HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

School of Information and Communication Technology

Feasibility Report

Subject: Software Engineering

Title: PizzaHUST

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TABLE OF CONTENTS

REFERENCE STATISTICS FOR OLIN LIBRARY FEASIBILITY REPORT

I. EXECUTIVE SUMMARY

The following proposed system is intended for the owner and customers of PizzaHUST. The client be represented by reference specialist Bui Thi Mai Anh (act as client, store owner and user). She will be our primary client. The basic goal of the development team is to implement a web-based system that allows online ordering from Pizza HUST as well as allow the owner to manage and create orders. The system will allow the owner to manage orders, add new dishes as well as create orders for users when users come directly to the store and manage statistics. The system will keep the basic functionality including managing information about the store's current dishes, information about orders placed, order time and payment statistics. The overall goal of the system is to streamline and automate store operations, making it more convenient for users. Successful implement of the system will enable flexible data output, input, and analysis, which will enhance the ability to make effective management decisions regarding staffing needs, transportation based on store customer trends and service-need patterns.

II. PRELIMINARY REQUIREMENTS ANALYSIS

Part I - Application Overview

Objectives

Create a PizzaHUST website for a Pizzeria that allows web-based online ordering with the following requirements:

i. The owner can manage Pizza with size (S, M, L), different toppings corresponding to prices and side dishes. The owner can create different combo boxes depending on the time, type of menu for users.

ii. After choosing the food, users will order right on the web (Delivery within the city with a shipping fee of 22 000) and pay in cash.

iii. Create additional features of order financial statics, order processing and shipping.

Business Objectives

The website aims to help remote users order Pizza, reduce work pressure for employees at peak hours, and store revenue data more efficiently. The store's direct ordering method will be replaced by an efficient online system with a user-friendly web interface. Through this web, the owner hopes to improve sales and promote their stores more widely on social media platforms. The owner will be more convenient in managing orders and adding dishes to the menu. The website also helps employees reduce pressure during peak hours.

Current Business Process and Rules

Previously, customers who wanted to buy pizza had to go to the store to order, stand at the counter to choose the type of cake with size and topping, in addition, there were side dishes and combo boxes. Customers can choose from different combo boxes of the store based on each time. The staff will take note of the customer's order and send it to the kitchen for preparing. When done, pizza can be served to customers at the store or packed for customers to take home. This process can take a long time, affecting the customers in the back, affecting the revenue and reputation of the store especially during congested hours.

The website will partially help with ordering. Customers can stay at home to order pizza with their favorite size, topping, and side dish instead of going to the store to order. Then the restaurant will make FOOD and the shipper send to the address provided by the customer. Customers can book directly without logging in. The owner or authorized staffs only needs to have an account to log in to add, remove items or control order information. The owner can also create orders according to customer requirements. This will create flexibility when changing dishes, generating reports that can be used for statistical analysis.

User Roles and Responsibilities

- User roles: No need to log in, can order directly, comment on dishes, need to enter full address information for accurate delivery.
- Admin roles: Must be logged into the system, have the right to access, edit and update data, the ability to track orders, create orders, can read customer reviews.

Interactions with other systems

The website is built based on Firebase - a database service that works in the cloud without the need for a backend or server.

Production Rollout Considerations

The central data repository design and development, the design layouts, and generation of reports are expected to be carried out in a phased manner over three to five 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

The customer will sign in, and order on the computer, which will allow the customer to enter personal information to be saved in data on the server or continue as a guest.

The customer on the computer will be allowed to have access to all the items on the menu and choose all items by clicking the desired items with the option of customizing order.

The customers will then be allowed to proceed to the full menu of the pizza restaurant. The menu page will have most popular pizzas for a quick selection and will have “customize your own pizza” which will include crust sizes, crust flavors, and ingredient to go on top of pizza.

The customer will be able to submit an order and be placed into a queue, which keeps track of what customer ordered first, and to add, edit, or remove menu items.

The customer on the computer will be able to keep track of pizza cost, see total currency to be paid, process payment order, and be given an electronic receipt.

Security and User Capabilities

To access the program, you need to have a username and password. The administrator will have the authority to create the credentials for each user.

All data that will help identify the customer will be preserved for a long-term duration, such as: Names, addresses, payment information, and special identification to locate addresses for delivery. We are committed to protecting your data from third parties. We don't share information that personally identifies you with advertisers.

Reporting

The reports generated will help in statistical analysis of the reference data that is collected and stored in the central data repository. Daily, weekly, monthly, quarterly, and yearly reports will be created using the functionalities of the system and sorted data.

Non-functional requirements

Security must be high priority to ensure non-users cannot accessrestaurant or customer sensitive information.

The manager should make sure that there is an orientation class on proper use of programs.

The server should have a backup in case of failures to avoid data loss.

The system should work on any PC, Android, or IOS device.

The system should be easy to use for all technical levels and easy to troubleshoot.

Optional Features

The customer should be then given the option to select payment type in the form of credit card, debit card, cash payment.

The customer may be able to include a tip if it is a delivery and that will be calculated in the bill.

Usability

Usability issues such as speed of operation for the user interface, collection and storage of important quantitative data, speed and efficiency of the workflow processes through automation, and concurrency of collected data will be important considerations.

Scope

The scope of our system includes reference data entry, tabular report generation, and administrative system tasks including user editing, system backup, and limited field editing.

The management will have a special database to access to be able to customize the menu at any time. Once the manager enters the editing area they will be able to easily update the menu with words and images. Also, change any information. The hanges will become effective immediately once the submission occurs.

III. PROCESS TO BE FOLLOWED

For this project, the team decided to do the development according to the Waterfall model. In this model, the software development process is divided into different phases and executed sequentially, the output of one phase is the input of the next phase and there is no overlap.

The decision to choose the Waterfall model of the group is based on the following reasons: it is the most basic method to develop a software. Moreover, because the members are all new and implementing software engineering projects for the first time, it takes time to learn about both the technology side

and the project implementation, the choice of Waterfall model is feasible and reasonable.

Describe in detail and specifically the phases of project development according to the Waterfall model. The team's project is expected to be implemented in 6 small phases, corresponding to 3 main milestones (milestones) corresponding to the three main milestones. about 12-14 weeks as follows:

- **Milestone 1:**

1. **Feasibility study:**

The group considers technology issues decides what programming languages and frameworks to use for the project, considers whether the database system is feasible in storing, automating systems that customer requirements, or not, thereby concluding the feasibility of the project. At the same time, conduct pre-analysis of requirements, choose a model to follow to implement the project, and then build a tentative plan of work as well as milestones for system development. Evaluate that plan is feasible? Are you okay? Anticipate possible risks and have plans to deal with possible risks.

- Time: 1-2 weeks

- Work results: Report 1 (Report 1): Feasibility Study and Plan

(Submitted on April 28, 2021)

- **Milestone 2:**

2. **Requirements:**

The team conducts analysis, understands clearly and explicitly the requirements set forth by the client. When everything is clear, translate the defined requirements into corresponding functional specifications (requirements => functions), prepare for the design phase.

- Estimated time: 2 weeks

- Work results:

• Specify the requirements, full functionality of the system

• Preliminary design report

- At the end of Milestone 2, the team needs to complete the requirements analysis and preliminary design phase, have a meeting to present with the customer to present the work that the team has done.

(Expected from 11/05/2022 - 18/05/2022)

- **Milestone 3:**

3. Design

From those requirements, functions have been determined, the project team creates designs for the product to meet all those requirements, including hardware design, software design, programming language, data saving. This is also the part that helps you determine how useful the project will be to users.

- The team will carry out the design including 2 steps: system design and detailed design (program design).

- Estimated time: 2-3 weeks

- Outputs: Full and detailed report on System Design and Program Design

4. Implementation

The team installs the product and tests the program: implementation (coding) and programming testing

- Estimated time: 3 weeks

- Output results: the system's software product has passed the program execution test steps

- **Milestone 4:**

5. Acceptance & release

- Groups for users to experience, collect opinions, check acceptance their receipt, and at the same time release versions of the product

- Estimated time: 2 weeks

- Outputs: product release, user opinions, acceptance

6. Operation & maintenance (operation and maintenance)

- The team goes into operation and maintenance of the system. The final system will include all the features the team and customer have agreed to require. Write a document for the client (documentation).

- Estimated time: 2 weeks

- Output result:

  • The finished product of the system

  • Documentation for customers (documentation)

IV. SUGGESTED DELIVERABLES

The group presents documents, reports or delivers what to the client customers to meet customer requirements for each stage

1. Periodic Status Reports

Periodic reports will be generated and delivered to the client throughout the software development process to maintain process visibility and improve the team's response to the customer's requests. The team recognizes that the client will want to comment on and respond to the progress of the project. As a result, the team will attempt to adapt and tailor procedures and advances to the client's demands on a regular basis. Periodic status reports will outline the project's feasibility, exact requirements, design, and, finally, final form and implementation. These will be written materials that the client and any other individuals the client specifies will be presented with.

2. Periodic Presentations

Periodic presentations will accompany the requirements, design, and final reports, in which the team will exhibit various parts of the software system under development.

These presentations are intended to provide the customer with the most comprehensive understanding of how their needs are fulfilled in the final product. These presentations will rely heavily on feedback, so the team can use the client's remarks to fully comprehend how the system fits the client's needs.

3. Computerized, Web-based System for Reference Statistics

This system will be the core deliverable for the client. It will consist of a coded, web-based tool. The client has identified four major functionalities that this system will need to deliver:

- Reference Data Entry
- Retroactive Editability
- Report Generation
- System Backups

The deliverable system will consist of a graphical user interface front-end for assistants to utilize the system’s functions and a centralized back-end central

data repository component where the actual data and program the user interacts with will be stored. Therefore, the system will span web-based interactions and code running on the library server.

4. Good Faith Requirements Agreement

A requirements agreement will be submitted to the customer after the project needs have been discussed and approved with the client to explain exactly what the project seeks to accomplish. The agreement will state exactly the features and goals the team aims to meet.

5. Documentation for Use and Mechanics

The client will receive documentation that explains how to utilize our technology as well as the mechanics that underpin it. The client has showed a desire in learning more about the system, and the documentation will come in handy for future reference.

6. Demonstration and Client Training

In addition to the documentation, the customer requested training for employees on how to use the system. The team meets this need by providing a demonstration of the system "at various stages of completion". Throughout the semester (coordinated with our regular presentations) and at subsequent times The final system is ready to educate customers on how to use our system. Demonstration passes Performing and training routine tasks identified by the customer consists of one of the following: From group lessons by team members or one-on-one training with clients.

V. Technical Feasibility

(1) Data sorting by different fields:

- feasible
- We will use Realtime Database, a service of Firebase to solve this problem.
- It is a NoSQL database that stores and syncs data on the cloud.
- For a small scale and uncomplicated data storage, it can sort and organize the data flexibly depending on the user’s preference.

(2) Centralized data repository

- feasible
- Realtime Database can real-time user data storage and synchronization. The data is stored in a database system that supports NoSQL and is placed

on the Cloud server platform, which allows many locations to be operating at once.

(3) Multiple levels of access to the system feasible

- The system can consist of 2 user levels:
- Admin: has their own privileges to use the system
- Customers: can only do basic operations on the web interface exclusively for customers
- The manager can log in to the system as Administrator, which allows the exploitation of information without having to reserve a single database for each management/guest object. This is achievable thanks to the Firebase Authentication service

(4) Retroactive editing of input data Feasibility.

- Can check the validation of <form/>, such as email password. Because it's the text input so it can be retroactive editing
- If the data input is not validated, ask user to re-enter

(5) Multiple, simultaneous users and input

- Google's server with RealtimeDB can handle parallel access very well and overcome the situation of data collision when many users use the system.
- Firebase also supports parallel processing of user requests, using http request/response

(6) Multiple, remote access points

- Feasibility.
- All other computers can access the remote system using http, https. protocol through the link.
- Through the server without lag and delay

7) Administrative interface: The system has 2 types of sites

- Public website: order, view menu... every user can access
- Website for administration: Administrator must log in to access the system.

8) Automatic report generation

- Firebase has the function to listen for events, changes in the system, from which to send notifications to administrators, as well as send messages to users.

9) Security

- RealtimeDB fulfills data integrity through transactions, validate
- Control user rights through a password system
- Firebase supports saving the admin's password so that it doesn't reveal the password and avoids hacking
- Firebase increases security when using HTTPS

Software/Technology used:

- Client-side: HTML, CSS, Javascript, ReactJS
- Server-side: Firebase

Feasibility Evidence:

- ReactJS is responsible for rendering a specific web page requested by the user on their screen. It interprets HTML and XML documents along with images that are styled or formatted using CSS, and a final layout is generated, which is displayed on the user interface.

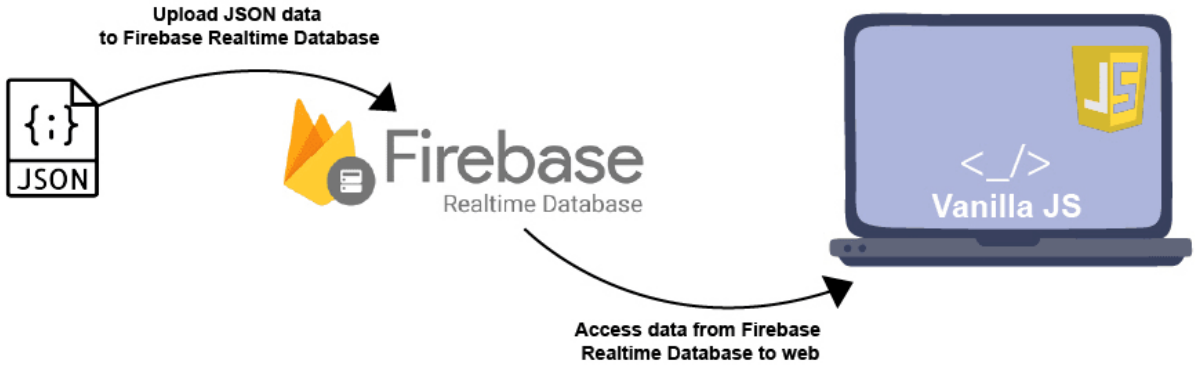

Figure 1: An abstract representation of the system design. User's computer will connect to firebase realtime database

In the above figure, The Firebase Realtime Database contains a central data repository of all the reference statistics that need to be tracked. It contains every detail of every transaction a user makes and also information of users such as names, addresses, phone number payment information, and the reference locations, categories, etc.

The most important is that the database is updated in real-time, and the data is stored in the cloud, which reduces the costs and possible problems with the implementation of the home service and database. Update in real-time means that every time a user changes data, in the order of milliseconds, the change will take effect for all users who are currently connected to the database.

VI. Visibility

Project visibility plays an important role in project success, helps to ensure all related parties have a clear sight of project performance. The team will strive to maximize the visibility of the system and the development process. This will
ensure that the project is being developed in line with client specifications. Any deviations from those specifications can also be caught early and corrected through client feedback. Several visibility procedures the team intends to use are mentioned in more detail below.

Communication

The primary form of open communication to keep the clients updated with the progress of the project is personal meeting and email. In case of inconvenience, online meeting will be held so that you can discuss with customers as soon as possible. Regular meetings will be held with the client to discuss progress and for the purposes of two-way feedback. The team will also meet as a whole at least once a week to assure all members are caught up and understand their roles and jobs.

Intermediate Deliverables and Presentations

Live demonstrations: The client will be given demonstrations of the progress through presentations at the client site and at the monthly presentations corresponding to each major phase in the project. In addition, it is possible to organize online presentations with customers for promptly contact in some other circumstances.

Presentations: Slideshows of design layouts of screens, reports and demos of working functions, and the system will be shown to the client to keep them updated with the team's progress.

Reports: The clients will also be presented with copies of the documentation, which record details at each phase in the software development process. These

progress reports will also enable them to be well aware of the details of the project from their perspectives.

VII. Risk analyst

Any field has an element of risk. With the unique characteristics of the IT, it is not easy to identify and analyze the risks in software development. Many products have failed because the development team ignored or cursorily controlled risks, so that the team receives a lot of complaints from client or the cost of product increases. Therefore, we analyst together about some risks that obstruct the working process. There are three main types of risk: time risk, resource risk and functionality risk.

1. Time risk

Firstly, most of members have little knowledge about web programming, so we must spend a lot of time learning about technology and knowledge of web programming to be able to create a website. After that, because of not having experience, our team also needs lots of time to complete the functions of system.

Because the project must be completed in this semester, we cannot add as well as improve some functions, therefore, the system is not fully functional and the client is not satisfied.

The time for testing is usually short and occurs at the end of the project doing process, so when the project has errors, it takes much time to fix and the performance of system is low.

2. Resource risk

Risk of human resources, most of members in our team have no experience in project development, little knowledge about development technologies. Therefore, when developing products, you may not be able to complete all parts of the project.

Resource risk, because of the team's cost constraints, the team may not have the best resources to complete parts of the system. For example, some members have difficulties with the specifications of the computer, such as the memory size of RAM or the outdated operating system.

Some errors about hardware can cause program interruptions or random data loss.

Some changes in the computer system cause to malfunction, hindering the project.

3. Functionality Risks

Functional risk is related to how the system works. Issues that fall under this category include developing a user interface that is not user-friendly or not well-liked by the client or producing functions that have limited ecological.

The system is completely uploaded to the web, so it causes the risks of stealing data and information insecurity.

The biggest risk comes from developing a system that does not do what the client wants it to do.

Minimizing functionality risk is usually accomplished by omitting specific parts and/or functions of the system, as decreasing functionality naturally decreases its associated risks. The team would like to avoid doing this as much as possible. The clients must be aware that it is possible that this must be done to deliver the system by the due date at the end of the semester

4. Risk Management/Minimization

After outlining the basic risks associated with this project, our team made plans to reduce these risks. Principle planning is the development and practice of good management strategies. Our team intends to divide the project into different phases and execute them sequentially, the output of this phase is the input of the next phase and there is no overlap.

Waterfall is a simple model, easy to apply, clear step-by-step process and works well in small projects with clear requirements. The input and output criteria are clearly defined so it is easy to control the quality. Furthermore, it helps members have more time to get acquainted and learn the necessary technologies.

Regular communication and feedback from the client is also essential for the client to be satisfied with the user interface and functionality. Our team will also continuously consider the progress of the project and revise the goals if necessary to provide a satisfactory system on time to the clients.

VIII. Business Considerations

1. Trade Secrets and Sensitive Information

Our team is absolutely committed to the confidentiality of customer information during project implementation. In case of necessity, we will contact client to sign information confidentiality contract. The software development team and client must not use the documents exchanged between the two parties to exchange with any third party without the agreement of the document supplier. If one party discloses or uses the other party's information (intentionally or unintentionally) to cause damage to the other party, it must indemnify according to regulations of the Law.

The data on the website will be secured through some security measures such as password protection. The team is responsible for reinforce protection and prevent external intrusions during system development.

2. Copyrights and Trademark

The team have no rights in trademark registration associated to the software system. The customer is the owner and has the property rights to the website. From the date of handing over the website, the group will delete all backed-up data about the content, images and website owned by the customer at the team's computer system and the team is not allowed to access the Administration page of this Website in any way without the consent of the customer. The team will not be responsible for any modifications after the software system is handed over.

3. Insurance

When customers detect abnormal signs of website operation such as: website running slower than usual, can not access to website... the team must take measures to handle the above problems within 24 hours at the latest, make sure to bring the website back to normal.

IX. CONCLUSION

From the results of the product feasibility analysis, the team found that the PizzHust game store management application construction project is feasible in terms of technique, team members' skills and time. With a duration of one semester, the team believed that the scope of the project was manageable and that the customer requirements could be satisfactorily met upon completion of the system. Team members are also skilled enough to implement the system and are familiar with the software development systems that may be used in this project. The conclusion of the feasibility report is that the team will continue with this software development project.