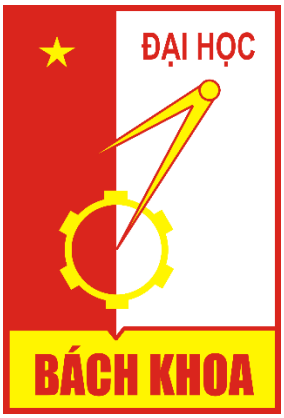
HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF INFORMATION AND COMMUNICATION TECHNOLOGY



FEASIBILITY REPORT

Software Engineering

Project 10: Jade Hill Homestay

Tutor: Ph.D Bùi Thị Mai Anh

Team ID: 505

Full name	Student ID
BÙI QUỐC THUẬN (Leader)	20194854
TRẦN TẤN DŨNG	20194746
ĐINH HỮU ĐẠI	20194735
NGUYỄN ANH QUÂN	20194822
HOÀNG VĂN TIẾN	20194856
ĐINH THỊ KIỀU TRINH	20194864
KIỀU ANH TUẤN	20194875
NGUYỄN NGỌC TÚ	20194873

Hanoi, April 2022

Table of contents

REFERENCE STATISTICS FOR JADE HILL HOMESTAY **1**

FEASIBILITY REPORT **1**

I. EXECUTIVE SUMMARY **1**

II. PRELIMINARY REQUIREMENTS ANALYSIS **1**

Part I – Application Overview **1**

Part II - Functional Requirements **2**

III. PROCESS TO BE FOLLOWED **5**

1st stage: Requirement (7/4/2022-15/4/2022) **5**

2nd stage: Design (16/4/2022 - 23/5/2022) **6**

3rd stage: Implementation (24/5/2022 -22/6/2022) **6**

4th stage: Release & Maintainance (23/6/2022 - 10/7/2022) **7**

IV. SUGGESTED DELIVERABLES **7**

V. TECHNICAL FEASIBILITY **8**

VI. VISIBILITY **10**

VII. RISK ANALYSIS **11**

VII. BUSINESS CONSIDERATIONS **13**

IX. CONCLUSION **14**

X. APPENDIX **14**

REFERENCE STATISTICS FOR JADE HILL HOMESTAY

Feasibility Report

I. EXECUTIVE SUMMARY

The following proposed system is intended for the reference staff of Jade Hill Homestays and travelers. The reference staff client will be represented by Dr. Bui Thi Mai Anh.
Dr. Bui Thi Mai Anh will be our primary client. The basic goal of the development team is to implement a booking system to help homestays manage their system more effectively and reach more customers as well as make it easy for travelers to book their trips. The new system will allow administrator to manage rooms and apartments in different locations, manage reservations and show availability to customers by location, and change prices depending on the travel season. The system also provides management of check-in and check-out as well as services that can be used in each room and each apartment of the homestay. The overall goal of the new system is to digitally transform the booking process and manage homestays. Successful implementation of the system will enable flexible financial and activities analysis, which will enhance the ability to make effective management decisions concerning a booking, based on travelers' trends and service-need patterns.

II. PRELIMINARY REQUIREMENTS ANALYSIS

Part I – Application Overview

Objectives

The basic functionality of the system will be to manage homestays and booking.

Business Objectives

The project aims to reduce costs, optimize the booking process, easily reach potential customers, and analyze the financial and activities problems of Jade Hill Homestay. The traditional management and booking process will be replaced by a more efficient online system with a user-friendly web interface.

Through this digital system, the management hopes to improve their business activities based on booking rooms and managing data at different locations. The project is also expected to greatly benefit the customer by reducing the booking process and increasing the ease of finding a room and location on their holiday.

A working prototype will be developed, tested, and implemented in time to be deployed in the final of this semester.

Current Business Process and Rules

Currently, the client operates an offline system at different reference desk locations, using the traditional method to manage room and data by paper and offline software. When a customer comes to homestays, they will have to go through various processes such as booking a room, choosing the number of days to stay, attached services, etc. Traditional reservation systems may allow customers to make reservations over the phone in advance. However, this form will have many limitations such as not being able to view photos and videos of the room as well as all homestays' services. The parameters of each homestay will be saved to the offline software or paper system, and it will be difficult to synchronize the revenue and operations of the entire chain.

The new system hopes to solve the "hash-mark problem" by eliminating traditional entries, replacing them with a real-time, synchronous, and online system, creating a more efficient centralized central data repository, a simple way to make a reservation, and generating meaningful reports which can be used for statistical analysis.

User Roles and Responsibilities

Administrator Role: The ability to manage services: check-in, check-out, update an available room, prices, and analyze financial status.

Staff Role: The ability to check information from web server and change check-in, check-out status.

Customer Role: Ability to refer, search and choose to order services that the system chains offer and share product feedback.

Interactions with Other Systems

The system will be built from scratch using standardized web packages, replacing an existing offline system. Data from admin panel in the online system can be combined with the offline system in the future to provide the most accurate reports on revenue and other activities.

Production Rollout Considerations

The central data repository design and development, the design layouts, and the generation of reports are expected to be carried out in a phased manner over three and a half months before the system is tested and put into production. Users are expected to use this system after undergoing a short period of training.

Part II - Functional Requirements

Statement of Functionality

This is a software system (website) that performs the main function of product management (the products here are rooms, hotels, and related services such as dining).
For users, the system allows customers to refer to the product information of the Homestay system chain, from which they can choose to order those products.

The system will help the officers manage by checking, editing, updating the data of the rooms (check-in, check-out, empty or full, price,...), and receiving the user's data when ordering service. In addition, the system offers future location expansion.
The system provides account to users (admin and staff) to manage. Data from multiple locations will be sent to a data management center (server). The server has the function of providing product data status and returning display in the user interface.

The system needs to analyze, process, and make statistics of data by time and location; from there, it is possible to grasp customer needs and expectations, thereby expanding and developing new destinations.

The system also statistics the activities of the Homestay system chain, the revenue of the locations, and the overall.

Security and User Capabilities

The system will support two types of user accounts: Administrator and Staff. To access the system, users are required to have an account to log in with the password provided previously.

- At the Admin access level, the user has permission to modify (delete, add, edit,…) all data in the system, including the permission of other users.
- At the remaining access levels (management staff), they can only have permission to modify data for the system at a location where the employee is active.
- For customer, they do not need to register an account to use.

To protect against SQL Injection/HTML Injection attacks, the system is required to use a password encoder for accounts. Conveniently and flexibly, the system will use MD5 encoder on SQL Sever. Thus, user's account will be protected.

In addition, protecting users' information, especially costumer's data, is necessary for any system. SSL Encryption is one of the best forms of online security that my team is considering and choosing. An SSL Certificate can help prevent hackers from intercepting information exchanged between a web browser and a server.

Reporting

Reports will be generated using the features available in the system. It is the statistical and evaluation functions that are handled in the data management and storage center. Reports will be made on a weekly and monthly basis. Based on such data, a long-term report will be made.

Non-functional requirements

The system must be accessible from various computers simultaneously, up to a maximum of 50 accesses.

The system will be tested before it is released. The system needs to be functional whenever a user accesses it. Because the user access time is not fixed, the system needs to operate 24/7.

The criteria for success of the system would be measured by the flexibility and suitability of the system. The functionality and ability of the system to meet all requirements (i.e. simultaneous access from different workstations, the effectiveness of the design of the central data repository, automatic backups, retroactive editing of data, various levels of user access, etc.) would be critical for success as well. Ease of use and efficiency would be adequate measures of performance.

Optional Features

Ideally, the system should be designed with a feature that allows users to evaluate the service experience on the system as well as the real experience. From there, arising problems will be detected and used as a basis to overcome and perfect the system. Users can create feedback comments (including text, images, and videos) and rate them on a scale of 1 to 5 stars.

In addition, the system also needs to have a search feature through the search box on the user interface, so that customers can search for a suitable place.

Usability

System usability issues include the speed of data collection, the speed of data storage and retrieval, the speed of performing analysis and evaluation of user data, and the speed of execution. report. Once the speed increases, the system will be smoother, operating more efficiently.

Scope

The scope of the system includes receiving user data (name, phone, mail, address, destination..), processing and synchronizing it to the data center, providing service information to customers through the user interface, generating weekly data reports, and administrative system tasks including user editing, system backup, and limited restricting access.

The system will not be able to provide a payment action on the system. This must be done manually through the users and the check of the staff.

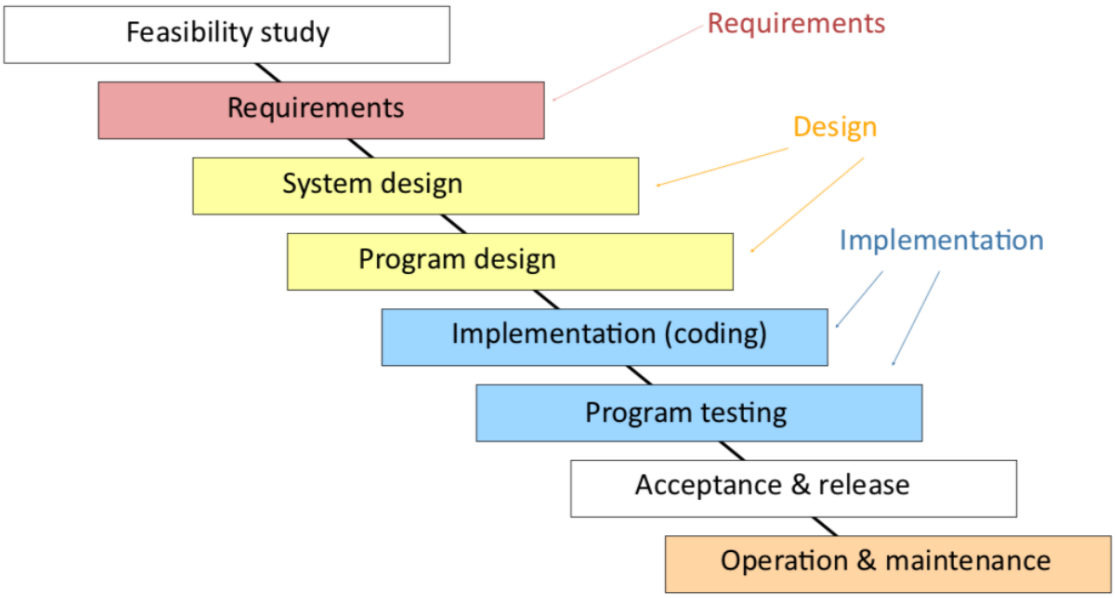
III. PROCESS TO BE FOLLOWED

The system will not be able to provide a payment action on the system. This must be done manually through the user and the check of the staff.

For this project, the team has decided to follow The Waterfall approach which is similar to the direction water flows over the edge of a cliff, distinct endpoints or goals are set for each phase of development and cannot be revisited after completion. The team chose this particular method due to this project has specific documentation, fixed requirements, ample resources, an established timeline, and well-understood technology. In addition, this method Facilitates departmentalization and managerial control based on schedule or deadlines. By using the waterfall method, the team can simply understand, follow and arrange tasks and also defines Clearly milestones and deadlines. However, the waterfall model is suitable for a system that has no changes or a little change, so the system's requirement must be constant and stable. It's difficult to have changes after finishing one milestone. This is a disadvantage of this model that my team must consider.

Process Outline

The team fixed design based on the idea of clients. At each milestone, the team will complete only one phrase and do not come back to do it again. And after completing each phase, we will send document to client, so they know what part have been done. Finally, the final product will be tested to be accepted or rejected.



1st stage: Requirement (7/4/2022-15/4/2022)

Requirements analysis and specification

The team will understand the exact requirements of the client and document them properly. This phase consists of two different activities:

- Requirement gathering and analysis: Firstly all the requirements regarding the software are gathered from the client and then the gathered requirements are analyzed. We will then remove incompleteness which is one in which some parts

of the actual requirements have been omitted and inconsistencies which is one in which some part of the requirement contradicts some other part.

- Requirement specification: We will document these analyzed requirements in a software requirement specification (SRS) document as a contract between the development team and client. Therefore, we can examine the SRS document in the future when any dispute between the client and the developers to settle.

2nd stage: Design (16/4/2022 - 23/5/2022)

The team will understand the exact requirements of the client and document them properly. This phase consists of two different activities:

System Design

In this phase, we will convert the requirements acquired in the SRS into a format that can be coded in a programming language. It includes high-level and detailed design as well as the overall software architecture.

Program Design

In this process, we will define system architecture, components, modules, interface, and data of a system using the requirement specification document.

We will use A Software Design Document to document all of this effort (SDD) and send it to client, so they can see our process.

3rd stage: Implementation (24/5/2022 -22/6/2022)

We will use A Software Design Document to document all of this effort (SDD) and send it to client, so they can see our process.

Implementation

With inputs from the system design, we first develop the system in small programs by translating system design into source code using the programming language we have decided before. Thus each designed module is coded to check whether each module is working properly or not.

Integration and System testing

We undertake the integration of different modules soon after they have been coded and unit tested. Integration of various modules is carried out incrementally over several steps. During each integration step, we add previously planned modules to the partially integrated system and test the resultant system. Finally, after all the modules have been successfully integrated and tested, the full working system is obtained and system testing is carried out on this.

We have three testing choices in the System testing stage as described below :

- Alpha testing: the development team will perform the test
- Beta testing: a friendly set of client will perform the test
- Acceptance testing: after the software has been delivered, the client performed acceptance testing to determine whether to accept the delivered software or reject it.

During the testing progress, we document all the work we do and then send it to the client.

4th stage: Release & Maintainance (23/6/2022 - 10/7/2022)

Release

Once the functional and non-functional testing is done; the product is deployed in the client environment or released into the market.

Maintenance

We will choose 1 of 3 three types of maintenance :

- Corrective Maintenance: we will correct errors that were not discovered during the product development phase.
- Perfective Maintenance: we will enhance the functionalities of the system based on the client's request.
- Adaptive Maintenance: we will port the software to work in a new environment such as working on a new computer platform or with a new operating system.

The release and maintenance stage also need to be documented so the client can get an overview of this project.

IV. SUGGESTED DELIVERABLES

1. Periodic Status Reports

Throughout software development, periodic status reports will provide customers with summary performance for project management purposes.
During the software development process, periodic reports will give customers an overview of the progress of work, and help customers promptly make additional requirements for the software.
Periodic progress reports detail the latest system updates. These will be written documents that are presented to the client and any other individuals the client identifies.

2. Periodic presentations

Accompanying requirements, design, and final reports will be periodic presentations where the team will demonstrate different aspects of the software system in development. This recurring presentation will include a progress report, as well as confirm the goals that

the group has been, is and intends to work towards follow in the project and answer customer queries.

3. Computerized, Web-based System for Reference Statistics

This system will be the core can provide customers. It will include a tool based on the web. The customer identified four key functions that this system would need to provide:

- Insert and edit information
- Report Generation
- System Backups

The deliverable system will include a front-end graphical user interface, and a centralized back-end central data repository component, where the actual data and the program with which the user interacts will be stored.

4. Good Faith Requirements Agreement

After the project requirements have been discussed and reviewed with the client, a requirements agreement will be presented to the client to clarify exactly what the project intends to accomplish. The agreement will explicitly spell out which features and objectives the team intends to deliver.

5. Documentation for Use and Mechanics

The client will be provided documentation both explaining how to use our system and describing its underlying mechanics. The client has expressed interest in gaining familiarity with the system, and the documentation will be useful for reference needs.

6. Demonstration and Client Training

In addition to documentation, the client has requested training for their staff to use the system. The team will satisfy this need by providing demonstrations of the system (in various stages of completion) throughout the semester (in coordination with our periodic presentations) and by allocating time after the final system is finished to train the clients in the use of our system. The demonstration will consist of performing routine tasks that have been identified by the client, and the training will either consist of group instruction led by team members or one-on-one training with the client.

V. TECHNICAL FEASIBILITY

1. Data sorting by different fields

Sorting data by different fields (time, date, customer’s information, information of homeStay). Its helps admins filtering out detailed information about Homestay activities

according to their wishes, staff can exchange conveniently with customers and as well as users can easily search for Homestays information and book suitable room.

2. Centralized data repository

Our website need Centralized data repository because all homestays of system will be active and many customers can be accessed at the same time. A centralized data warehouse is needed to coordinate all the information. If someone has booked a room, the others can't book that room anymore. Thus, it is possible to avoid conflicts of customer booking information.

3. An administrative interface

An administration interface for adding, modifying, deleting and searching on a web page designed to allow system administrators to add information, services, update user activity levels, change prices according to the season, check the business situation, and the operation of the inventory system for each homestay.

4. Feedback mail to user

The website supports customers who login in by gmail without registering an account of the system. In addition, this also helps customers secure gmail information because their mail passwords are not stored in the database of the website. The number of people booking room in tourist season seasons is very crowded, so it is necessary to have the function of automatically sending confirmation mail to the booker so that the booker can confirm his or her room booking.

5. Multiple access

Users can access the website ; Enter data, personal information, search and book rooms anywhere without waiting for others to complete on another electronic device. The data on the system is also always updated to avoid conflicts of customer booking information.

6. Automatic statistical report generation

The new system will generate reports as one of the main goals of switching to an automated, computerized system.. When manager requests, the system will query data from the database to statistic and calculate all revenue parameters, activities and business results of each homestay for admins by day, week, month, and year so that the manager can easily monitor, manage your homestays and and make the right business decisions.

7. Multiple levels of access to the system

Users include customers, staffs, managers and the allocation of staff is one of the important goals of the system to ensure information security.

After logging in, staff and manager will be able to access the admin page, but here the staff can only have right to know information andupdate the general information of the homestay, add services.

In contrast, the manager can manage information from many homestays and receive detailed automatic statistical reports of the system. Managers can also assign homestay to admin for manage each homestay.

8. Security

Security needs to be maintained to ensure the integrity of the data, although no malicious or advantageous editing is expected and as well as do not perform unauthorized actions, causing danger to users. Password protection and a login system (based on access-level or usertype) are sufficient.

To access the system, users only need to log in with their existing gmail account. After choosing to sign in with gmail, the user will go to google's login by gmail page. helps customers secure gmail information because their mail passwords are not stored in the database of the website.

Conclusion

This is the technical feasibility of the system proposed by our team. The central data repository can be implemented with a MySQL database, which would support data storage and editing. The web server can be run with Apache, which would support simultaneous users to access the system at the same time. Web interface coded by React Javascript, HTML, CSS and a The backend web is built with NodeJS. The combination of these freely available software products and the team's own coding will meet customer requirements.

Finally

The final system delivered to the customer may differ from the one described in terms of technical feasibility. The purpose of technical feasibility is to determine whether the project is viable or not.

VI. VISIBILITY

Because waterfall model is difficult to accept feedbacks from the client and make the change during the process, we will take an effort to make all requirements of the client are completed early in the project, which enable the team to define the entire project scope, create a complete schedule, and design the overall applications. Beside, after each phase of development process, we will provide the client the document of that phase. This will ensure that the project is conducted according to the initial schedule, estimating the cost for each phase of project and what tasks that the development team will do next. Various methods that team intends to use as described below.

1. Communication

Github, Teams and emails would be the primary form of open communication to keep the clients updated with the progress of the project. The document report of each phase completed will be sent to the client and project's files will be posted to our Github repository (the client's account is added as member) to make sure that what part of the project has been completed as set out in the project schedules. The team also meet as a whole once a week on Teams to ensure all member are caught up, understand their roles and get feedback to detect early the defect. By using Teams, adding a document to the project site and bringing tools (SharePoint) together to manage the project are very easy.

2. Intermediate Deliverables and Presentations

Live demonstrations: A presentation of the demonstration will be held at the client site before the work of the development team to agree on the two sides' opinions (the client and the development team) about all requirements to be completed and the schedules of the project. Besides, the team also have another presentation to show and deploy the final product with all requirement completed.

Presentations: Slideshows of design layouts of screens, reports of working functions, and the system will be sent and displayed to the client to keep them updated with the team's progress. This will be attached with the report after each phase of the project.

Reports: After each phase of the project is completed, the clients will also be given the documentation, which records details at each phase in the web development process. These progress reports will also enable the client to be well aware of the details of the project, the cost of the phase, and what requirements the team will complete in the next phase.

VII. RISK ANALYSIS

As with any project, this undertaking is not entirely risk-free. Three major risk categories have been identified: time, resource, and functionality.

1. Time Risks

Waterfall is a heavily documentation-oriented project management. In theory, team members simply read the existing documents and they can smoothly onboard. But in reality, the team cannot ensure this so it can make the delays to continue after each phase. Our project is conducted by waterfall model which typically flows down only. When a critical issue is discovered, the only thing that can be done is to return to many previous states of the whole process. This causes lengthy delays and related problems.

Since the project must be completed within one academic semester and our development model is waterfall, any extensions from the client are not possible. This introduces the risk that the system may not be completed with the full functionality the document specifies early within the given timeframe of a semester.

2. Resource Risks

Resource risks involve technologies the team has available for their use. The team may not be able to obtain the needed or best resources to complete parts of the system due to costs and other external constraints. For example, one apparent resource is that team members all need laptops running a Windows operating system. Luckily, all team members can buy this least resource by their own.

Besides, there are inherent risks in the resources, such as the software and hardware the team decides to use. The team tend to use open-source software which ideally should be free (authentication with Gmail SMTP) to keep costs at a minimum.The free technology of project such as react-js and node-js have the change in the library, which can make team change the whole system. The hardware each homestay facilities has available can determine hardware for actual system implementation. Risks that merge from resources include system crashes, incompatible browser, bugs, hardware failures, etc., which may cause accidental data loss. Updating the computer system of client's facilities in the future may also cause the system to malfunction. Since part of the system is web-based, slight variations in display of the user interface (mobile, laptop, tablet, etc...) may also occur due to different internet browsers.

Human resources shouldn't be underestimated. The work-in-process handover between the phases is a typical friction point between the teams. When team members are under stress and the project deadline is close, even a tiny issue can fire up a huge blame war, which make poor team coherence. In addition, it will take time for team to study a new programming language and technologies to work with the project. Scenarios can be worse when team members get sick or outright leave in the middle of the project.

3. Functionality Risks

Functionality risks have to do with how the system works. Common issues include developing a user interface that is not user-friendly or not well-liked by the client, or producing functions that have limited sustainability. In the worst case, the final system does not match what the client want it to do.

Another potential risk need to mentioned is building website that not follow specific standards, which can make your website to be listed in Google Sandbox. These consequences stem from the website design and optimization techniques encountered in violation of Search Engines.

Functionality risk can be the easiest in three risk categories since functionality constraint are more flexible than time or resource constraint. However, the client must be aware that when risk of functionality occurs nearly at the due date (the end of the semester), the team consider to minimize it by ignoring specific parts and/or functions of the system, since decreasing functionality naturally decreases its associated risks.

4. Risk Management/Minimization

Having mentioned the potential risks associated with this project, the team have prepared and proposed appropriate directions to minimize risks as much as possible.

The principle plan is to develop and practice good management strategies. The project will be divided into a series of phases that have clear milestones delineated. This will bring a clearly view for team members about their roles and jobs for each phase of the project. Because of the sequential system, team know where the project is at any given time and if that's where it. When unexpected outside delays or personnel changes, waterfall documentation allow members to quickly get your team back on track. After each phase, there will be the feedback of the team about the previous part of project, which can help to remove the defect in the software as soon as possible.

Before the team start work, there will be a meeting at client site to discuss thoroughly, accurately and fully the requirements that client want for the system with the project schedule. Taking the time early on to discover and plan for requirements can save time and money. This also enabling the team have the overview of the entire project scope and design the overall applications. After each phases of project completed, the client will be received the document report, which includes details at each phase in the web development process. These progress reports enable the client to be well aware of the visibility of the project and ensure that the project is conducted according to the expected schedule.

Finally, it is important to remind the team that they are in the same boat and the same goal. The conflicts between team members can be mission issues, personality differences, discrimination, ... This time everyone should listen to team members opinions and understand how they think about the problem, from that they give fair comments, towards the ultimate success of the whole group. The team leader must build trust, make informed decisions and resolve conflicts to give each individual fairness.

VII. BUSINESS CONSIDERATIONS

There are several business considerations that must be taken into account when determining the feasibility of the Jade Hill Homestays project, including but not limited to: disclosure of trade secrets and sensitive information, copyright and trademark issues, and considerations with regard to patents.

Trade Secrets and Sensitive Information

After some discussions between my team and the Jade Hill Homestays, we will sign a confidentiality contract with the customer. Thereby, we are committed that customer information will be kept confidential throughout the project implementation.

The two parties will not use that document to communicate with any third party without the consent of the document supplier. If one party discloses or uses the other party's

information (intentionally or unintentionally) causing damage to the other party, it must compensate in accordance with the law.
The sensitive information on the website will be secured by some security measures such as password or OTP code protection. My team will be responsible for reinforce protection and prevent external intrusions during system development.

Besides, the information is not of a sensitive nature that will also have to be heavily guarded through several security measures. Even in light of this situation, the system will be designed with password protected pages to prevent malicious users from accessing and corrupting this valuable data.

Copyrights and Trademark

The team will not be responsible for any modifications after delivering the software system but will answer any questions or concerns from the customer as time and circumstances permit. The authorized group can demo the software system for the potential employers and present the software system as a work created by each team member. The group has no plans to trademark any names associated with the software system, so trademarks are not expected to be an issue.

Patents

No part of the system is foreseen to be eligible for any patent applications. However, if upon later date, a part of the system is found to be patentable, the team reserves the rights to the uncontested patent and any derivative works based therein, while the client will automatically gain non-exclusive rights to use the system, and will have full rights to the use and modification of the system regardless of any patent rights held by the team.

IX. CONCLUSION

From the view of the feasibility study, the team finds that the Reference Statistics for the Jade Hill Homestay project are feasible in terms of technicality, the ability of team members, and time. Given one semester to finish the product, the team believes we can successfully manage the project and satisfy the client's requirements upon system completion. Furthermore, team members have the necessary skills to implement the system, and we are familiar with the hardware and software that is used in this project. The conclusion of the feasibility report is to go ahead with this software development project.

X. APPENDIX

Assign tasks:

Section / Member	I	II	III	IV	V	VI	VII	VIII	IX	Others
BÙI QUỐC THUẬN										
TRẦN TẤN DŨNG										
ĐINH HỮU ĐẠI										
NGUYỄN ANH QUÂN										
HOÀNG VĂN TIẾN										
ĐINH THỊ KIỀU TRINH										
KIỀU ANH TUẤN										
NGUYỄN NGỌC TÚ										