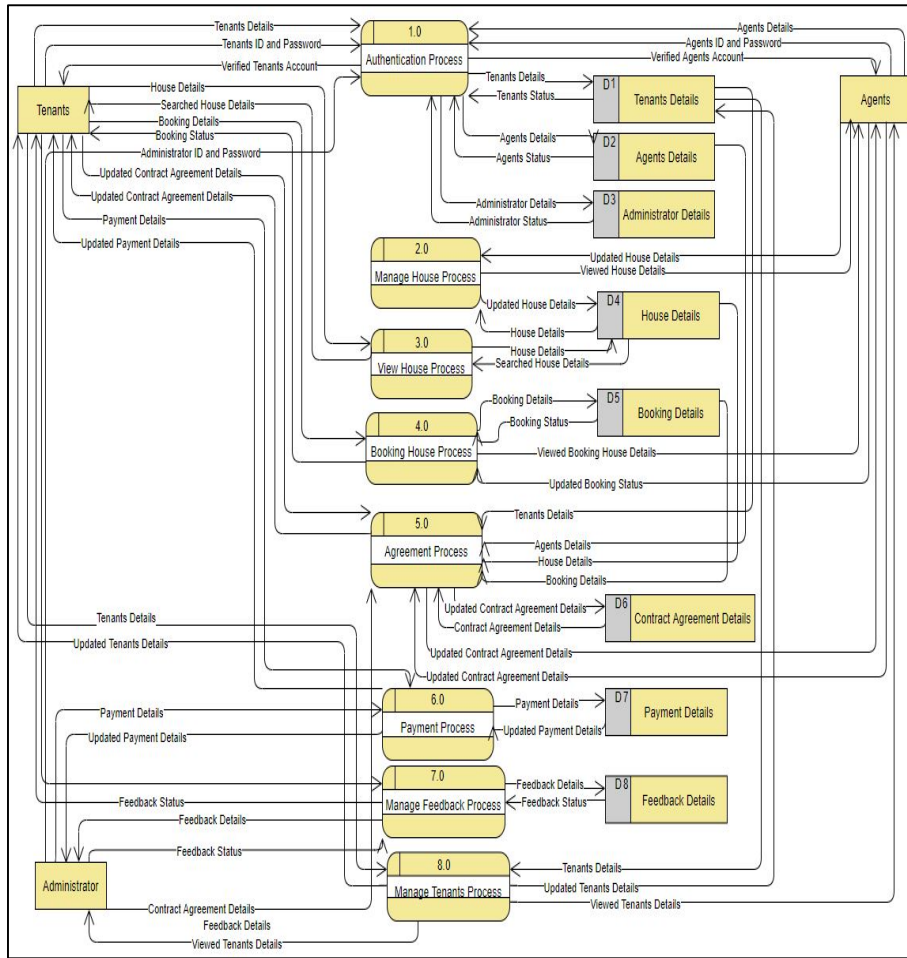


Figure 3: Data flow diagram

### 3.8 Entity Relationship Diagram

Figure 4 shows the Entity Relationship Diagram (ERD) for house rental management system. Entity relationship diagram (ERD) contains two specifications namely primary key (PK) and foreign key (FK).

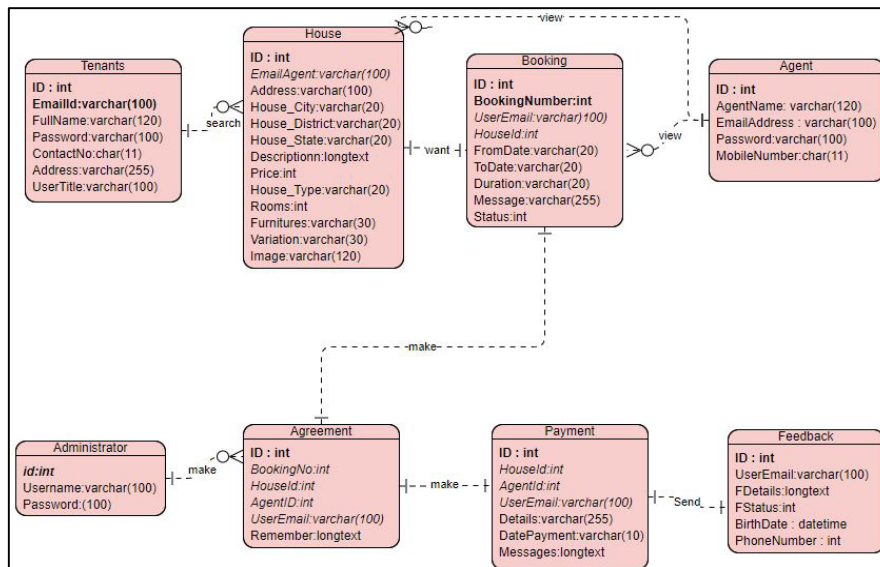


Figure 4: Entity relationship diagram

### 3.9 Flowchart

Figure 5 shows the flowchart of the house rental management system for the tenants, agents, and administrator.

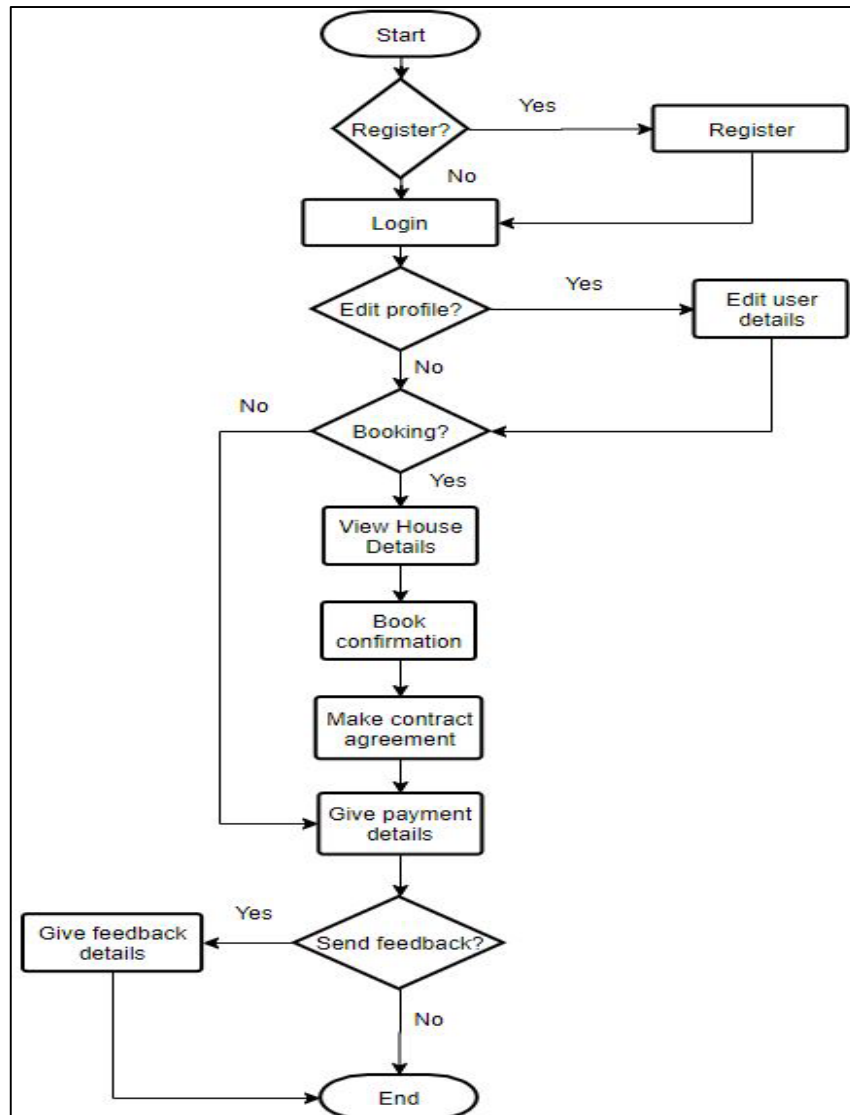
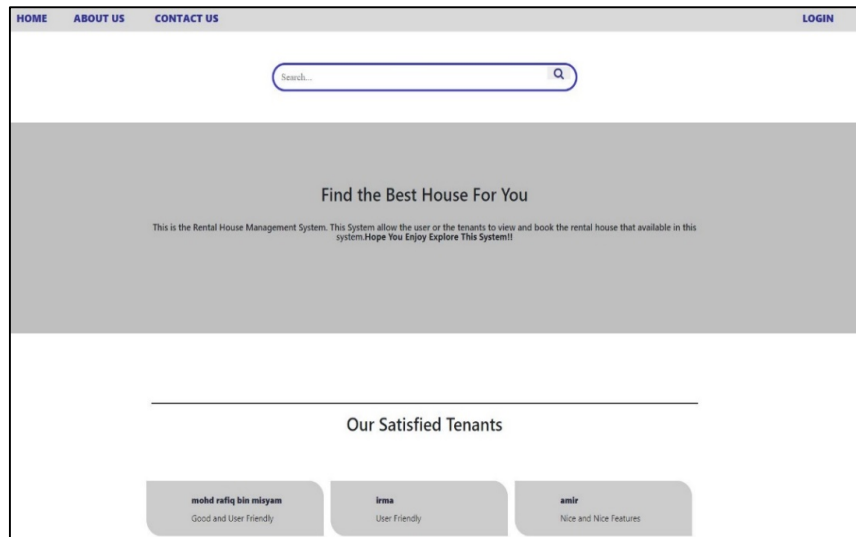


Figure 5: System flow chart

### 3.10 Implementation

The implementation is described the work that has been done by the developer to meet the requirement of the scope of work. The modules that will described in this chapter is authentication module, customer information module, house details module, booking module, agreement module payment module and feedback details module. Each user interface was tested during development to ensure the database could be function well. Figure 6 shows the user interface for tenants in House Rental Management System. The user interface is developed according to the user requirements and the system modules.



**Figure 6: User interface for tenants**

### 3.11 System Testing

In this phase, the developer tries to find out whether the code and the programming followed to the user requirements. This phase is very important because it need to ensure that the requirements and the needs has been fulfilled in the system. There are several system testing that applied to the system. Table 4 shows the system testing for the authentication function for tenants, agents, and administrator.

**Table 4: Test plan for authentication function**

| Test Case  | Expected Outcome  | Actual Output |
|--|---|---------------|
| Fill in the valid details in the registration, login and forgot password form.   | Successfully registered and login into the system.                | Passed        |
| Fill in the invalid details in the registration, login and forgot password form. | Shows error message and require users to input the details again. | Passed        |

## 4. Results and Discussion

This section presents the user acceptance testing that was conducted for House Rental management System.

### 4.1 User Acceptance Test

This phase is discussed about the evaluation that obtained from the tenants, agents, and administrator which the name is user acceptance test. The total respondents that involved in this test is 10 respondents. The user acceptance test is divided into two sections which are the user interface design and the functionalities of the system. Figure 7 shows the result of the user acceptance test for user interface design.



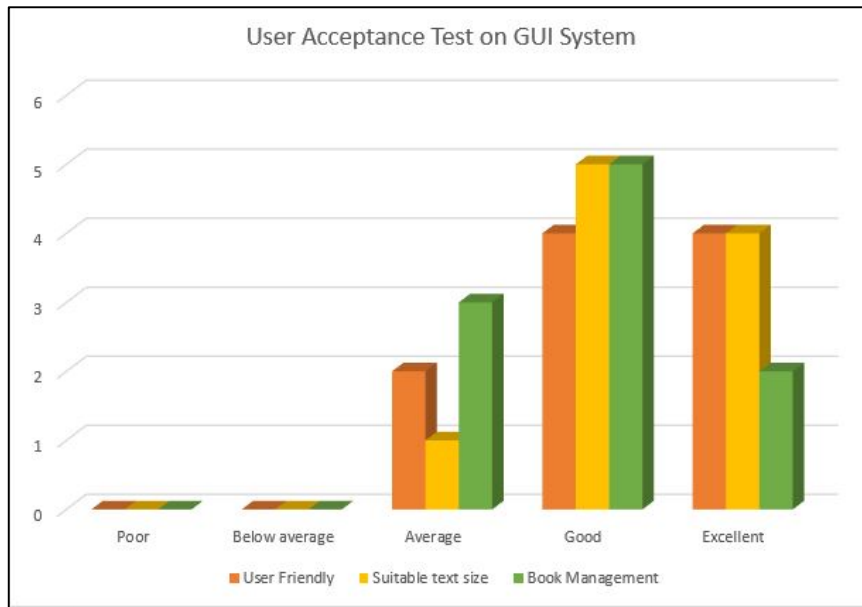


Figure 7: User acceptance test on user interface design

Figure 8 shows the result of the system functionalities test of user. The register and login function have the highest respondents which are obtained 7 respondents out of 10 respondents.

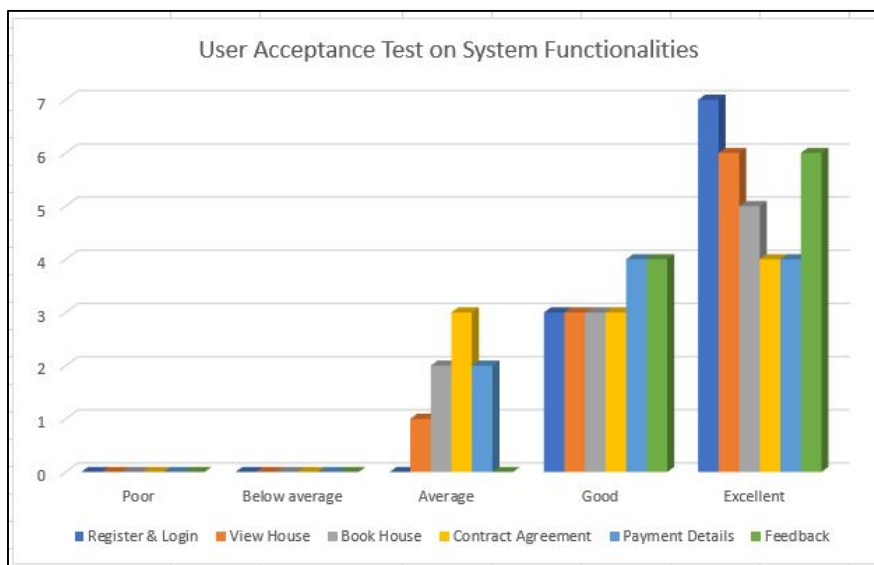


Figure 8: User acceptance test on system functionalities

## 5. Conclusion

As a conclusion, this report consists of five parts which are part introduction, part related work, part methodology, part result and discussion, and part conclusion. Introduction's part described the project introduction and research background such as problem statement, objectives, scope, importance, and expected results of the project. Related work's part is a very important because the study and the result can help in developing the system where related work discussed about the management system and comparative studies from existing systems. Besides, methodology's part consists of system development where all the activities during the development of the system has been described. Result and discussion's part discussed about the user acceptance test on the House Rental Management

System. Hence, this system has been developed following all the requirements and design that have been discussed in this study.

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