Food and Beverage Decision Support System
(FBDSS)

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ADMISSION

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STUDENT   : _____ Date : _____
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DEDICATION

To my beloved parents...

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An endeavor like this would not have been possible without the blessings of my parents. It is because of their dedication and support that I have been able to study in KUTKM. The quality and success of PSM1 report is greatly dependant on the motivation and direction provided by both supervisor and friends. It has been my privilege to work under the mentorship of Pn. Zahriah Othman for assisting me along the duration of Project I until she start taking holidays to deliver a baby. From there Pn. Maslita Abdul Aziz started to take over responsibility of Pn. Zahriah to mentor me for Project II development. Therefore, the hard work and caring support from all will be appreciated.

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ABSTRAK

Tesis ini dibahagikan kepada dua bahagian, iaitu, Projek I dan Projek II. Projek I dilaksanakan semasa di Semester Khas selama 8 minggu, manakala Projek II dijalankan pada masa yang sama dengan Semester 7 iaitu selama 14 minggu. Sistem yang dibangunkan ialah Sistem Pesanan Makanan dan Minuman (*Food and Beverage Ordering System*) yang berasaskan Sistem Sokongan Keputusan (*Decission Support System*) atau dikenali secara singkatan sebagai FBDSS (*Food and Beverage Decision Support System*). Sistem ini dibangunkan untuk The Orange Restaurant. The Orange Restaurant adalah sebuah restoran yang mengamalkan cara pesanan makanan dan minuman secara manual. Objektif projek ini adalah untuk membangunkan sistem yang mengamalkan proses pesanan sistematik dan juga untuk menyelesaikan masalah yang dihadapi oleh pekerja dari The Orange Restaurant. Masalah-masalah yang dihadapi adalah seperti kesilapan dalam mengambil pesanan, kekeliruan dalam penghantaran makanan dan minuman kepada pelanggan, maklumat mengenai makanan dan minuman yang dihidangkan, perkhidmatan dan sebagainya. Kelebihan FBBDSS adalah ianya membekalkan sistem pesanan yang lebih sistematik dan teratur kerana kesemua data/maklumat akan disimpan ke dalam pangkalan data bagi meningkatkan prestasi pengurusan dalam The Orange Restaurant. Pelanggan boleh mengambil pesanan makanan dan minuman berserta dengan maklumatnya, pemberian nombor meja secara automatic dan mengubahsuai pesanan secara lebih efisien melalui FBDSS. FBDSS juga berupaya untuk mencetak bil pesanan pelanggan supaya pembayaran akan berjalan secara lebih lancar. Justifikasi metodologi yang digunakan untuk membangunkan sistem ini akan memastikan sistem yang dibangunkan adalah betul dan boleh dipercayai. Maka dengan ini, model "*Waterfall*" digunakan sebagai panduan untuk membangunkan FBDSS. Pendekatan teknik *object-oriented* dan *unified modeling language* (UML) digunakan dalam pembangunan FBDSS. Skop yang terlibat adalah sepertix *login*, pendaftaran, pesanan makanan dan minuman, pemilihan kawasan dan lokasi meja dan lain-lain. Secara keseluruhannya, FBDSS telah meyelesaikan masalah yang dihadapi oleh The Orange Restaurant.

ABSTRACT

This thesis is divided into two parts; there are Project I and Project II. Project I was carried out in Special Semester (8 weeks), while Project II in Semester 7. The system being developed is Food and Beverage Decision Support System (FBDSS) for The Orange Restaurant. The project objective is to perform a systematic ordering process and to solve the problems faced by the staffs of The Orange Restaurant. The problems that are mentions here are mistake in taking orders, mix-up during food delivery to the tables, food and beverage information, services and so on. The significance of the project is that it provides more systematic and organized ordering system because all data will be kept in database so it can increase the level of the management in The Orange Restaurant. Customer can orders food and beverage, get their information, automatic table placement and modify orders more efficient with FBDSS. FBDSS is capable to print orders report or better known as bill to keep track of customer's own orders to ensure billing processed was done smoothly. The correct choice of methodology plays an essential role for the delivery of reliable and correct software products. A "Waterfall" model is chosen to guide FBDSS and OO approach technique and UML tool to develop FBDSS. Scopes areas of FBDSS are login, register, ordering food and beverages, select table area and others. In conclusion, the FBDSS had solved the problems face by staff of The Orange Restaurant.

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FBDSS	-	Food and Beverage Decision Support System
F&B	-	Food and beverage
DSS	-	Decision support system
UML	-	Unified Modeling Language
KUTKM	-	Kolej Universiti Teknikal Kebangsaan Malaysia
SDLC	-	Software Development Life Cycle
CASE	-	Computer Aided Software Engineering
WIA	-	Workforce Investment Act
FDSS	-	Frontline Decision Support System
USDOL	-	U.S Department of Labor
IT	-	Information technology
SPX	-	Sigma Operations Platform
RAD	-	Rapid Application Development
GIS	-	Geographic Information System
EMS	-	Emergency Medical Services
GPS	-	Global Positioning System
RAM	-	Random Access Memory
CD-ROM	-	Compact Disc Read Only Memory
DFD	-	Data flow diagram
OOA	-	Object-oriented analysis
PSM	-	*Projek Sarjana Muda*

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CHAPTER I

INTRODUCTION

1.1   Overview

The food and beverage industry has been a leading industry in the world. This industry has become a core business among the human race. Food is an essential nutrient for human body. There had been a lot of enhancement, modification and modernization implemented on the food and beverage industry. The demands from customers are becoming higher and higher each day. They had demanded the food to be delivered faster, better service, less error and more varieties of creative food and beverage to be offered. With the increased demand and popularized trend of eating out especially at restaurant, an electronic system is indeed necessary to cope with it. For the past decades, several companies had already developed systems to aid the restaurant to manage the ordering process and stock management.

New systems can now connect everyone from the dining table to the food vendor in an electronic supply chain. In the restaurant of tomorrow, guests give their orders to a waiter attending a specific counter, where an electronic device will take the orders details. The orders are transmitted to the kitchen, speeding service, reducing errors, and in turn the waiter/waitress can spent more time with the customers.

In advance of all these existing system, a Food and Beverage Decision Support System (FBDSS) will be introduced here. The Orange Restaurant Sdn. Bhd. had approach LBlueg Sdn. Bhd. a software house company to develop software to replace its management in customer ordering process, bill settlement and updating menus. With a computer aided tools and a program, The Orange Restaurant Sdn. Bhd. are believe to have a more smooth and faster service with less errors.

In order to build this system successfully, best-practice business analysis and project management methodologies are to be applied to facilitate exchange between the project stakeholders, business users, developers, and testers, shorten the development cycle, and deliver the product on time and within the budget. Depending on the business's needs, a combination of one or more of proven methodologies matching the specific project/department needs are to be implemented. Unified Modeling Language (UML) a business analysis methodology will be used to define business requirements and problems. While in project planning, a standard Software Development Life Cycle (SDLC) models will be used, "Waterfall" or Traditional method are the best recommended. "Waterfall" divides the project into well-defined sequential stages with intermediate milestones. The final product is not delivered until all phases are finished. More details referring to the models and methodologies will be discussed in Chapter 3.

1.2   Problem Statements

In the food and beverage industry, the traditional taking orders and table placement are merely made by waiters using paper and pen. Therefore, errors always occur during the ordering process. The time taken to cook certain foods depend on the type of food, cooking style and chef skills. Indeed, customer would loves to know more about the food ingredients, the nutrients facts, cooking styles and others information related to the food. With all these issues preventing the best of service provided to the customer and to reduce human errors, FBDSS can solve the issues.

A prime challenge for front-line waiters is to determine which set of services best meets the needs of customers who enter a restaurants, and to do this in a consistent, rational, and effective manner. However, not all waiters may have sufficient experience to make informed decisions for clients participating in the wide variety of menus offered at the restaurant. The FBDSS is a set of ordering management tools that is being developed to help customer successfully make the best decisions to order their choice of food. The goal of these tools is to assist customer in quickly assessing their needs in referring customers to services that best meet their needs.

1.3   Objectives

The objective of building FBDSS is to provide a user friendly electronic food and beverage ordering system that will directly communicate with the customer. In order to make it operate efficiently and easy to understand, it will be built with a decision support system, where it will help customer to decide on which table to be seated based on number of seats needed and also preferences set by customers. Besides that, it also manage the food and beverage system ordering process, summarize of the orders with its prices and the total price for all the food ordered in a list and print out the orders that will act as a bill.

While for The Orange Restaurant's staffs mainly cashier, they will use the FBDSS as an application to retrieve orders made by customers and settle the bill when customer are to leave the restaurant. To make it a whole, an administrator can use the FBDSS to add, edit and delete the existing records kept in the system database. For example, to add new item into the menu list or edit customer orders, add new cashier to enable them to login and to change their password.

There are eight objectives that should be met. Firstly, FBDSS aims to make food and beverage ordering an electronic system. Secondly, to make food and beverage ordering system an errors or faults free system. The thirds objective is to decide for customer which table to be seated based on preference set by customer themselves. While the fourth objective is to manage food and beverage list systematically. Fifth, FBDSS also aims to calculate the price of foods and beverages ordered by the system to minimize errors made by human. Lastly, FBDSS should allow an administrator to manage the orders, tables, cashiers and menu.

1.4   Scopes

The focused of this project is on the decision support system that offers an information models to help customer makes decisions. There are three modules and sub-modules that will be created to make this system a real and operating system. The modules are as follows:

i) F&B ordering

This module includes the ordering process and table placement. The customer login here and select table preference then orders through the system. The user also can modify the orders taken before confirming it. When ordering process done, it will summarize it and get confirmation from the customer before print out the bill.

ii) Billing

Upon leaving the restaurant, customer needs to settle their bill through cashier. Cashier will retrieve their orders from the bill presented by the customer and double confirm it with comparing the information printed on the bill with the information display on the screen. Then, the cashier can close the bill/order. It will automatically change the table status back to unoccupied.

iii) Administrator

An administrator will be allowed to add, update or delete item from the database. For example, administrator can add new item into menu list or add cashier list to enable new cashier to login to the system or change orders made by customer if there exist mistake when ordering.

This system can be implemented in a restaurant with certain layout condition. First of all, the system works on counter/station base environment. The restaurant will be design with only one door as entrance and exit. Upon entering the restaurant, customer will be ordering their foods and beverages through a counter. The system installed into the counters will assist customer to orders wisely as well as giving description on certain foods and beverage. Basically, waiters only offer second helping to the guest, cutleries, tables, clearing and delivering foods to the customer table.

Other than those system related subject, the business process and DSS aspect of theories and analysis should be done in order to get the system running accurately.

1.5   Contribution

The FBDSS will be a stand-alone system where the process of taking orders will be done by the user/customer themselves. The importance of installing this system into a restaurant is that the owner of the restaurant will benefit with a more accurate orders, less error, lower man power wages and better services offered. In the other hand, the customer will experience improved services from the restaurant's staff because they had lesser burden on taking orders. Other than that, information provided by the system is more user-friendly, precise and complete. Therefore, customer gets more satisfaction using this system to orders than the traditional ways using paper and pen.

Other contribution of this FBDSS is that it is more informative, effective and user-friendly. Customer will find it very helpful and easy to use. Information like, time to cook various dishes, ingredients involve in cooking certain dishes and the way to make it for example, grill, fry, steam or bake and also taste of the food.

1.6   Expected Output

When the system is fully developed, it will be implemented into The Orange Restaurant. It is expected to make the ordering system easier and faster. These can be seen especially during lunch and dinner time, which is the most busy operation hour with the peak customers at that time. The change of situation and environment is the most significance because in normal day one can see that the waiters and waitresses will be busy taking orders from the customers. Once FBDSS implemented, all customers will be seen taking orders themselves from the counter set inside the restaurant using FBDSS. The operation of The orange Restaurant will be seems relax and organized because the burden of taking orders was eliminated with the usage of FBDSS, waiters and waitresses will be serving foods and beverages to the respective tables, errors or misunderstanding between staffs and customers will be lessen because the customer is ordering the food themselves using the system. Overall, the operation of The Orange Restaurant will appear smooth and hassle free.

1.7   Conclusion

In this chapter, it is learnt that a Food and Beverage Decision Support System will be develop for The Orange Restaurant Sdn. Bhd. The "Waterfall" methodology will guides in developing this system. Phases include in this methodology are analysis, design, implementation, testing and maintenance. In the analysis phase, technique such as interview and by observation is the best way to get up most information for the system. While, object-oriented approach will be use in the designing phase. The main function in this program would be the decision support system.

CHAPTER II

LITERATURE REVIEW

2.1   Introduction

To facilitate the development of the system FBDSS, several case studies had been gathered from various resources such the internet, online journals, library books and others. The cases collected to be studied mostly are related to DSS approach implemented in different field of studies. Various researches had been done to look for some what similar system akin to FBDSS. In this Chapter 2, three case studies will be review/discuss in the area of methodology, models involve, outcomes and the reliability of the system.

The importance of reviewing other case studies is to realize its advantages and weaknesses. Thus, it can use as reference while developing FBDSS.

2.2   Facts and Finding

In this sub topic we will discuss on research done from the facts and findings. The facts and finding are divided into two categories which are Theory and Case Studies.

2.2.1   Theory

This section consists of two topics discussion, decision support system (DSS) and network architecture loacal area network (LAN). These two topics are chosen to be discuss here because it is related to the system that are going to be built, the FBDSS.

2.2.1.1 Decision Support System

Decision Support Systems (DSS) are a specific class of computerized information system that supports decision-making activities. DSS are interactive computer-based systems and subsystems intended to help decision makers use data, documents, knowledge and/or models to identify and solve problems and make decisions. Using an organizing framework defines in DSSResources.COM there is five major DSS types or categories:

    i)   Communications-Driven DSS

    ii)   Data-Driven DSS

    iii)   Document-Driven DSS

    iv)   Knowledge-Driven DSS

    v)   Model-Driven DSS

Decision Support technologies are changing rapidly and a great deal of innovation is occurring related to these types of systems. So, the proposed FBDSS is base on Knowledge-Driven DSS. A Knowledge-Driven DSS base on the FBDSS system means an intelligent system that contains information of foods and beverages. It will be able to make decision for the customer on foods and beverage orders based on information gather in the database which serves as the brain to the system. FBDSS will suggest certain combinations of foods from the menus which is the best choice to go around with the courses ordered by the customer. There will be also information or reason presented with the combination or menus so that the customer will understand the nature of the combination. In the end, after learning all the objective and appropriate of the menus combination, customer can make their decision wisely based on their taste and preferable choice.

2.2.1.2 Network Architecture

A local area network (LAN) will be use as the system network architecture in the restaurant. LAN is a network architecture design to connect computers in the same building. The LAN will include several workstations on the restaurant frontline

and cashier, kitchen and bar. A server will act as a database center to keep all the data/information entered.

As in definition, a LAN is a group of computers and associated devices that share a common communications line or wireless link and typically share the resources of a single processor or server within a small geographic area (for example, within an office building). Usually, the server has applications and data storage that are shared in common by multiple computer users. A local area network may serve as few as two or three users (for example, in a home network) or as many as thousands of users (for example, in an FDDI network). Major local area network technologies are:

    i)   Ethernet
    ii)   Token Ring
    iii)   FDDI (Fiber Distributed Data Interface)

Ethernet is by far the most commonly used LAN technology. A number of corporations use the Token Ring technology. FDDI is sometimes used as a backbone LAN interconnecting Ethernet or Token Ring LANs. Another LAN technology, ARCNET, once the most commonly installed LAN technology, is still used in the industrial automation industry.

Typically, a suite of application programs can be kept on the LAN server. Users who need an application frequently can download it once and then run it from their local hard disk. Users can order printing and other services as needed through applications run on the LAN server. A user can share files with others at the LAN server; read and write access is maintained by a LAN administrator. A LAN server may also be used as a Web server if safeguards are taken to secure internal applications and data from outside access.

2.2.2   Case Studies

There are three types of case studies being viewed to assist the development of FBDSS. The first case study is the Frontline Decision Support System which is designed for workforce development staff with the U.S. Department of Labor. Second case study is the Customer-Focused Decision Support at OpSource which focused on deploying best practices in account management and customer care operation. The third and the last case study is the Decision Support for Fire and Emergency Medical Services which discuss on Geographic Information System technologies.

i)   Frontline Decision Support System (FDSS)

The Workforce Investment Act (WIA) of 1998 emphasizes the integration and coordination of employment services. Central to achieving this aim is the federal requirement that local areas receiving WIA funding must establish one-stop centers, where providers of various employment services within a local labor market are assembled in one location. This arrangement is expected to coordinate and streamline the delivery of employment-related programs and to meet the needs of both job seekers and employers more effectively than did the previous arrangement.

Research to develop and pilot test a Frontline Decision Support System (FDSS) for workforce development staff in one-stop centers had been done with The U.S. Department of Labor co-operating with the W.E. Upjohn Institute for Employment. The goal of FDSS is to assist staff in quickly assessing and properly targeting services to customers. FDSS tools are being tested in new WIA operating systems in the states of Georgia and Washington. The study of this paper reports on the strategy, tools, and implementation efforts in the pilot states. FDSS is comprised of two main modules: