Perpustakaan SKTM

Disediakan Oleh :

Nama : Racheal Ebin Gon

No Matrik : WEK 000204

Penyelia : Professor Madya Raja Noor Ainon Zabariah

Raja Zainal Abidin

Project Moderator : Professor Madya Dr. Lee Sai Peck

Tajuk : Restaurant Customer Ordering System

University of Malaya

CONTENT

Restaurant Customer Ordering System

University of Malaya

TABLE OF CONTENTS

University of Malaya

CONTENT

University of Malaya

University of Malaya

University of Malaya

University of Malaya

ABSTRACT

SYSTEM CUSTOMER ORDERING SYSTEM

University of Malaya

Project Abstract

The project, which is to be undertaken, refers to the current restaurant system. Based on the current system, research and analysis is done to come up with a proposed system, which improves the business operations. The method used in this project will be Structured Systems Analysis and Design Method (SSADM), which is a standard approach to the task, techniques, and documentation of projects to be under taken. SSADM covers areas of analysis and the design solutions to major projects in an effective way of helping to understand how to apply computer techniques to the solution of problems where possible and to guide the project through testing, debugging and documentation phases until the final implementation phase has been achieved. By the use of this method, it is expected to help others understand the overall business environment especially in the restaurant business. This project highlights problems mainly in the area of the current customer ordering systems. Ways to improve this area will be the discussion in the documentation of this project. The overall project development must bring benefit and at a cost, which can be justified and agreed by the organization concerned. The system, which is to be developed, is the Restaurant Customer Ordering System (RCOS). The proposed system is intended to further improve business efficiency in the management and customer service. The overall idea of the proposed system came about after first hand experience and personnel observation of the current system which brought the idea to find ways to further improve the current system mainly concerning the customer service.

University of Malaya

Acknowledgement

RESTAURANT CUSTOMER ORDERING SYSTEM

University of Malaya

Acknowledgement

I am very grateful to all whom supported me through the completion of this project. I thank especially to God for giving me patience and wisdom to go through the tough hours of preparation of this project. Many thanks to my family and friends, whom have supported me through their help, support and guidance during the project development.

I would like to convey my special thanks to Assoc. Prof. Raja Noor Ainon Zabariah Raja Zainal Abidin , my supervisor at the faculty of Computer Science & Information Technology , University Malaya , for her helpful guidance and comments at various stages of this project development.

I would also like to take this opportunity to thanks Assoc. Prof. Dr. Lee Sai Peck The moderator for this project , for her suggestions and comments. I will not forget his kindness that he had gave during the project development and Viva stage.

University of Malaya

CHAPTER 1

INTRODUCTION

University of Malaya

1.1 Introduction of Project

Fast food restaurants have been the most popular place to get a bite to eat. It's popular for the reason that you can get your favorite food fast and easy. As time goes by the demand for such places has increased.

One of the drawbacks for fast food restaurants is that handling customer orders can be very stressful, especially during peak hours and when staffs are limited. The impact on customers is that they have to stand in long queues and at the end of it all having to find out there are no seats available.

In addition, a number of systems have been developed to handle such problems in the fast food industry. These systems, so far has been a great help for the management point, but there are certain aspects of drawbacks in such systems such as not user friendly in terms that the interface looks quite complex to the user and etc.

University of Malaya

1.2 Objective of the Project

The project that is to be developed and design is to tackle problems especially in handling *customer order* in such established fast food industries. By developing this system, it is intended to help not only the customers but also the management in terms of getting things done fast and efficient Customers will be able to make orders from their table without going through long queues and going through the hassle of finding a table.

1.2.1 Advantage of the project

- In terms of management, the process of ordering will be much efficient and faster.
- In terms of customer service, customers are able to order in a much more comfortable environment without the hassle they usually get when ordering.
- Staffs can concentrate more on getting the customers order done, then going back and forth dealing with the customers and getting their order done.
- Lack of staff especially during peak hours to handle customers can be dealt with as not much staff is required to handle customer order.
- Unlike other current systems being used in the market, it is much more user friendly and concentrates more on the customers point.

University of Malaya

1.3 Scope of Project

This project will develop a system that is intended not to help not only The customers but also management in terms of getting things done fast and efficient. This project highlights problems mainly in the area of the current customer ordering systems.

1.4 Project Schedule

The purpose of project schedule is to ensure the development is completed At a fixed time besides that , project schedule also states the date frame of each activity , which is the date frame of each activity , which consist the start time and the finish time of a certain activity.

Table 1 shows the Gantt chart of the schedule of this project :

University of Malaya

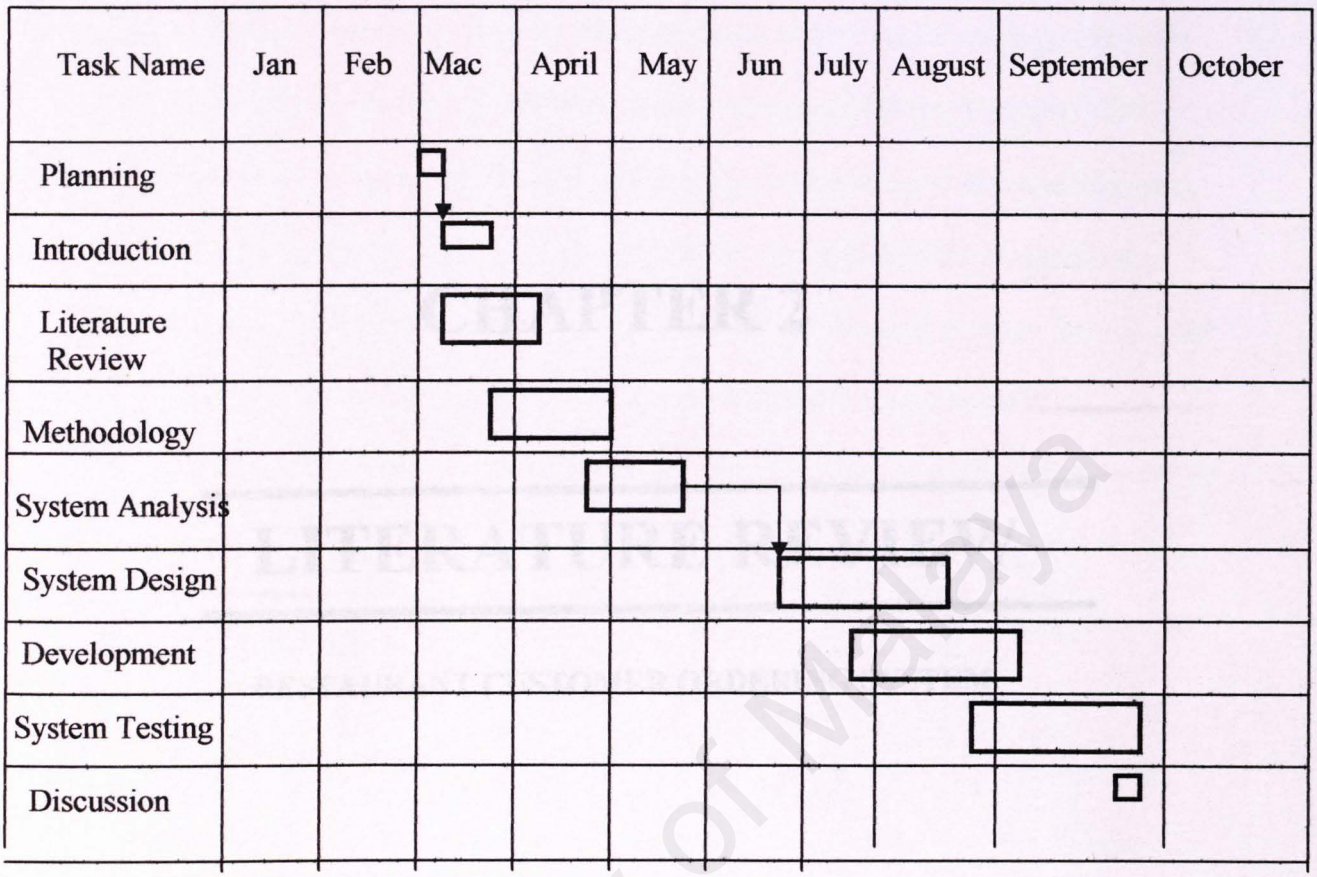


Figure 1.1 Project Shedule

University of Malaya

CHAPTER 2

LITERATURE REVIEW

RESTAURANT CUSTOMER ORDERING SYSTEM

University of Malaya

2.1 About Literature Review

Literature review is an activity where research is done on the background study about the knowledge and information gained in developing this project. The purpose of carrying out literature review is to have a better understanding about the development tools used to develop this project and also the programming language for example Visual Basic , Active Server Pages and others. Besides that literature review can help to obtain a better skill on the development methodologies used while developing a project. It is important because it gives an overview of steps for information gathering before going to other phases such as system design and analysis , system implementation and others. In this case , it requires studying the background of project , comparison of other system , marking down details of going to be system and analysis of the enhancement probability. It also requires researching from other people's research , electronic research , journals, books and personal observation.

University of Malaya

2.2 Overview of Fast Food Restaurant

Mcdonald

It all started with the McDonald brothers : Maurice and Richard. In 1940, The brothers decided to open a small drive-in restaurant , because the only Business that they had seen succeeding in the current economy was a little Hot-dog stand. To their own surprise their business was an instant success , Making $40,000 profit in its first year. Desiring greater speed in serving Customers , the brothers shut the store down for a few months to restructure the store.

The first McDonald's

The first step was getting rid of all the car shops. Next , the menu was cut down From 25 items to 9 , which mostly consisted of hamburgers. They replaced their old grills larger, more efficient kinds. The plates and silverware was replaced by paper , taking away the need for a dishwasher and constant replacements. The size of burgers was cut down , and the workers , not the customers , put the condiments on the burger. In an effort to increase speed and efficiency more , the McDonald brothers ordered 8 milkshake machines that made 5 shakes at the same time , from a man named Ray Kroc. Intrigued by a business that would need so many milkshake machines , Kroc decided to franchising for McDonald's and offering them a percentage of profits in return .Eventually , the brothers simply sold the business (for much less than they could have asked for) and go out. Ray Kroc made some of his own changes , by changing the size of in diameter. The fat content was between 17 and 20 percent . He demanded his employee's cleanliness

University of Malaya

and exact uniforms.

2.2.1 Basic rules for operating a fast food restaurant

Automation : a self-activating operation or control of a process , equipment , or system and is totality of mechanical and electronic techniques and equipment used to achieve such operation or control . Fast : acting , moving , or capable of moving quickly , swift , and accomplished in relatively little time : it is expeditious, which combines the senses of rapidity and efficiency . Use of paper products and plastic wraps keeps labor cost down : pre-sliced cheese , packs of jellies and ketchup . Getting the customer to do the work. A limited menu restricted to items with a short Preparation time would make fast service possible and would also be useful in streamlining operations.

Fast Food :

1 utilization of time-saving equipment : microwave , postmix beverage dispensers

2 Utilization of labor-saving equipment : ware washers , automatic potato peelers and automatic coffee brewers.

3 Utilization of self-service devices or methods to reduce labor overhead : vending machines , cafeteria systems, buffet tables

The causes of a system not meeting its anticipated goal :

1 Poor working conditions.

2 Poor employer-employee relations.

3 Poor employee-employee relations.

4 Lack of teamwork

5 Snags in production

6 Lack of adequate and simplified instructions.

7 Not enough equipment

8 Poor safety procedures

9 Poor sanitation procedures

10 Unnecessary movement of materials

11 Ineffective use of workspace and equipment

12 Poor and ineffective communication

13 Out of stock or inventory conditions, resulting in frequent menu changes

14 Frequent breakdown of equipment , lack of preventive maintenance

15 Equipment too complicated to operate .

16 Equipment controls are inaccessible or too difficult to manipulate.

17 Equipment poorly displayed or deployed.

To make the employee happy , improve :

- Illumination
- Noise discomforts
- Décor and color planning
- Temperature comfort factor
- Designing for employee's comfort

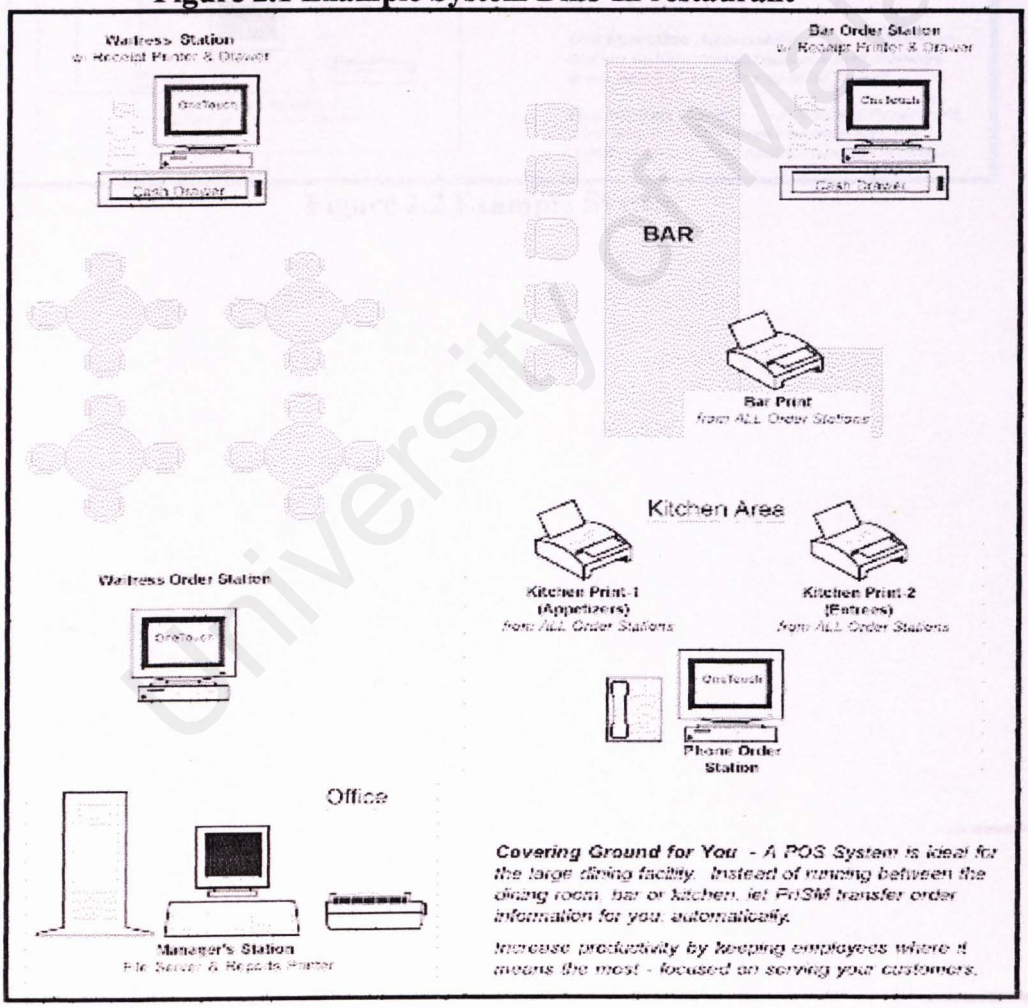
University of Malaya

2.2.2 An Example of one fast food restaurant

Pizza Restaurant

Backed by over a decade of customer driven innovation , Microworks PrISM Onetouch Tm POS offers an ideal solution for pizza delivery , restaurant management and franchise Foodservice. Complete with detailed sales reporting , inventory controls , food cost and Labor cost analysis, this Microsoft Windows 2000 based system features simple intuitive Touch screen ordering for table-service , delivery , carry-out and catering. Simple Affordable – Touch Screen Pizza Delivery and Restaurant Management Solutions

Figure 2.1 Example System Dine-In restaurant



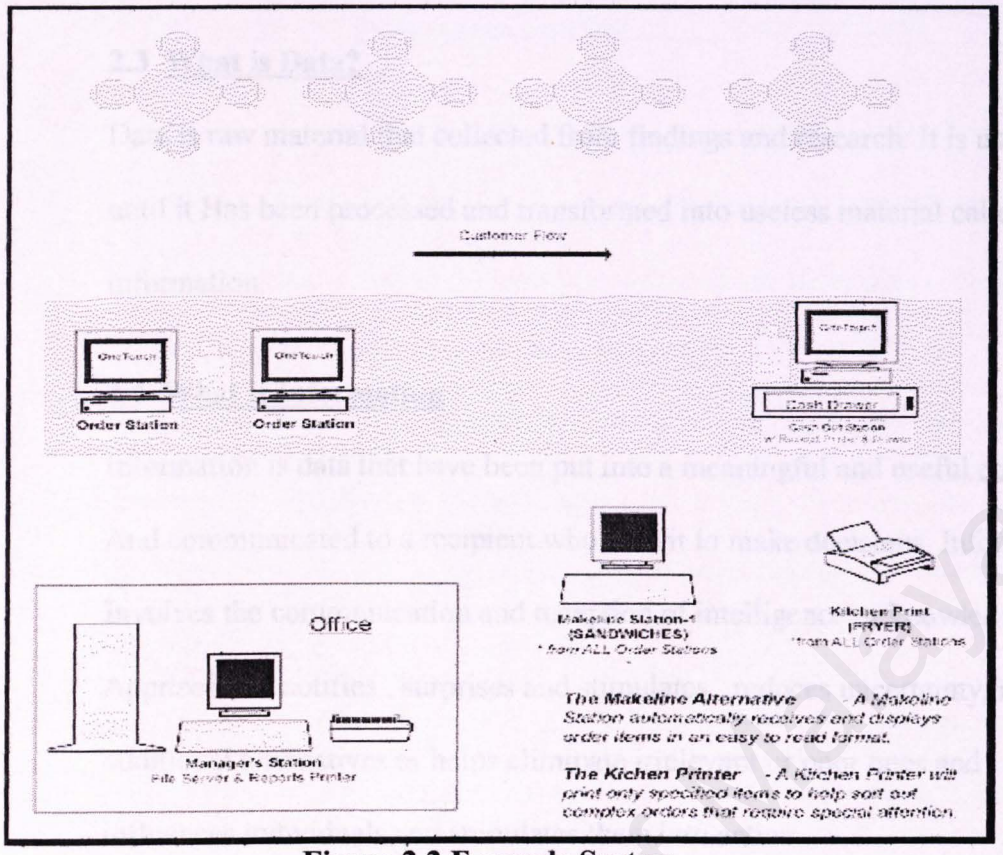


Figure 2.2 Example System

University of Malaya

2.3 What is Data?

Data is raw material that collected from findings and research. It is useless until it Has been processed and transformed into useless material called information.

2.4 What is Information

Information is data that have been put into a meaningful and useful context And communicated to a recipient who uses it to make decisions. Information Involves the communication and reception of intelligence or knowledge. It Apprises and notifies , surprises and stimulates , reduces uncertainty, reveals additional alternatives or helps eliminate irrelevant or poor ones and influences individuals and stimulates them into action.

2.5 What is Computer Network?

A computer network is a collection of computers that communicate with One another using a standardized protocol. Some network are public ; Anyone can utilize the network by paying a fee to a vendor who will Provide access (or like students, by joining an organization that has Already paid to have access). Other network are private . With these , only Users who are preauthorized to connect to the network can gain access.

University of Malaya

2.6 Description of the Current System

The Fast food restaurant business has been traced back to the early 1950's where it was first started. At that time, one of the first pioneers of the fast food restaurant, is Ray Kroc a fifty-two-year-old milk-shake machine salesman who saw a vision of a massive new industry: fast food.

He revolutionized the restaurant industry by incorporating the production of hamburgers, french fries, and milk shakes. Ray Kroc developed a sophisticated operating and delivery system which in turn made McDonald's the brand name that defined American fast food.

Now in modern days, fast food restaurants have been one of the major spots where people loved to dine. In has been a turning point for the fast food industries, and because of this the demand for such places has been increasingly high. People go to these fast food restaurants to take there breakfast, lunch and dinner because of its fast service and convenience.

So far, the ordering process of these fast food restaurants have been the same which is the customer will line up at a counter, make an order, staff then prepares the order and deliver the order to the respective customers who then will go to any available seats in the restaurants. Customer are also given the choice to have a 'take-out' if they wish not to have breakfast, lunch or dinner at the restaurant.

University of Malaya

Below shows the customer ordering process in much detail:

- Staff greets the customer and ask customer if they wish to take-in or take-out.
- If the customer wishes to take-in or take-out then the staff shows the menu and customer makes an order.
- Staff then keys-in the order details and confirms the order details again to the customer.
- Once confirm, the order details is sent to the kitchen staff to prepare the order. Once the order is prepared, the staff request payment from the customer.
- Customer makes payment, and staff then gives the receipt to the customer.
- Customer who wish to dine-in, then finds an available seat to dine.

Below shows the basic management operation process in the restaurant:

- The restaurant will have a number of different staffs who will perform different levels of task within the restaurant. Usually these staffs are as follows:
    - **Cashier :** Handles customer order and prepares order.
    - **Lobby :** Handles cleanliness of the restaurant
    - **Supply base :** Prepares the order
    - **Cook :** Cooks the food
    - **Trainee :** Handles customer and basic operation in the restaurant.

University of Malaya

- **Chief supervisor :** Manages the staff and basic operations in the restaurant.
- **Assistant restaurant manager :** Helps the Restaurant manger in the whole operation in the restaurant.
- **Restaurant manager :** Manages the restaurant.

➢ Every staff in the restaurant works as a team rather than individually as this will help the restaurant operations moves smoothly and efficient.

➢ The assistant manager will do a stock check to see if they are low in certain products. Stocks that are low must be re-ordered as soon as possible to ensure sufficient supplies. This process will be on a day-to-day basis.

➢ Maintenance check is done regularly to ensure all restaurant equipments are in perfect working order. Maintenance is usually done by maintenance agencies hired by the restaurant.

The restaurant manager will usually handle the accounts of the restaurant with the assistant manager. A report is also done after a period of time to check the sales of the restaurant, highlight problem areas and ways to improve the efficiency of the overall operation in the restaurant.

University of Malaya

2.7 Problems with the Current System

So far many fast food restaurant that have been establish , have implemented to their current system with the latest technology to improve their management and customer services. This due to the increasingly high demand and changing environment we live in today.

For those restaurant , which are not implementing these new technology this Is only because they feel that the cost of setting up such an idea may be costly. Based on research that have been done , there have been a major decline in the Prices of hardware's software's and other restaurant equipment over the year.

Based on the investigation and fact-finding done , many restaurant have Implemented systems that have help a great deal to the management but not much on the customer's point.. Customer satisfaction is very important because without them there will be no restaurant business in first place. Today , because of high demand of such fast food restaurant , many people rush in everyday to these restaurant to dine. In many cases , there will be a situation where by the customer waits in a long queue , make an order and finally finds out there are no seats available. This situation is best seen in areas where the population is high , and working areas , in this case working people who need to take there lunch fast and go off to work. In this sense , the restaurant current system helps them in getting things done fast and efficiently , but when the number of people who dines are many , problems arises especially directed to the customers. This is not what it seems when customers satisfaction its suppose to be the number one priority of such restaurant business.

University of Malaya

There are also a number of other relating problems in the current system of the Restaurant business which are highlighted below :

- Customer ordering systems that are available in the market nowadays, are Usually complex in the sense of the user interface is not user-friendly.
- Handling customer order and preparation of the order is done usually by the same staff , which causes delay.
- Customer have to wait in long lines especially during peak hour, which makes it Inconvenient for them.
- Limited staff to handle customer order and preparation of the order , which gives Lot of pressure to the available staff especially during peak hours
- Much training must be given to the staffs so they are able to handle the current system efficiently.

University of Malaya

2.8 OVERVIEW OF FEATURES AND CAPABILITIES (Proposed System)

The system runs on IBM PC compatible machines (open architecture).

RCOS interfaces with touch screens as this is the most convenient t for customers to interact with.

Easy to Use: RCOS is designed to be a user friendly system which makes it easy to use. The customer interacts with RCOS through function keys (touch buttons) and pop-up menus. All RCOS screens, menus and options are self-explanatory and require minimal training. RCOS includes help functions, where by the user simply presses the designated "HELP" key and detailed instructions appear in a special help window.

PC Based (Open Architecture): Because RCOS runs on IBM PC compatibles, managers benefit from LOW hardware and maintenance costs. Orders are displayed at once at the kitchen screen terminal where a single staff will monitor orders and notify kitchen staff to prepare the order. Orders are maintained in a sequence. When an order is complete, it is cleared from the screen and all subsequent orders are advanced forward in the queue (**first come first served basis**).

Takeout

For takeout orders, a single touch screen terminal will be placed to serve the customers.

University of Malaya

Item Correction

If a customer accidentally entered food and beverage, orders can be easily changed or deleted before sending orders to the kitchen.

Menu

Each terminal at the tables will show customers a variety of foods and beverages which the restaurant has to offer. Foods and beverages are group and categorized according to their type which makes easy selection by the customers.

Network

The whole system will have a private network in place to connect all devices and hardware such as touch screen terminals, printers and ect.

University of Malaya

CHAPTER 3

METHODOLOGY

University of Malaya

3.1 About Methodology

Methodology is a detailed description about the method used in doing the research For this project , so that when problems arise , quick solution can help to guide the project back on track.

3.2 Approach

Information are gathered in these following approach in order to know more about the system that is develop :

- Books – information through the books are more reliable for knowledgeable and trusted authors that are experienced write about developing a system .Books are also used as a guide and reference.
- Search Engine – Finding information through search engines benefits a lot Because it saves time. It is also faster and easier because users only have to type in the key word at the search function in order to display the list of Results matching the key word.
- Existing thesis – Existing thesis located at the faculty library sent in by Seniors are referred to know the procedure of building a system and also To refer to the arrangements of the contents.

University of Malaya

3.3 Software Process Models

When producing a product , sequence of steps are to be followed to accomplish A set of tasks. The task are usually performed in the same order each time. A set ordered task is called a process a series of steps involving activities , constraint and resource that produce an intended output of some kind.

A process usually involves a set of tools and techniques. When the process involves the building of some product , we refer to the process as a life cycle . Processes are important because they show consistency and structure on a set of activities. The process structure guides our actions by allowing us to examine , understand , control and improve the the activities that comprise the process. Processes are also important for enabling us to capture our experience and pass them along to others. In the same way , we want to learn to produce high-quality software and follow a software development process so we can be understand , control and improve what happens as we build products for our customer . The software development stages are :

- Requirement analysis and definition
- System Design
- Program Design
- Writing the program
- Unit testing
- Integration testing
- System Testing
- System delivery

- Maintenance

Each stage is itself a process that can described as a set of activities. And each Activity has constraints , such as a budget and schedule for producing the Requirements document , and standard about the kinds of requirements to include To include and perhaps the notation to express them.In order to work out system development software , processes have to be modeled to be modeled to make developers understand the progress of the development . There are several reasons for a modeling process :

- To form a common understanding of activities , resources and constraints Involved in software development.
- Helps the development team find inconsistencies , redundancies and Omissions in the process and in its constituent parts. As these are corrected , the process become more effective and focused.
- It reflects the goal of the development . With its existence , the development team would not wander away from the main goal.

University of Malaya

There are 7 processing models :

- **Waterfall Model**
- **Waterfall Model with Prototyping**
- **V Model**
- **Prototyping Model**
- **Operational Spesification**
- **Transformation Models**
- **Phased Development : Increments and interations**
- **Spiral Models**

Among the seven models , I choose the Waterfall Model with Prototyping

University of Malaya

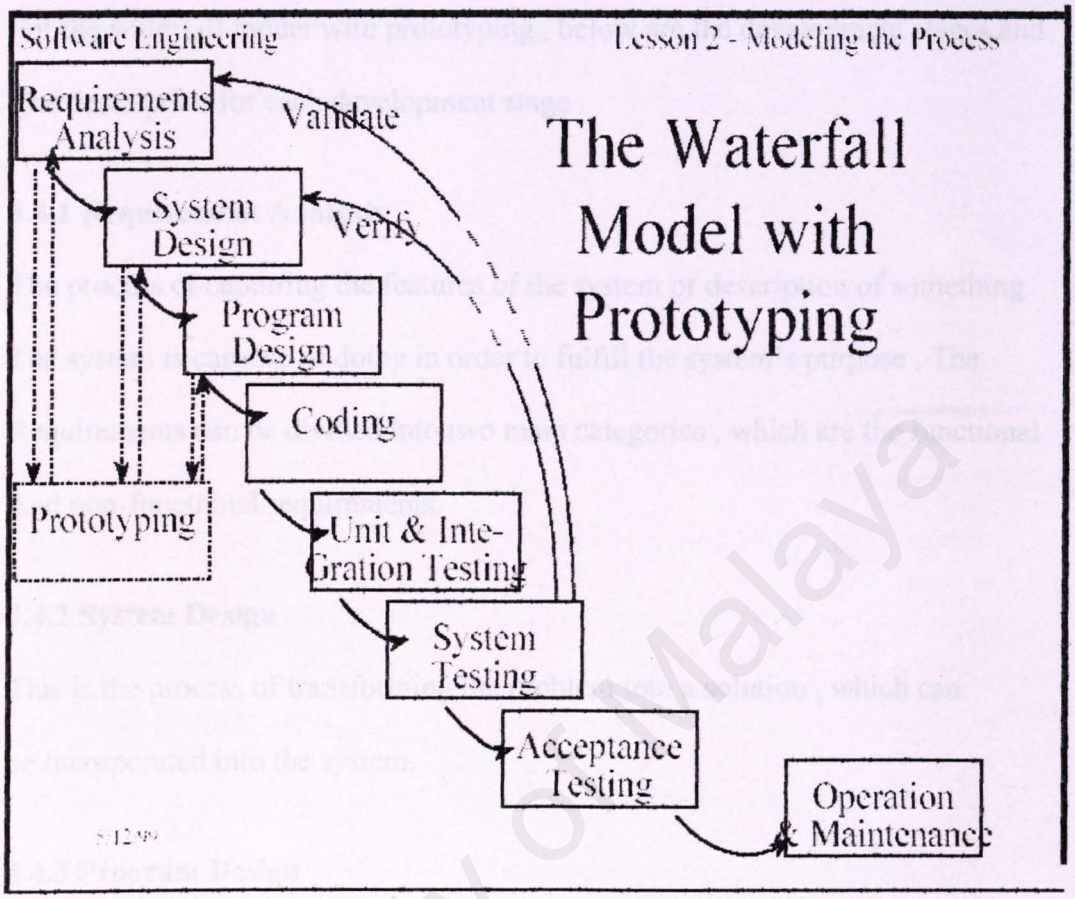


Figure 3.1 The Waterfall Model with Prototyping

University of Malaya

3.4 Software Development Stages

For the waterfall model with prototyping , below are the development stages and The description for each development stage :

3.4.1 Requirement Analysis

The process of capturing the features of the system or description of something The system is capable of doing in order to fulfill the system's purpose . The Requirements can be divided into two main categories , which are the functional And non-functional requirements.

3.4.2 System Design

This is the process of transforming the problem into a solution , which can be incorporated into the system.

3.4.3 Program Design

This is the process of transforming the system into a programmable Structure such as decomposing the system into several modules and later Transforms into algorithm

3.4.4 Prototyping

This is part of the process of continuous developing a quick and rough Version of desired or parts of that system this stage is important especially In developing a suitable user interface that meets the user requirements especially for the catalogue views.

University of Malaya

3.4.5 Coding

This is where the program design is realized as a set of programs codes.

3.4.6 Unit and Integration Testing

Each program unit or modules are tested independently . Then , several Modules are combined and tested to ensure integration capability.

3.4.7 System Testing

All the modules are combined to form the whole system and then it is tested In its actual or similar environment when system is implemented.

3.4.8 Verify and Validate

Validation is carried out to ensure that the system has implemented all of the Requirements , so that each system function can be traced back to a particular Requirements in the specification where it makes sure that the developer is Building the right products. Whereas verification ensures that each function Works correctly where it checks the quality of the implementation.

3.4.9 Acceptance Testing

This is part of the stage that actual user is given the opportunity to use the System. The purpose is to enable the users to determine if the system really meets their need and expectations.

University of Malaya

3.4.10 Operation and Maintenance

The system is ready to be implemented. This includes the training of users To use the system. System maintenance and enhancement are carried out to meet new requirements.

3.5 Waterfall Model with Prototyping Development Method

This models is an approach to enable client to have a preview of the System from the quick design and the prototype developed early in the Process. Designer's can revise forms , input screens , database and processing Methods which can then be submit to a limited number of system and users For testing , and then later be revised for necessary final design.

With the usage of this model , users or those who are handling the project Can add or refine requirements and specification to the system at the Beginning step. The complexity of an error is low because the prototype Enables the developer to detect any deficiency . Each state of development Will enforce discipline ; the system will be deliverable with documents by Developer. Validation and verification will be done during system testing. System can be traced back to a particular requirement in the specification.

University of Malaya

3.5.1 Reasons using Waterfall Models with Prototyping

Below are the reasons for choosing this models :

- Enables an earlier change in development , because this method depends On feedback from customers.
- Provides communication basis for discussion among the groups involved In the development process, between users and developers.
- Provide common understanding between users , customer and developer.
- Cost to build a prototype is relatively less than building a fully working Application.
- Easy to explain to those who are not familiar with system development.

3.6 Summary

Even though the real life situation for a development stage is depends On one another , I choose the waterfall model with prototyping Because of the presence of using prototyping to make information Gathering more easier to understand . Besides that , by verification and Validation , System could be analyzed again to make sure that the product Later reach the needs of the customer

University of Malaya

CHAPTER 4

SYSTEM ANALYSIS

University of Malaya

Analysis System

4.1 Introduction

System analysis is closely tied up with what's known as software engineering. Software Engineering is the term now often used to denote a whole cycle of Software development being made up of the analysis, testing , debugging and Documentation phases.

System analysis deals with the problem of helping us to understand how to Analyze and design general solutions to major projects in an effective way. It also helps us to understand how to apply computer techniques to the Solution of these problems if possible , helps to manage teams of people Who are working on particular projects and to nurture the projects through Testing , debugging and documentation phases until the final implementation Phases has been achieved.

The system analysis phase does not end completely as customers expect continued support for expensive product purchased , so the job of the analyst and software engineers is to ensure that the software and hardware can change to meet the ever growing needs of the customer as time progresses.

University of Malaya

4.2 Definition requirements and specification

The definition of requirements is writing a document where customer can Understand the developing system and a complete list of what the user Expect. Specification requirements in the other hand means the technical Definition for developing the system design.

4.3 Developer Skills

As developer they have to prepare themselves by having some skills and a wide knowledge about multimedia tools and software so that they can have a good communication with their customer and also a good choice of selecting a tools.

4.4 Suitable

The system that we will be developing should be easy to change and use for Doing the works.

4.5 Easy designing of interface

The design of the interface should be easy to understand and use for Customer. The layout , position , color and writing is important for making A good interface.

University of Malaya

4.6 Preliminary Study

Introduction

The preliminary study plays a crucial part in the development of any system. At this stage, the analyst through what is referred to as investigation carries out findings and analysis of the current system.

Based on the analysis and fact finding, the analyst will then produce a report of the current system. In this report, the analyst must highlight problem areas, which affect the smooth running of the organization and further on come up with a solution to tackle the problem and improve the efficiency of the organization. One of the major drawbacks in conducting the investigation of the current system is the perception. A certain situation may be perceived by one person differently from another, and because of this, the task which the analyst must undergo is often difficult. The first step in the investigation stage, is to study the background information of the areas which is to be investigated. Having done so, the analyst is then ready to continue with the investigation. There are a number of methods to which the analyst can use to collect information. These methods are:

- Observation;
- Record searching;
- Special-purpose records;
- Sampling;
- Questionnaires;
- Interviewing.

University of Malaya

Observation. There are 2 types of observation, which are formal and informal.

Formal observation is an observation done to a specific operation or procedure for a specific period of time. By using formal observation, the analyst is able to understand better the clerical or manual operation done in the organization. This technique can also be used to trace problem areas in the system.

Informal observation is better used at all time especially when investigating user operation. During investigation, the analyst must be alert at all times of every little detail relevant to the investigation. Detail in the sense of the layout, tidiness, noise, lighting, behavior of the staffs and so on.

Record Searching. This relates to quantitative information such as volume, frequencies, trends, seasonality and ratios. To obtain such a record is to do a record search which in turn will help confirm any estimates provided by a manager or staff of that particular organization being investigated.

Special –purpose records. The use of record searching may not find all quantitative information needed. Alternative ways of collecting information are by taking a photocopy or carbon copy of a document or by making a mark in a special column added to an existing form. It is better if the information collected for as short a time as possible to obtained the required information.

University of Malaya

Sampling. There are 2 type of sampling, which is statistical sampling and activity sampling.

Statistical sampling can include timing parts of the work, e.g. the time taken to process a document. By the use of this method it can confirm management or user estimates and verify information given at interviews. The analyst should be well trained in statistical analysis before coming up with conclusions based on samples. It should also be known that these samples are completely representative and results from a non-representative sample could be disastrous.

Activity sampling is when the state of an activity is observed at a predetermined times. The observation is done randomly so that those involved in the operation would not know when they are observed. By using this method, it is possible to get an estimate of documents or activities much more accurately.

Questionnaires. Two major problems with questionnaires are:

- Designing them so that they may be completed easily and accurately
- Getting them filled in, in sufficient numbers to make the effort worthwhile.

Many people do not wish to spend their time filling forms unless there is some good reason to complete it. If similar information is needed from a large number of respondents then this method should be used. The analyst at this point must be sure that if this method is to be used then the purpose, the respondents, their level of understanding, intelligence and interest and the timing must be well aware and

clear to the analyst. A questionnaire can be designed to be completed by the people who is to be interviewed which in turn saves time.

Interviewing. By using this method the analyst can communicate with users from all levels and provide an opportunity to listen to what their view is of the existing system. Observation can also be done coherently with the interview process. When conducting an interview it must be well planned. It requires a great deal of interviewing skill because if done poorly the result will be also poor. Poor result from an interview is because of the breakdown in communication with the analyst and the users.

4.7 User and System Requirements

During system analysis, we gained a clearer understanding of the reasons for developing a new system. The scope of system analysis is defined. We interview prospective users and work with the users to identify and highlight problems and finally define user requirements.

User are the people who employ and interact with the information system to perform tasks. Referred to sometimes as the end user, they are differentiated from systems professional that develop, manage, operate and maintain the information system. User falls into the following types:

University of Malaya

- ***Novice User*** – These user have no syntactic knowledge about computers and software. Also, *Novice User* typically know little about assigned tasks. Generally, they are extremely nervous about making embarrassing mistakes. They have trouble in differentiating between what is critical and what is trivial. Novices are reluctant to ask for help. Lacking the vocabulary to express their question.
- ***Occasional User*** – These users know how to work with the system at one time, but because of frequent use, *Occasional Users* have forgotten essential commands and procedures. They will accept only a limited amount of initial training and are intolerant of paper-based software documentation. They impatient with precise and formal computer terms.
- ***Transfer User*** – They already know how to work with systems, *Transfer Users* are simply trying to transfer what they already know to a system.
- ***Expert User*** – These people understands how to work with the new system as well as most other systems. *Expert Users* are intolerant of any procedures or instruction that waste their time. Their chief demand is fast response time. They like shortcuts, macro commands and abbreviations.

After identifying the user requirements for the system which is to be developed, the process of identifying the system requirements is done. The identification of of the system requirements are done based on analysis techniques such as the use of DFDs, ELHs and ERDs. If all the system requirements have been agreed with the user, the designer work should be to outline in detail what the new system is required to do. Contained in the system requirements outline should be all the desirable features of the new system, although not all will

necessarily be included in the installed system, as some features may not be cost-justifiable.

4.8 Cost and Benefit Analysis

The cost and benefit analysis is done to give an estimate to the organization to what extent of cost is required to develop, implement and in the ongoing maintenance of the system. The analysis should identify and outline the benefits of the proposed system to the organization. The cost of the overall development of the system should be at a cost, which the organization can justify and agree.

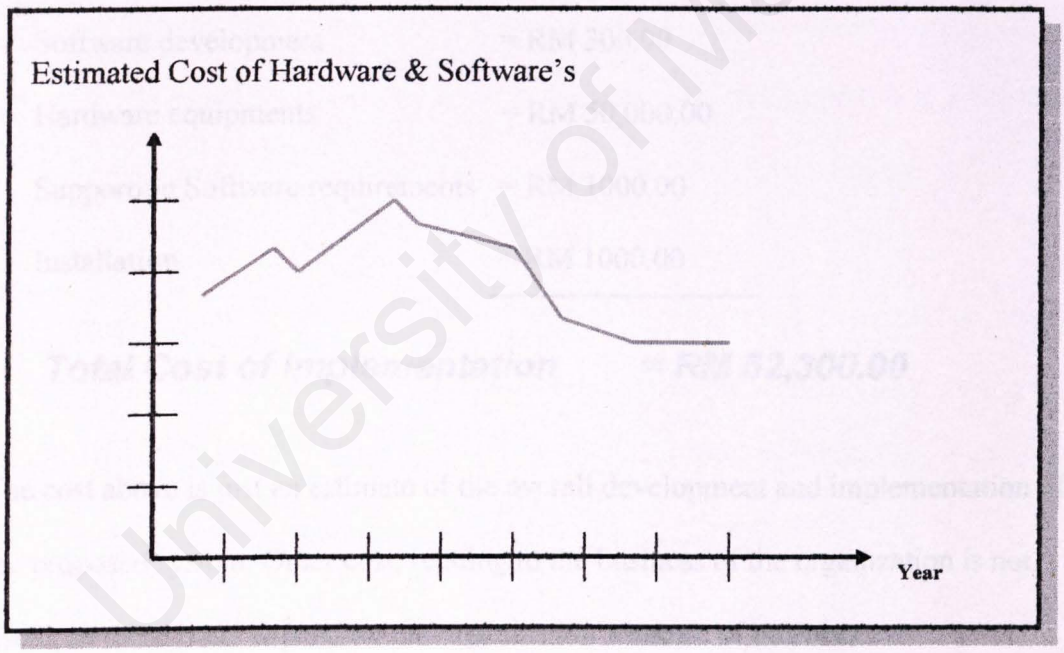


Figure 4.1 Estimated Cost of Hardware and Software's

University of Malaya

Figure shows the estimated cost of hardware and software's through the year. Based on this estimated figure, we can say that there is a certain decline in the cost through the year. Due to the decline in cost, the purchase of such hardware and software would be cheaper maybe in the near future, which in turns make maintenance not as costly as expected by some restaurant managers. During the interviews with some of the restaurants managers, it came to the attention that the cost would be the main drawbacks of implementing the proposed system, even though the idea of such a system would give many advantages to the organization.

For the development of the RCOS system the estimated cost are as follows:

Software development	= RM 300.00
Hardware equipments	= RM 50,000.00
Supporting Software requirements	= RM 1000.00
Installation	= RM 1000.00

Total Cost of Implementation = RM 52,300.00

The cost above is just an estimate of the overall development and implementation of the proposed system. Other cost, relating to the business of the organization is not listed, as these costs depend on the organization's nature of business.

University of Malaya

Below shows the benefits of introducing the proposed system:

- In terms of management, the process of ordering will be much efficient and faster.
- In terms of customer service, customers are able to order in a much more comfortable environment without the hassle they usually get when ordering.
- Staffs can concentrate more on getting the customers order done, then going back and forth dealing with the customers and getting their order done.
- Lack of staff especially during peak hours to handle customers can be dealt with as not much staff is required to handle customer order.
- Unlike other current systems being used in the market, it is much more user friendly and concentrates more on the customers point.

In conclusion to the cost and benefit analysis, even though the overall cost may be high for some restaurants to implement the system such as proposed, in the long run of the business, it would prove to be cheaper and improve overall efficiency of the business operations.

University of Malaya

CHAPTER 5

SYSTEM DESIGN

University of Malaya

System Design

5.1 Introduction

Once the system analysis stage has been done, the design of the new system takes place. This is where the designer must take account of what has been specified by the user requirements and produce a good, workable physical design of the new system being proposed.

The designer seldom has much power to control the type of user destined to operate the system. It is essential, therefore, that they find out as much as possible about the inevitably changing population in order to design the system or the dialogue which may will be practical throughout the life of the system. Therefore the new system must have a good system design in the sense of :

- Flexibility
- Control
- Performance

5.1.1 Flexibility

The term flexibility here refers to questions such as is the system easily modified for future changes? How easy will it be to track and amend problem and errors? If the system can not in any way be flexible then the cost for maintenance can be surprisingly high.

University of Malaya

5.1.2 Control

Human errors, machine malfunction or deliberate misuse is usually the main threats to a system. Every system usually contains a data which is extremely sensitive in nature and such data must be protected at all cost from the threats mentioned above. Some type of control is needed to control how data is to be used to ensure the integrity of these data.

5.1.3 Performance

Performance here refers to how fast is the system able to perform task required by the user. Performance can be measured in terms of:

- ***Throughput*** - The number of transactions processed in a certain time.
- ***Run- time*** – The time taken to run a particular program in batch systems.
- ***Response time*** - In an interactive system, this is the time taken for the first character of a response to appear at a terminal, measured from the time when the 'return' key is pressed.

University of Malaya

Under the system design stage we will look at 7 main headings which brings to the overall process of the system design stage in this project. These headings are as follows:

- Screen Design;
- File Design;
- Form Design;
- Program Design;
- Network Design;
- Security Design;
- Hardware and Software Requirements.

University of Malaya

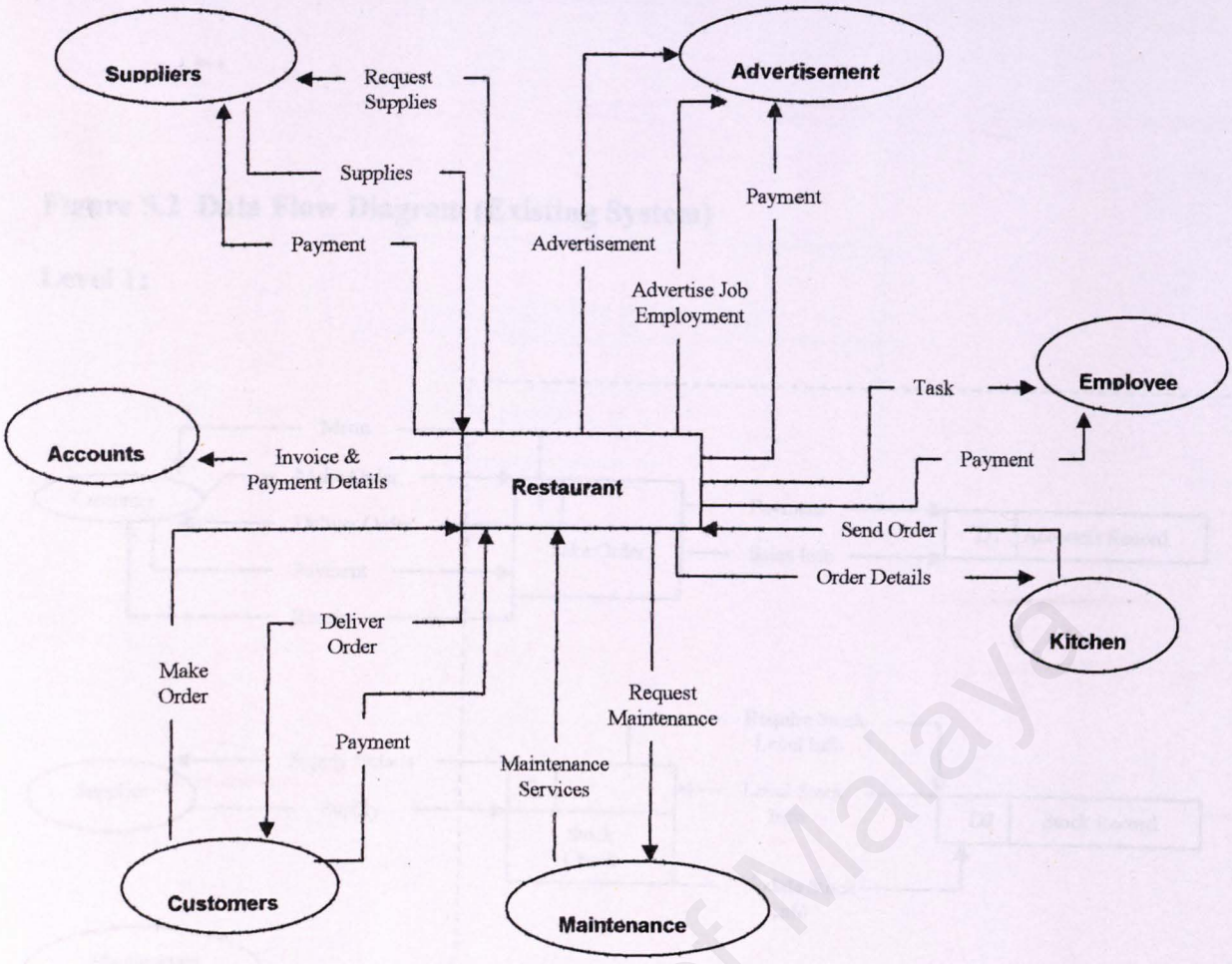
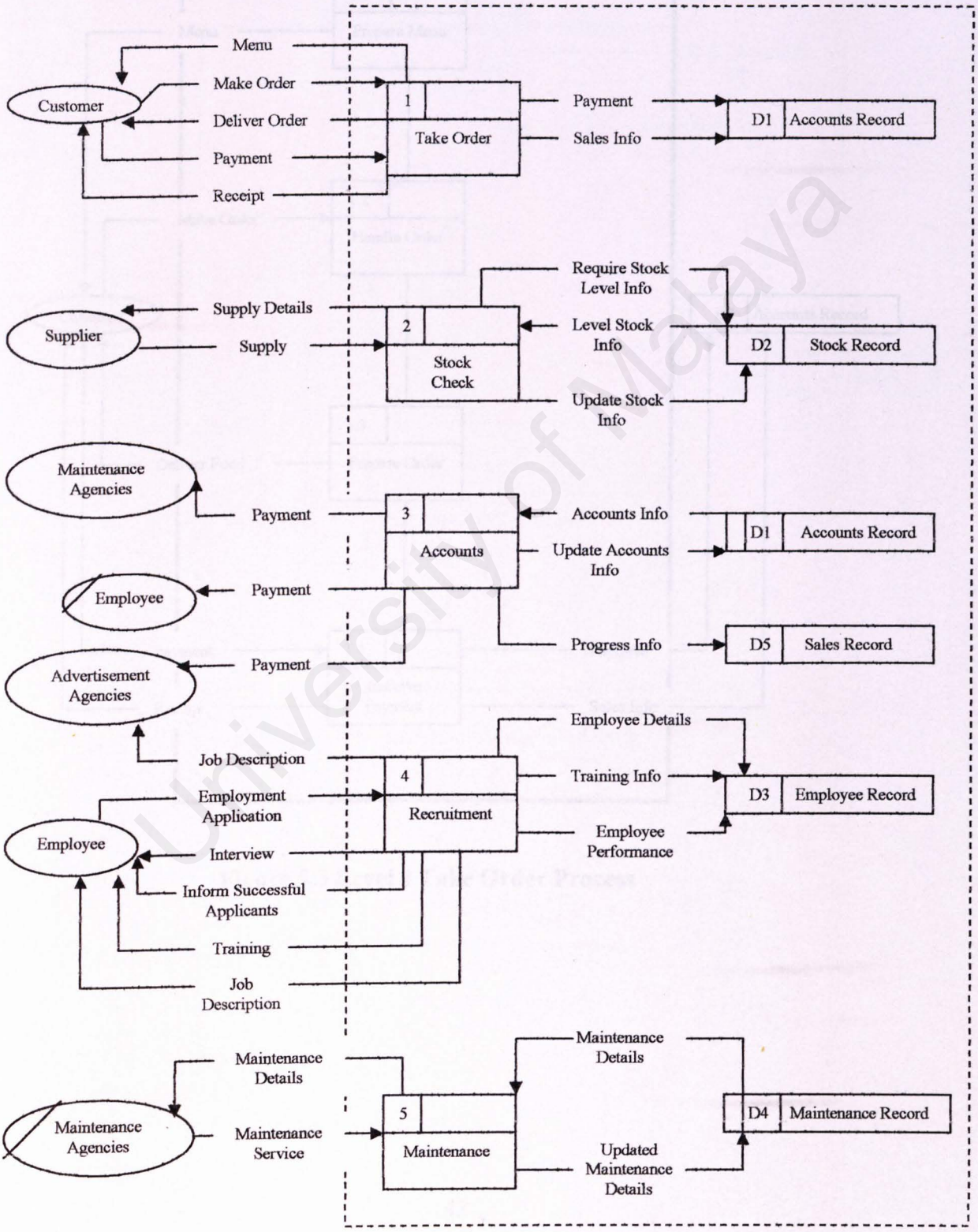


Figure 5.1 Context Diagram (Existing System).

University of Malaya

Figure 5.2 Data Flow Diagram (Existing System)

Level 1:



University of Malaya

Level 2 :

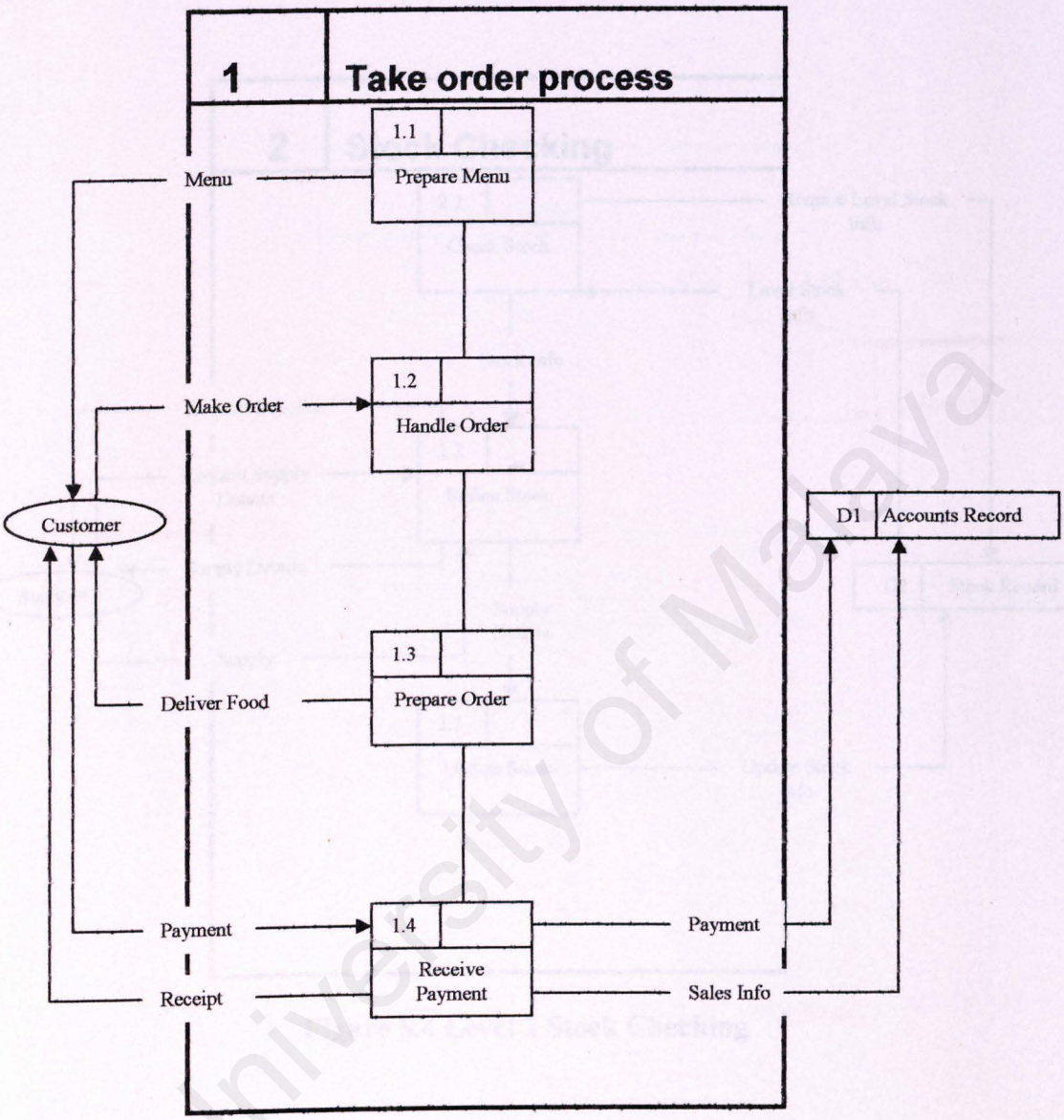


Figure 5.3 Level 2 Take Order Process

University of Malaya

Level 2 :

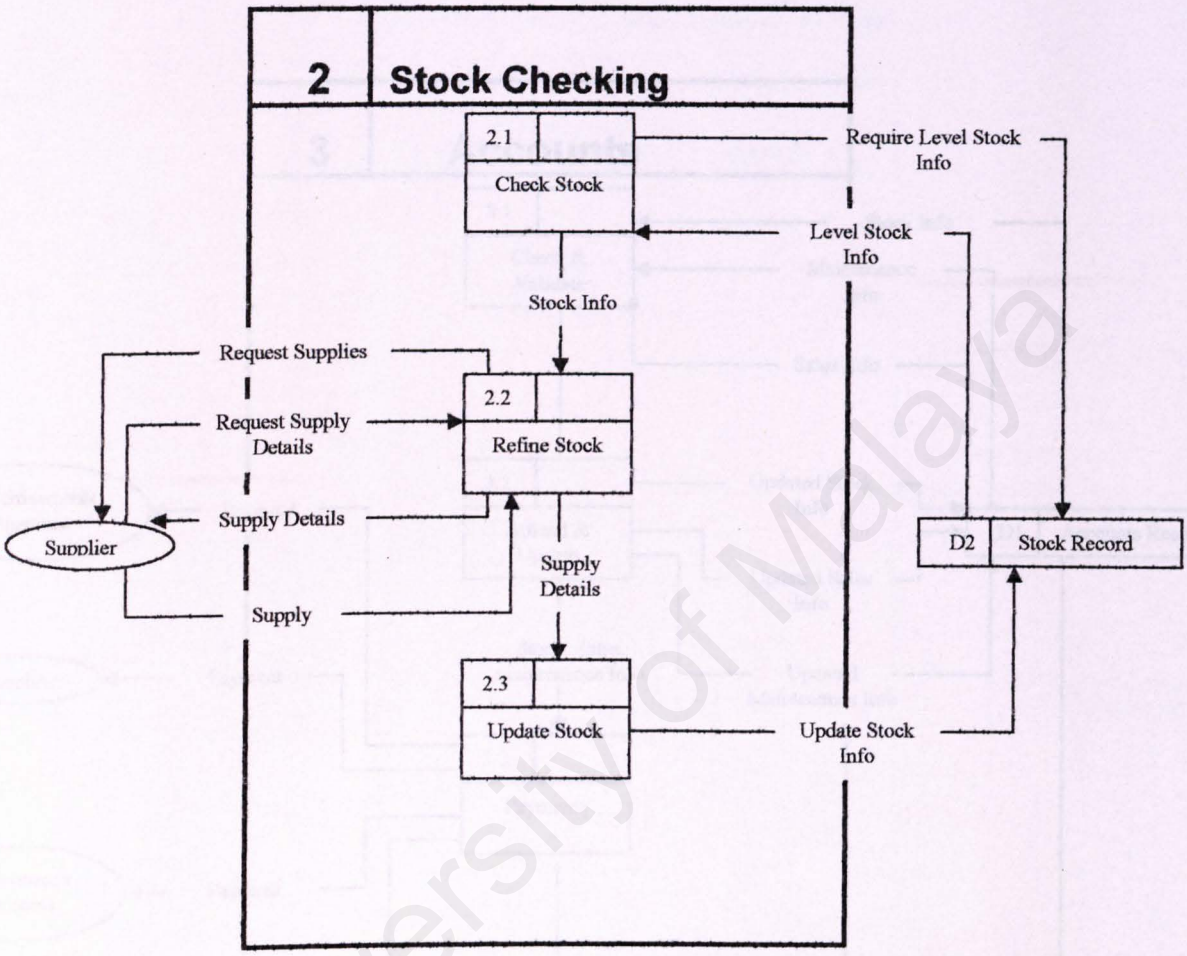


Figure 5.4 Level 2 Stock Checking

University of Malaya

Level 2 :

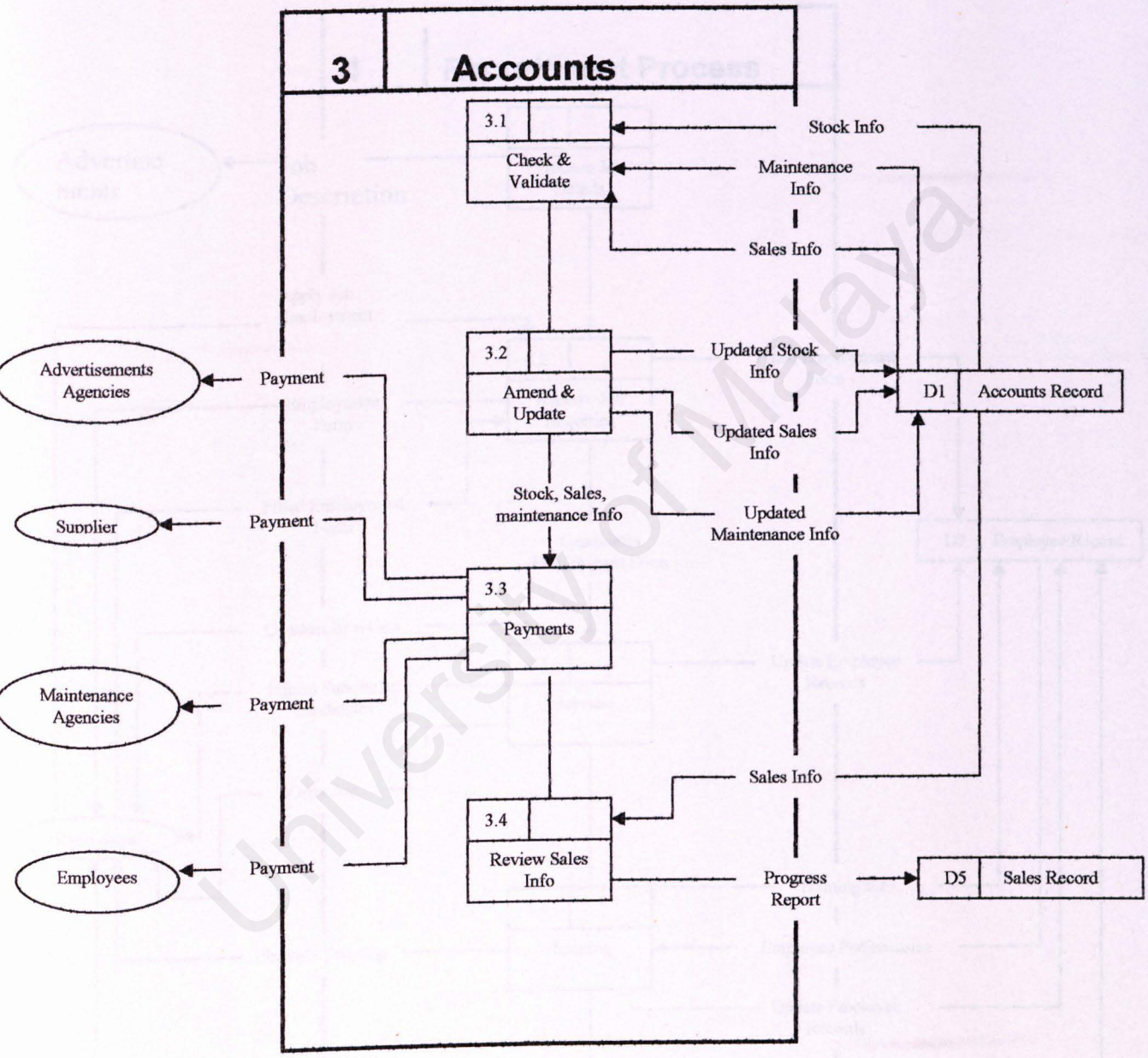
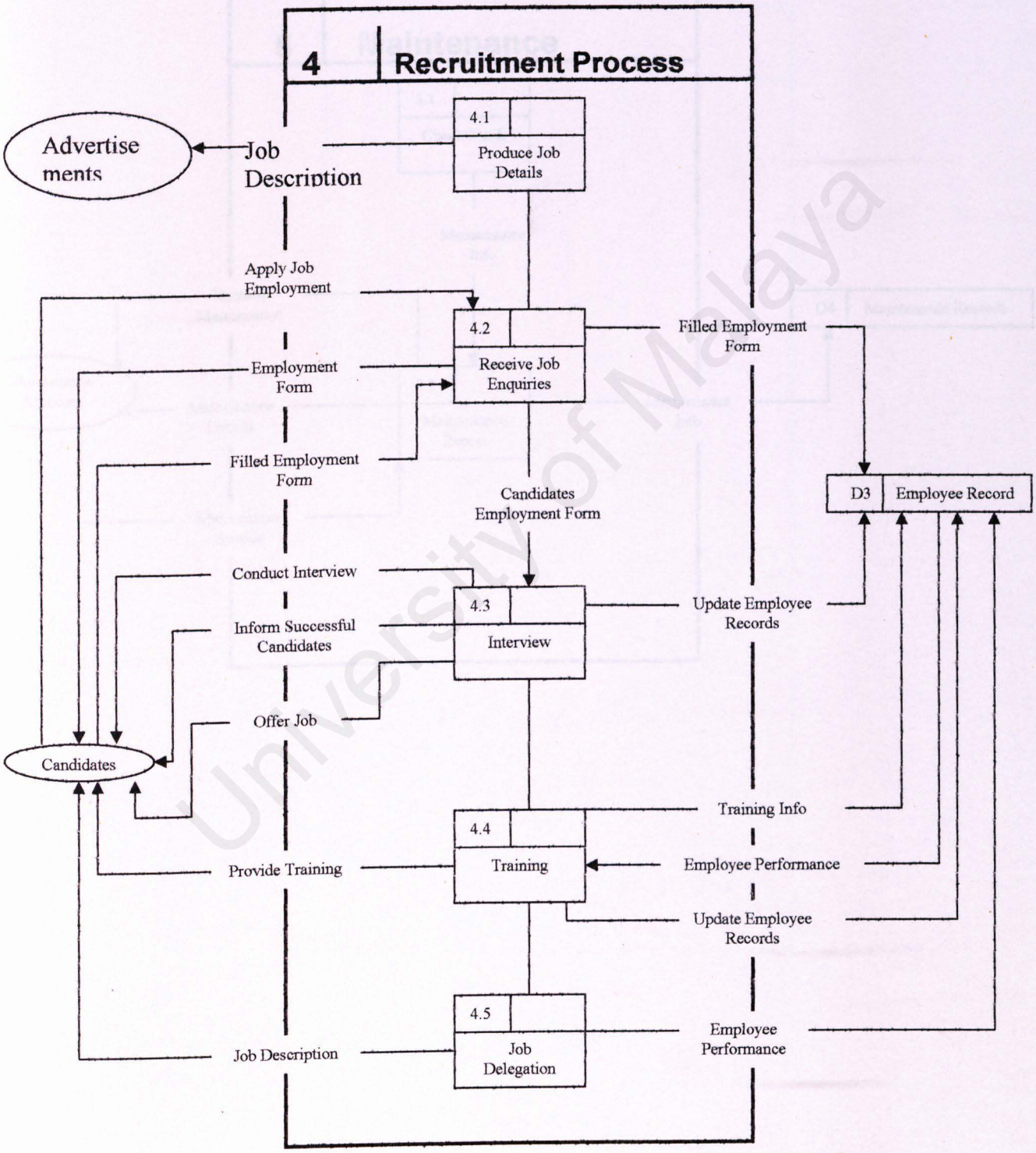


Figure 5.5 Level 2 Account

University of Malaya

Level 2 :

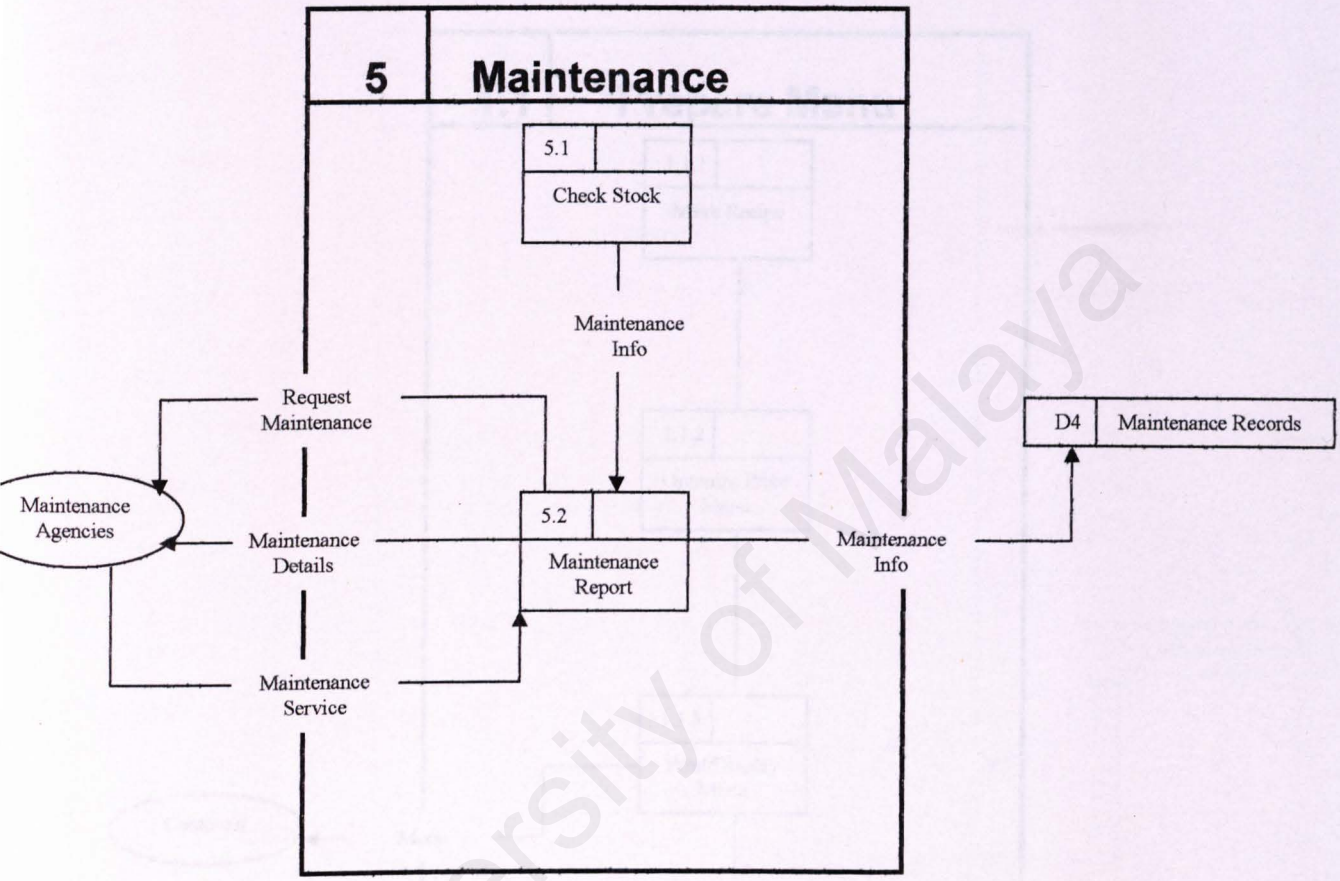
Figure 5.6 Level 2 Recruitment Process



University of Malaya

Level 2 :

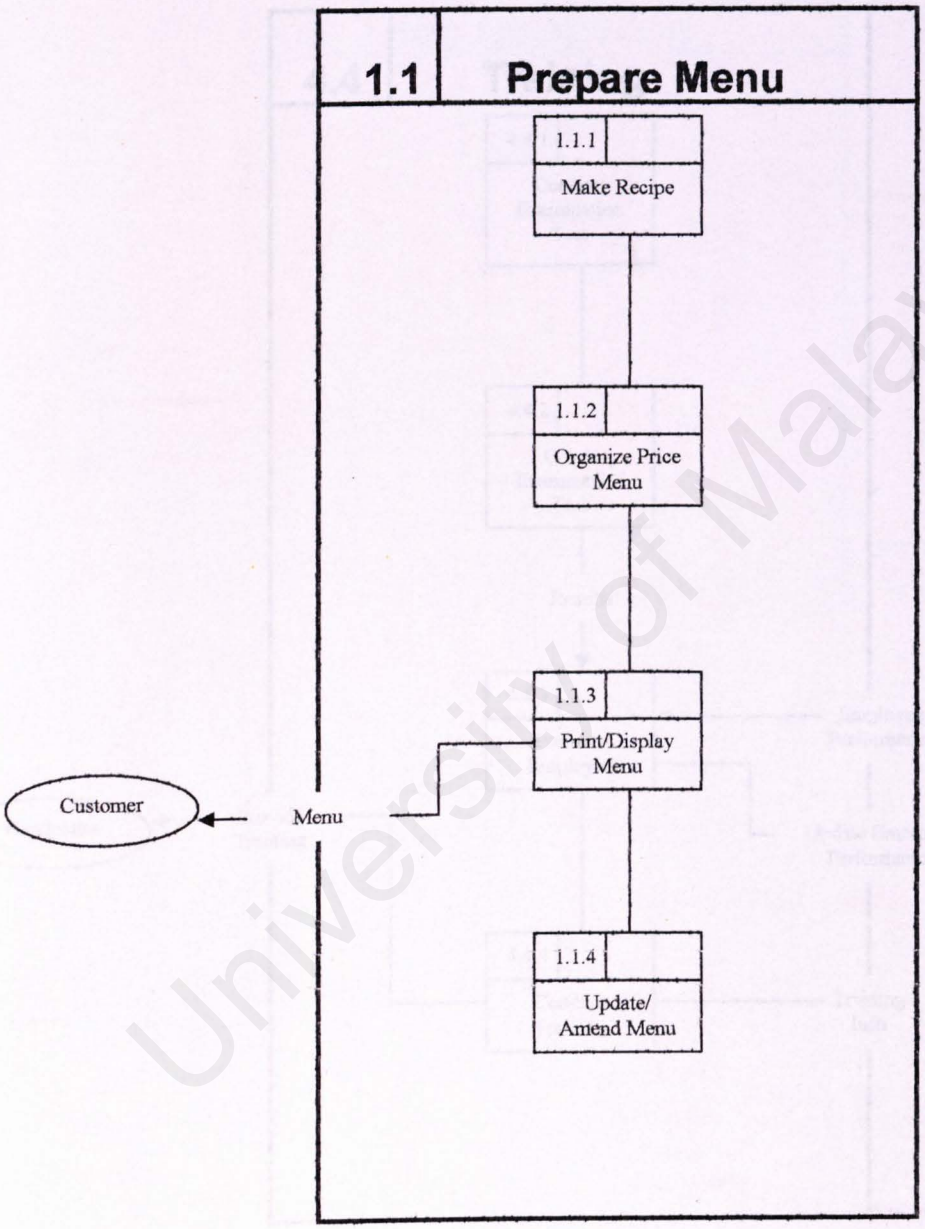
Figure 5.7 Level 2 Maintenance



University of Malaya

Level 3 :

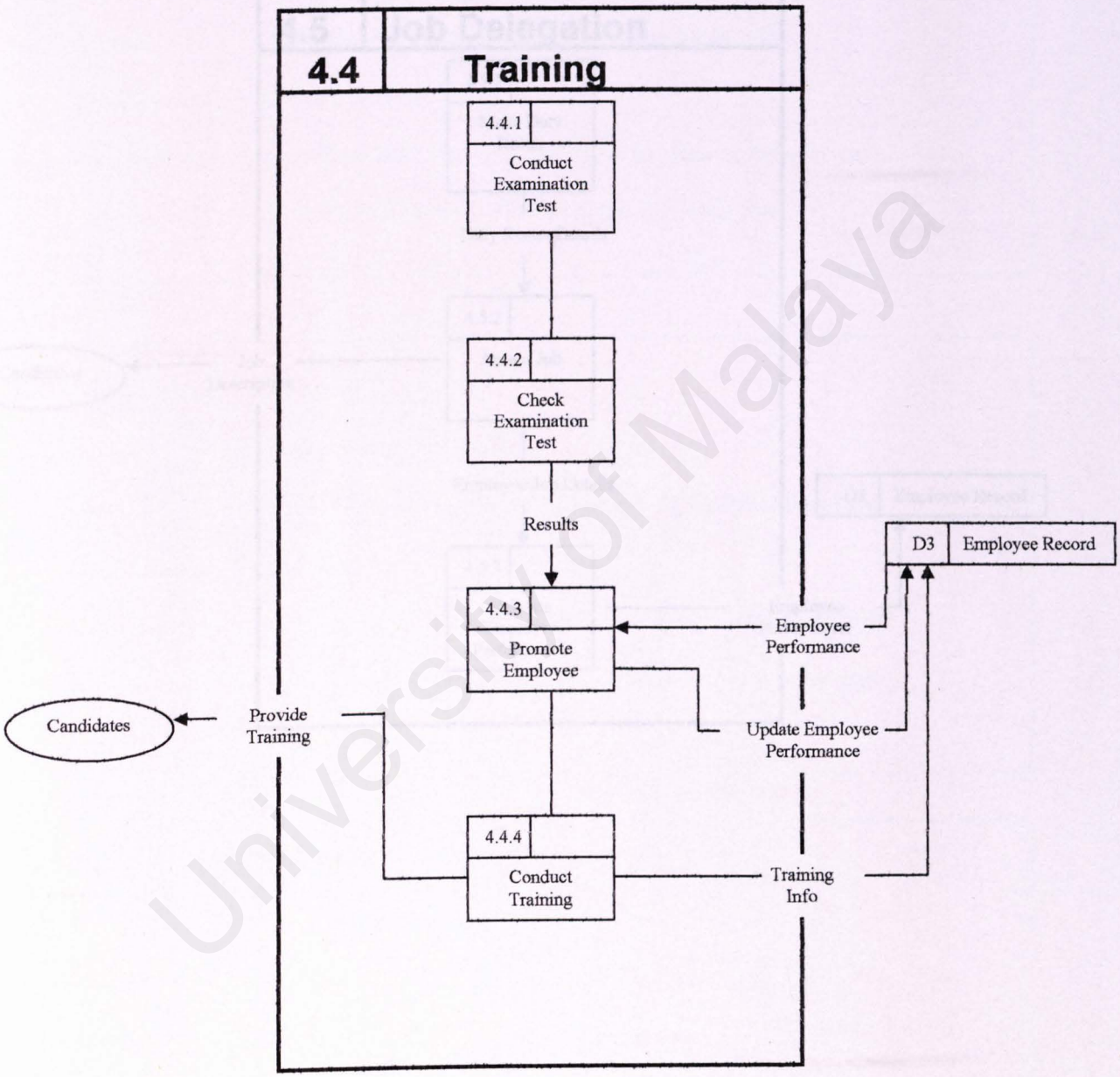
Figure 5.8 Level 3 Prepare Menu



University of Malaya

Level 3 :

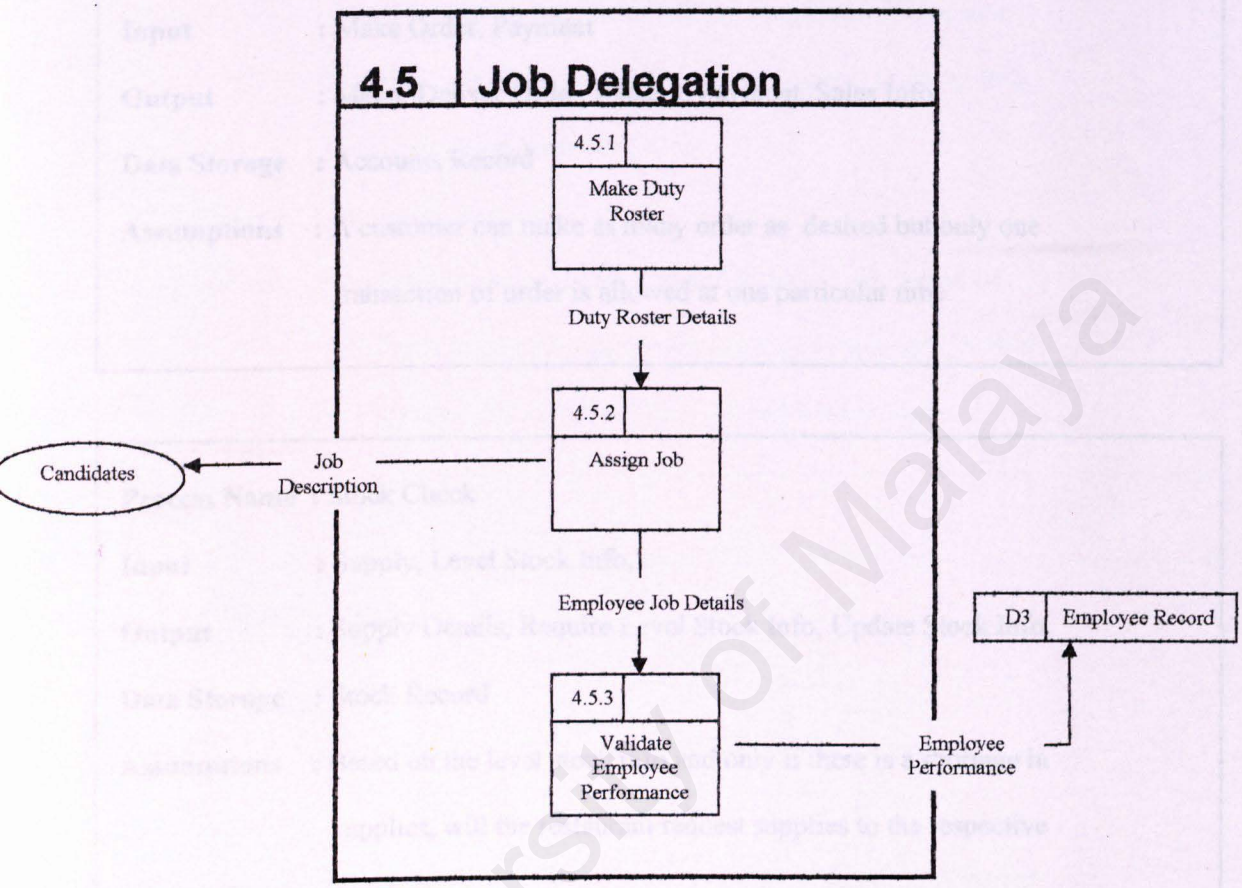
Figure 5.9 Level 3 Training



University of Malaya

Level 3 :

Figure 5.10 Level 3 Delegation



University of Malaya

5.2 Data Dictionary (Existing System)

Process Name : Take Order Process

Input : Make Order, Payment

Output : Menu, Deliver Order, Receipt, Payment, Sales Info

Data Storage : Accounts Record

Assumptions : A customer can make as many order as desired but only one transaction of order is allowed at one particular time.

Process Name : Stock Check

Input : Supply, Level Stock Info,

Output : Supply Details, Require Level Stock Info, Update Stock Info

Data Storage : Stock Record

Assumptions : Based on the level stock info and only if there is a shortage in supplies, will the restaurant request supplies to the respective supplier.

Process Name : Accounts

Input : Accounts Info

Output : Payment, Update Accounts Info, Progress Info

Data Storage : Accounts Record, Sales Record

Assumptions : Payments will be made to Supplier, Maintenance Agencies, Employee, and Advertisement Agencies once cleared with the Accounts Record.

University of Malaya

Process Name : Recruitment Process

Input : Employment Application

Output : Job Description, Interview, Inform Successful Applicants, Training, Job Description, Employee Details, Training Info, Employee Performance.

Data Storage : Employee Record

Assumptions : Successful candidates are updated as employee. Based on training info and the employee performance they are given a position and description of their job required by them.

Process Name : Maintenance

Input : Maintenance Service, Maintenance Details

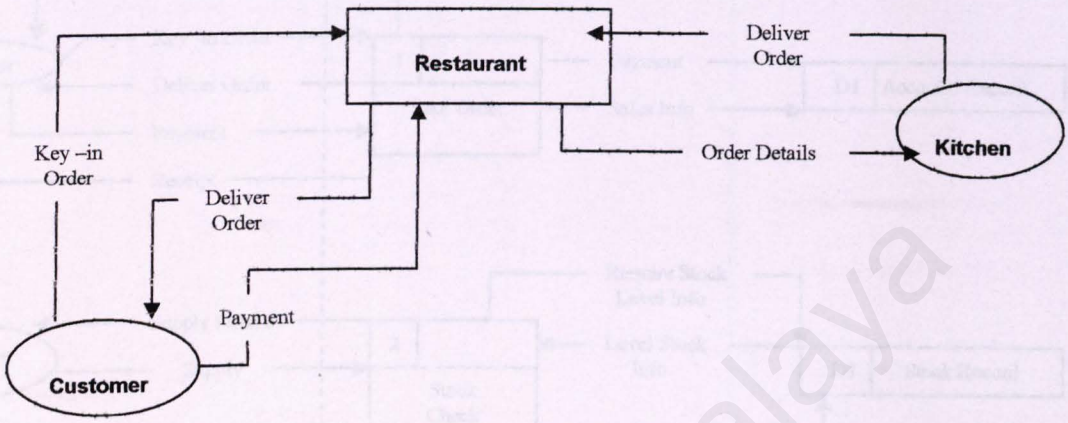
Output : Maintenance Details, Updated Maintenance Details

Data Storage : Maintenance Record

Assumptions : Maintenance Details are generated only if there is a occurrence of a problem within the system that needs to be tend to by the maintenance agencies.

University of Malaya

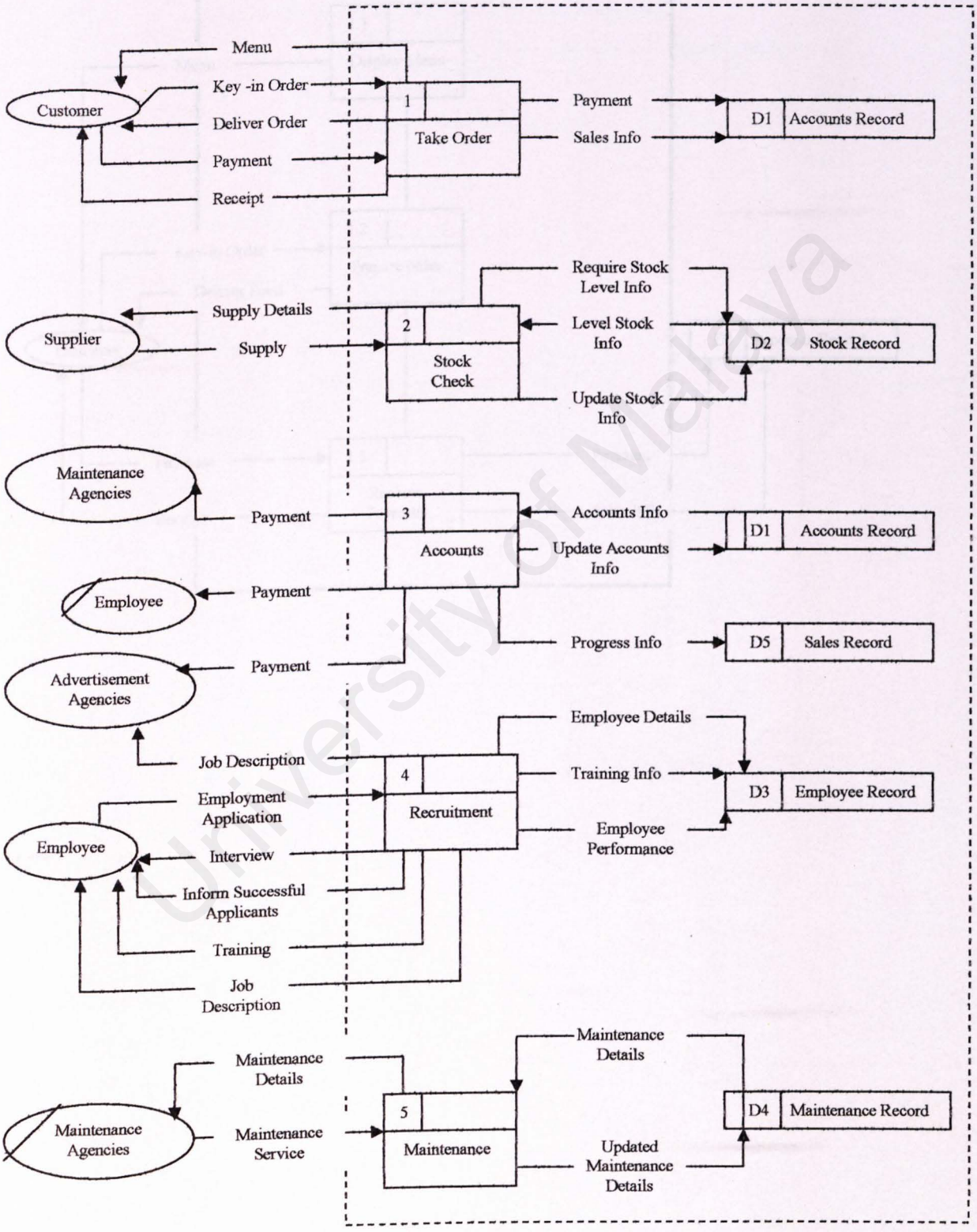
Figure 5.11 Context Diagram (Proposed System)



University of Malaya

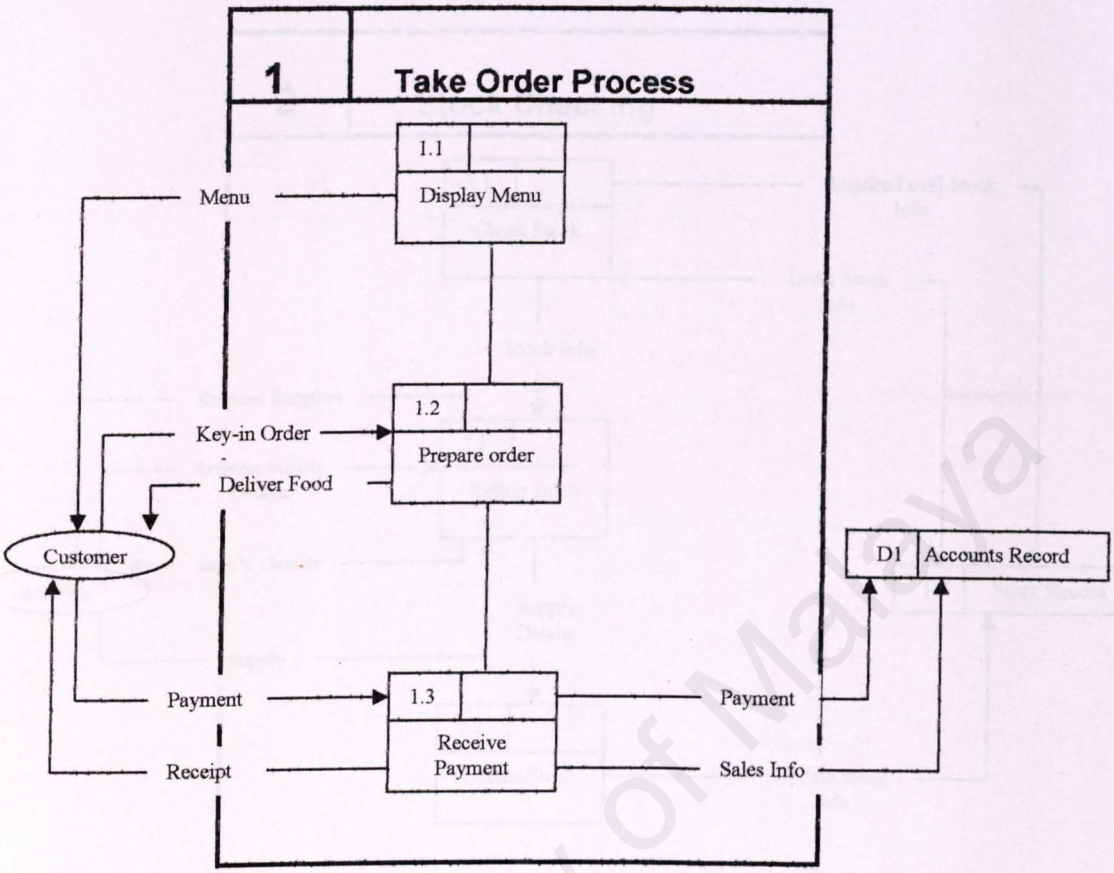
Figure 5.12 Data Flow Diagram

Level 1:



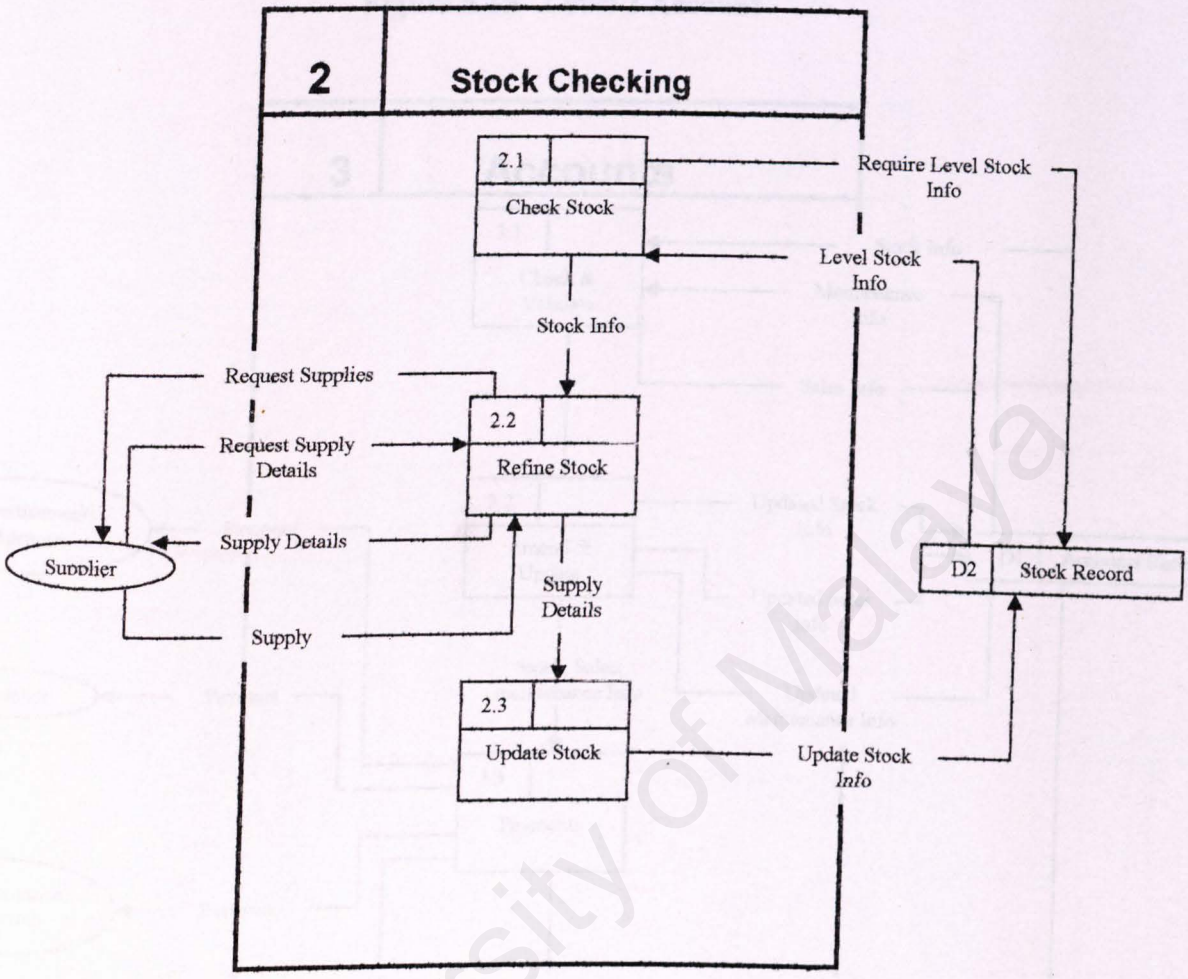
University of Malaya

Figure 5.13 Take Order Process



University of Malaya

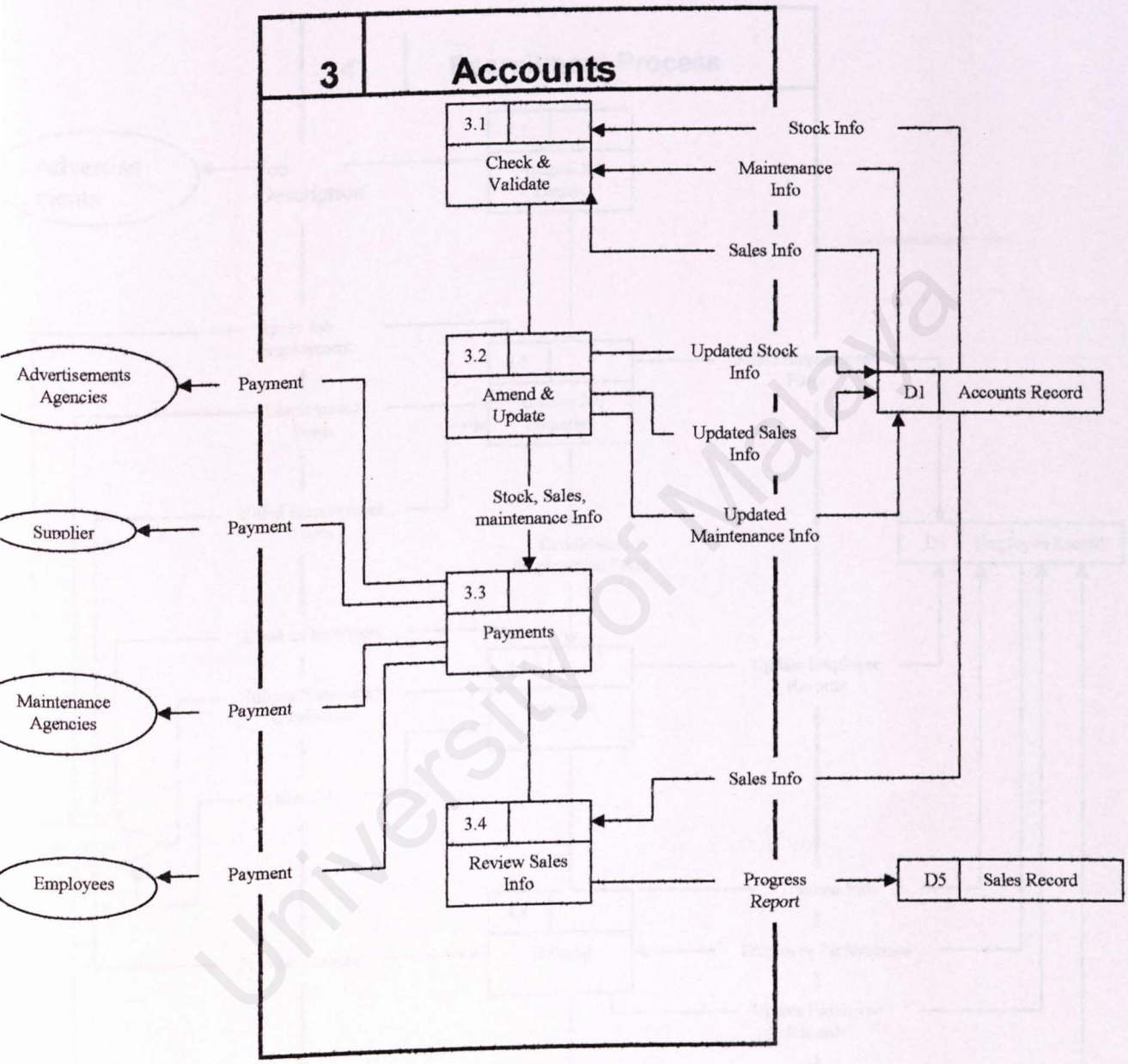
Level 2 : **Figure 5.14 Level 2 Stock Checking**



University of Malaya

Level 2 :

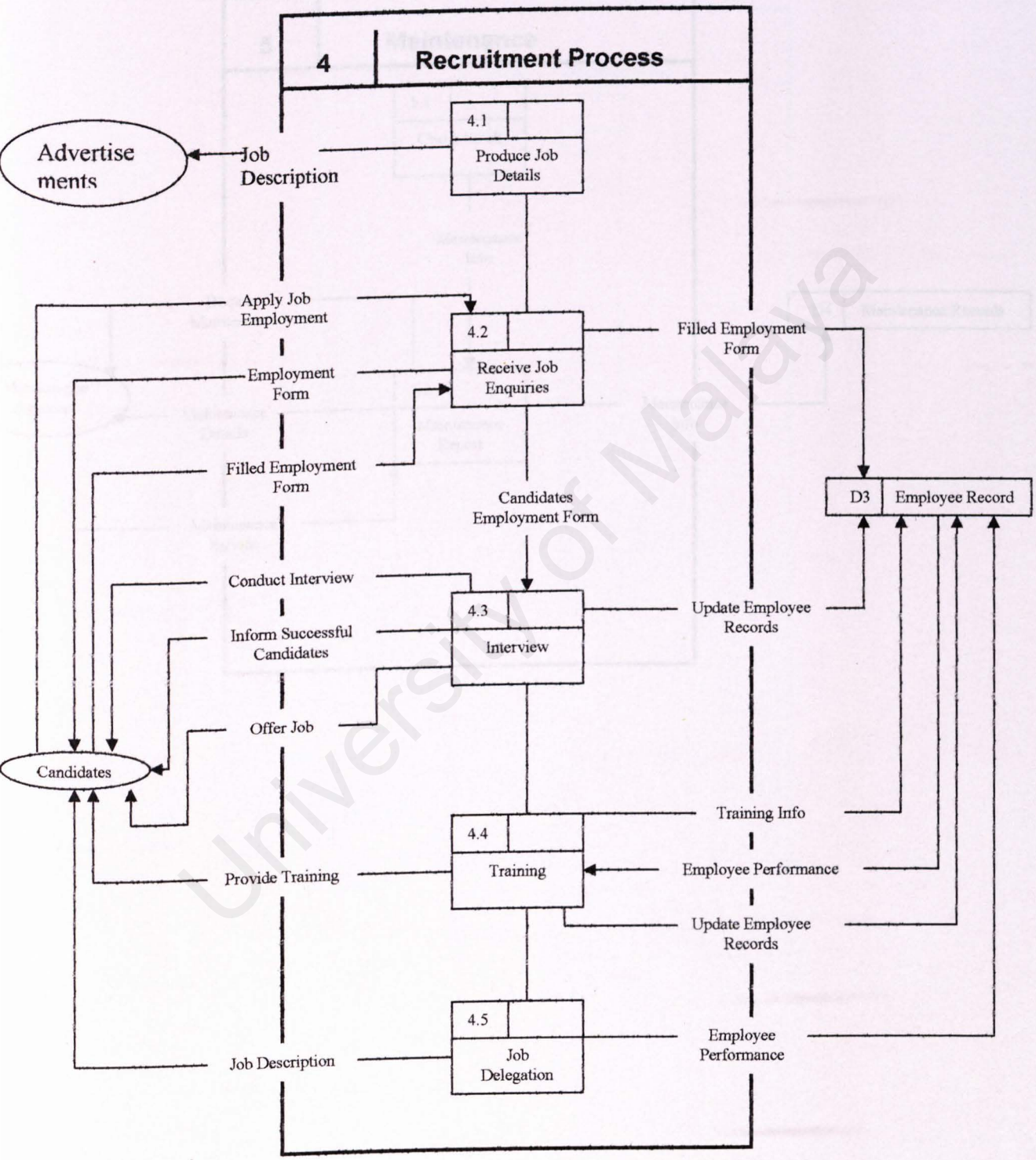
Figure 5.15 Level 2 Account



University of Malaya

Level 2 :

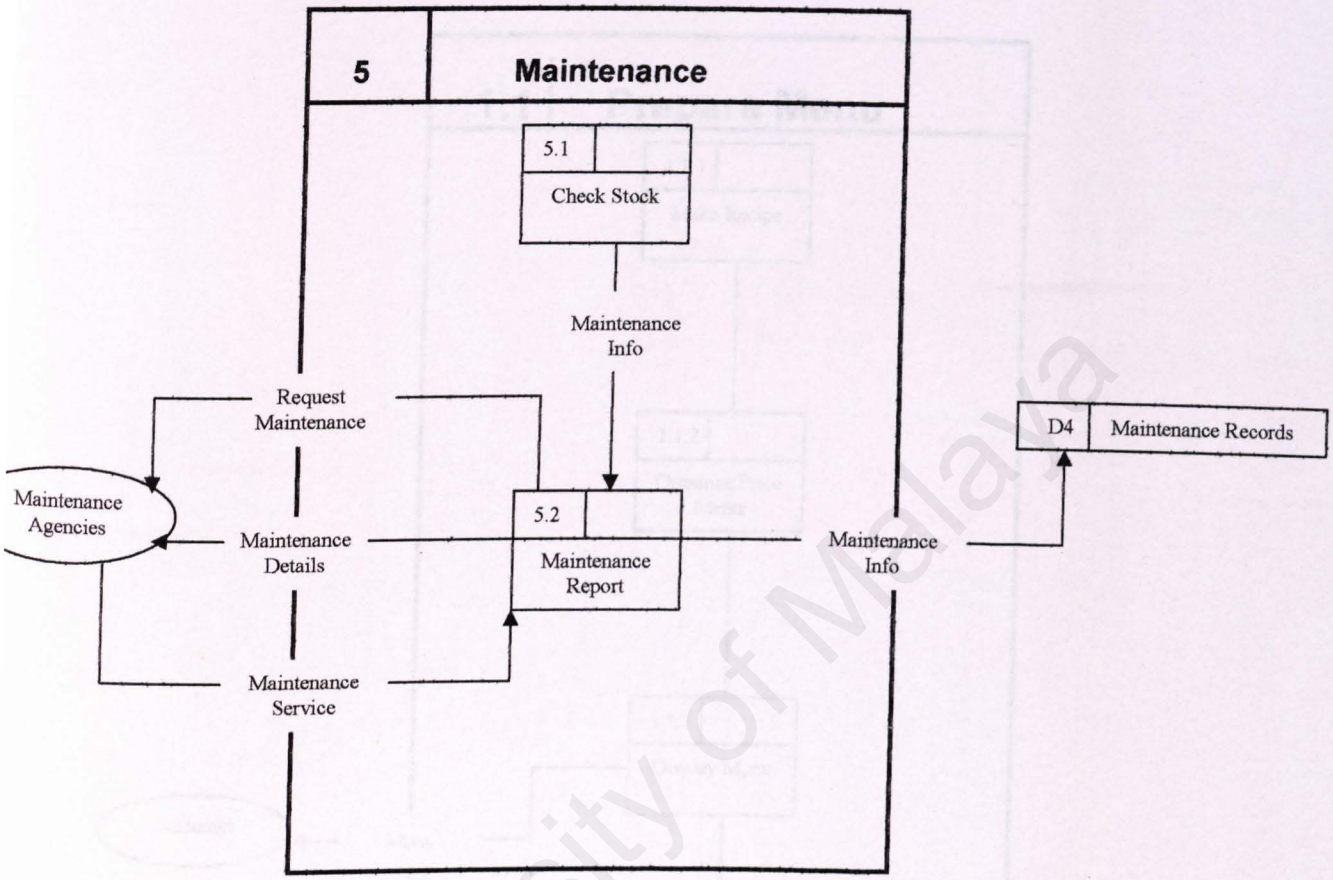
Figure 5.16 Level 2 Recruitment Process



University of Malaya

Level 2 :

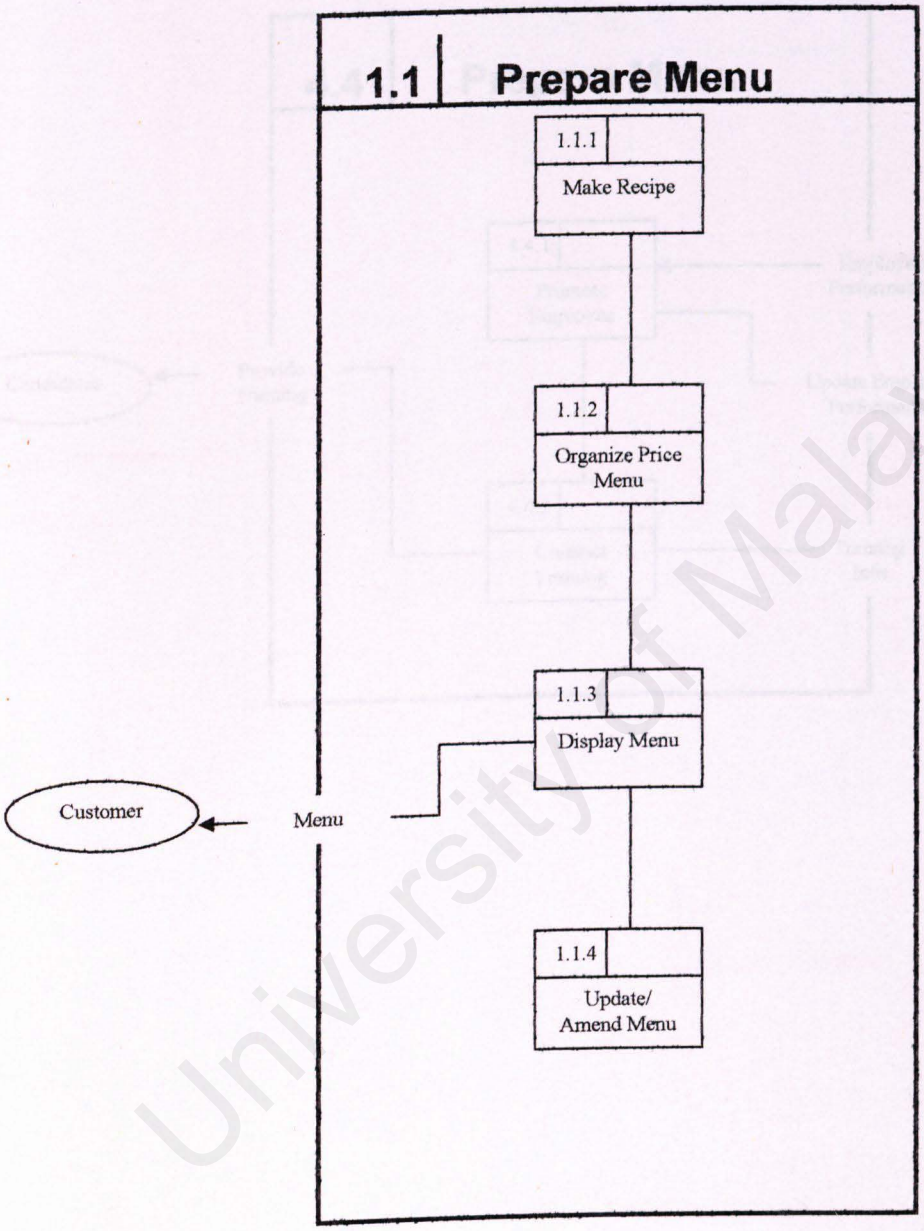
Figure 5.17 Level 2 Maintenance



University of Malaya

Level 3 :

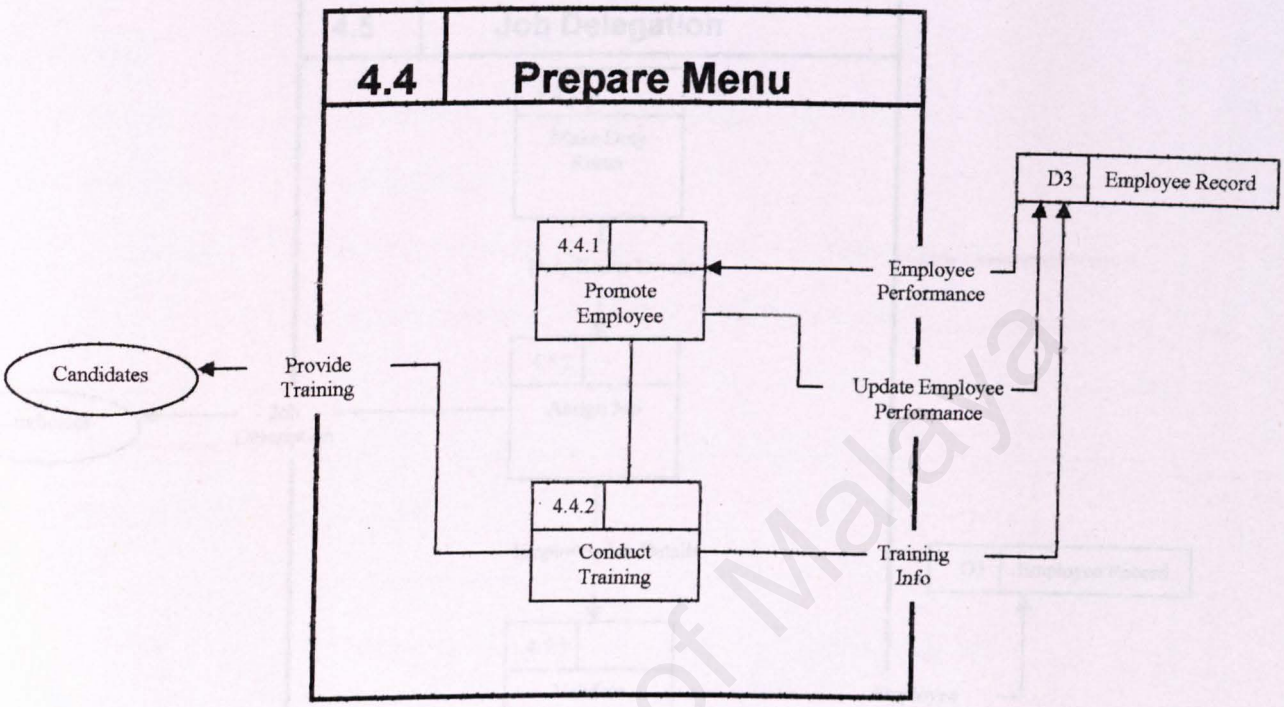
Figure 5.18 Level 3 Prepare Menu



University of Malaya

Level 3 :

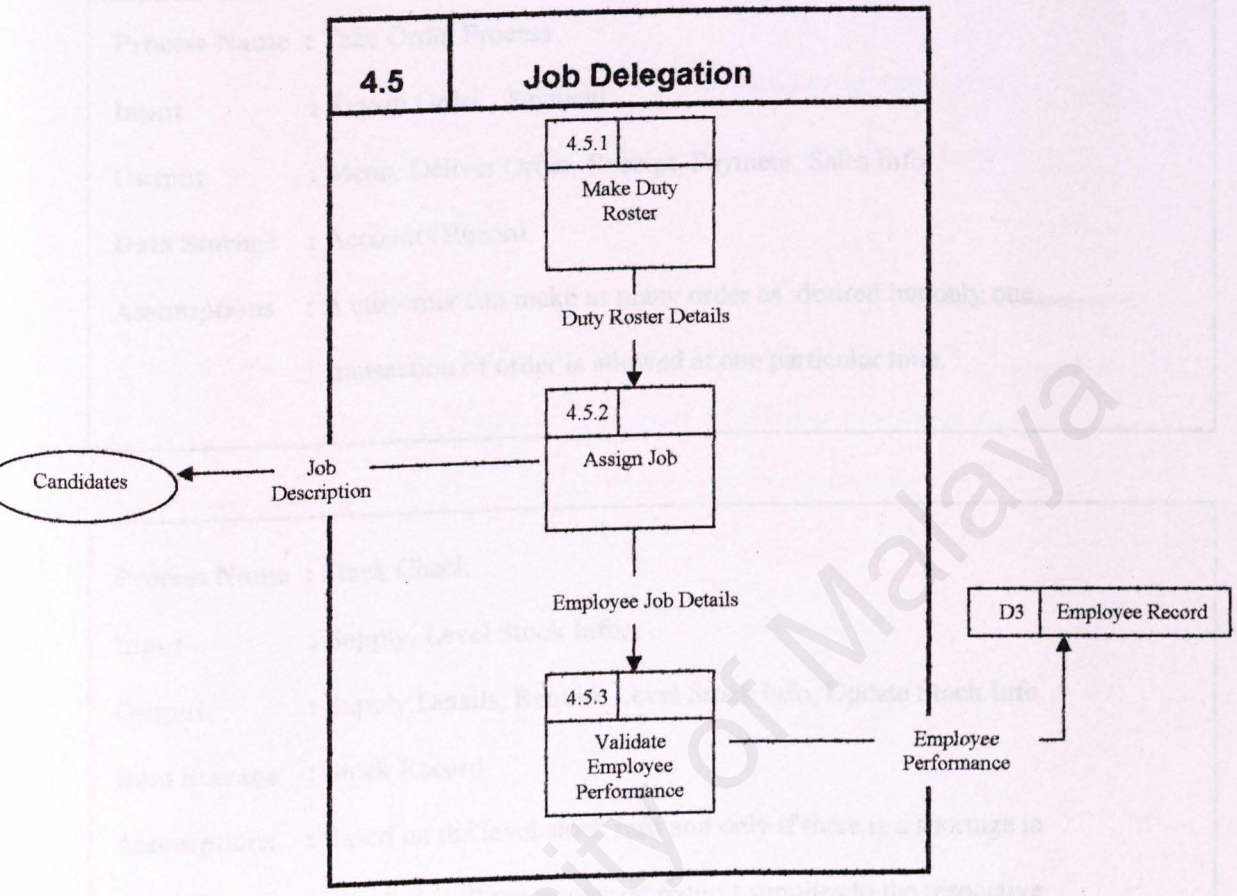
Figure 5.19 Level 3 Prepare Menu



University of Malaya

Level 3 :

Figure 5.20 Level 3 Job Delegation



University of Malaya

5.3 Data Dictionary (Proposed System)

Process Name	: Take Order Process
Input	: Key-in Order , Payment
Output	: Menu, Deliver Order, Receipt, Payment, Sales Info
Data Storage	: Accounts Record
Assumptions	: A customer can make as many order as desired but only one transaction of order is allowed at one particular time.

Process Name	: Stock Check
Input	: Supply, Level Stock Info,
Output	: Supply Details, Require Level Stock Info, Update Stock Info
Data Storage	: Stock Record
Assumptions	: Based on the level stock info and only if there is a shortage in supplies, will the restaurant request supplies to the respective supplier.

Process Name	: Accounts
Input	: Accounts Info
Output	: Payment, Update Accounts Info, Progress Info
Data Storage	: Accounts Record, Sales Record
Assumptions	: Payments will be made to Supplier, Maintenance Agencies, Employee, and Advertisement Agencies once cleared with the Accounts Record.

University of Malaya

Process Name : Recruitment Process

Input : Employment Application

Output : Job Description, Interview, Inform Successful Applicants, Training, Job Description, Employee Details, Training Info, Employee Performance.

Data Storage : Employee Record

Assumptions : Successful candidates are updated as employee. Based on training info and the employee performance they are given a position and description of their job required by them.

Process Name : Maintenance

Input : Maintenance Service, Maintenance Details

Output : Maintenance Details, Updated Maintenance Details

Data Storage : Maintenance Record

Assumptions : Maintenance Details are generated only if there is a occurrence of a problem within the system that needs to be tend to by the maintenance agencies.

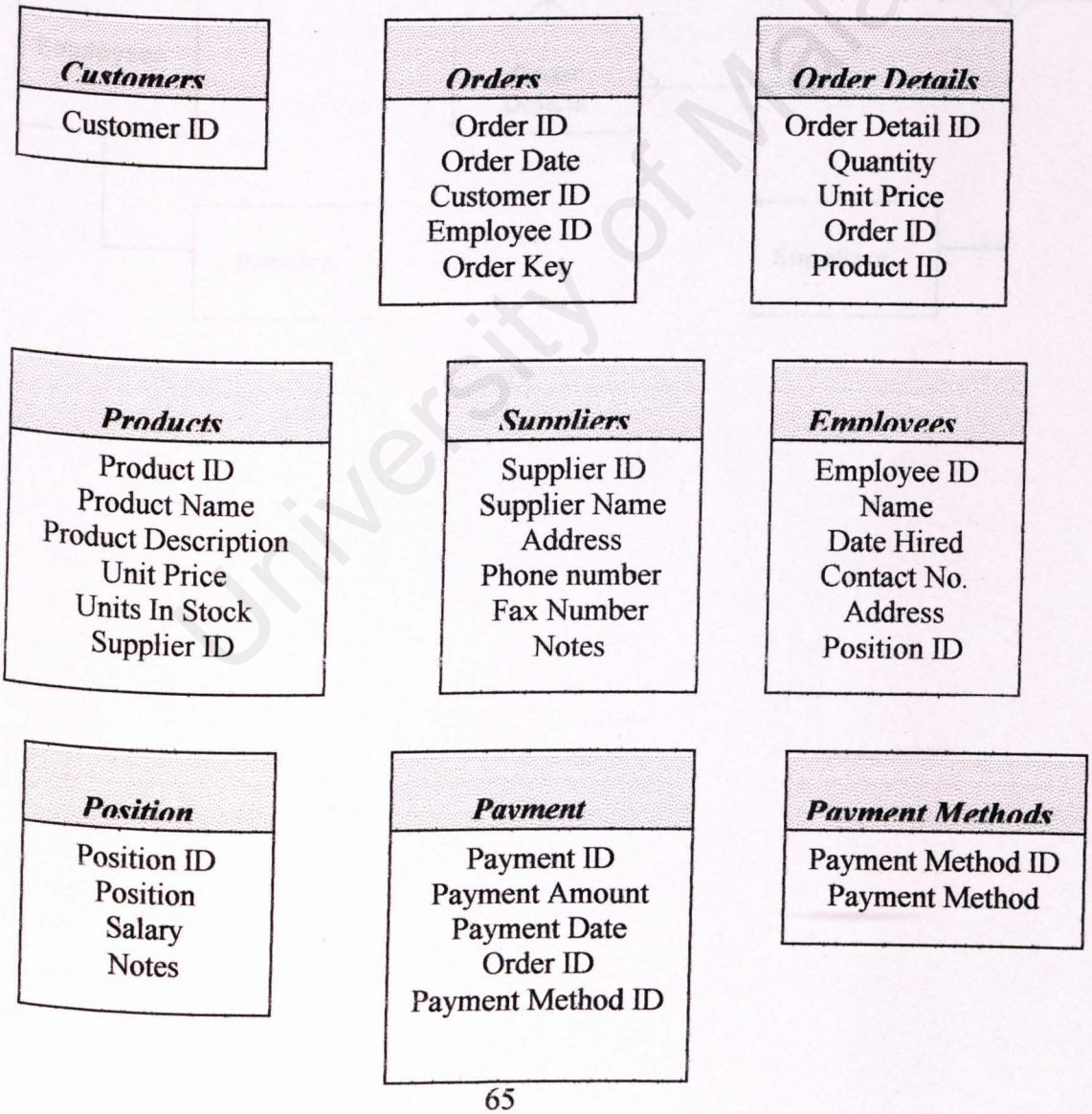
University of Malaya

5.4 Normalization

The aim of Normalization or Relation Data Analysis is to produce a set of normalized relations, which can be built into an Entity Relation Diagram. The entities and their relationships are defined so that redundancy are removed, independent attributes are separated and dependent ones are grouped. The ERD produced is then compared and combined with results of entity analysis to provide a reliable model of the true data structure from a business point of view.

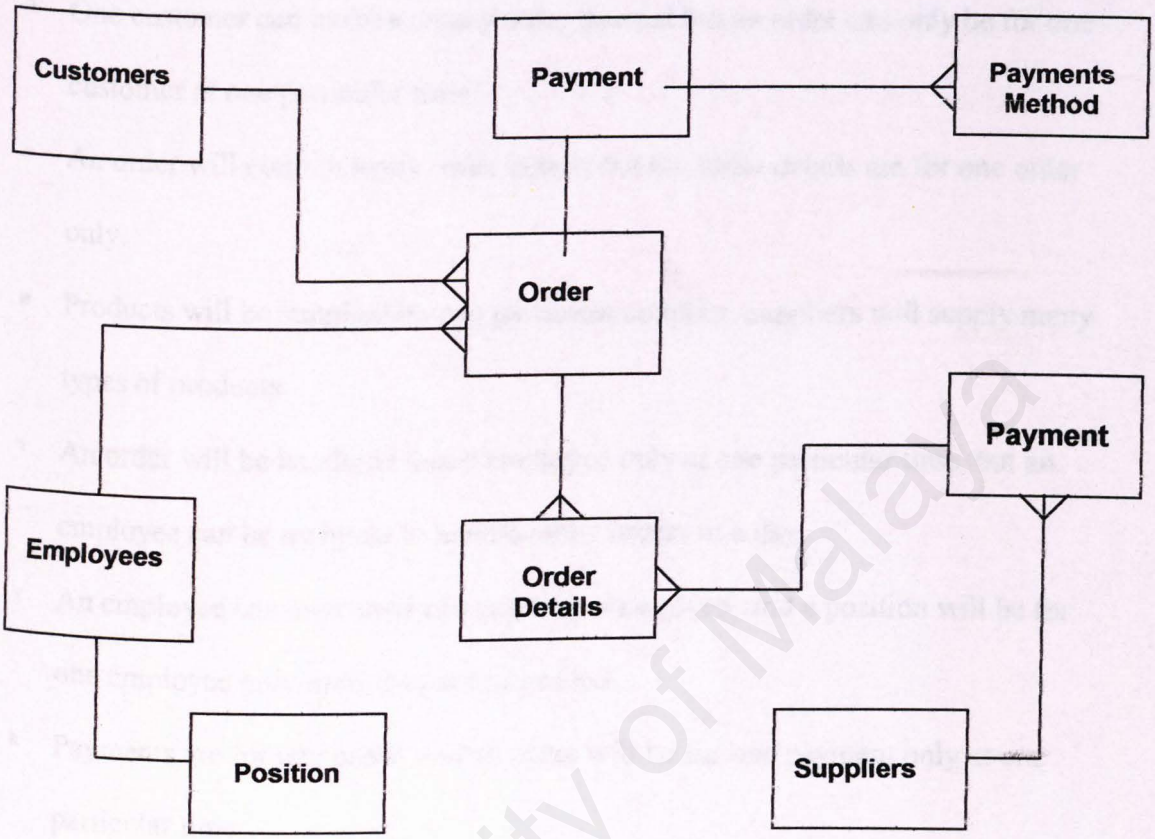
Below shows the normalized data after performing normalization to the data :

Figure 5.21 Normalized Data



University of Malaya

5.5 Entity Relationship Diagram



University of Malaya

Assumptions:

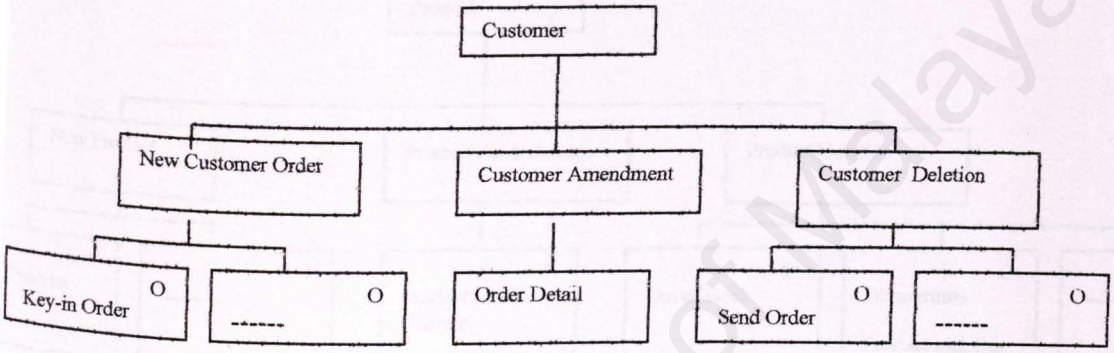
- One customer can make as many order desired but an order can only be for one customer at one particular time.
- An order will contain many order details but the order details are for one order only.
- Products will be supplied by one particular supplier, suppliers will supply many types of products.
- An order will be handled by one employee only at one particular time, but an employee can be assigned to handle many orders in a day.
- An employee can have only one position once given, and a position will be for one employee only until they are promoted.
- Payments are for one order, and an order will be for one payment only at one particular time.
- Payments can be made by a number of payment methods and payment methods will correspond to only one payment only.

University of Malaya

5.6 Entity Life History

An ELH is a pictorial means of representing events that can affect the life of an occurrence of an entity, from its creation within the system to its deletion from the system. The events follows a sequence create, amend, delete, from left to right. Below shows the following ELH in the proposed system :

Figure 5.22 Customer ELH



University of Malaya

Figure 5.23 Employee ELH

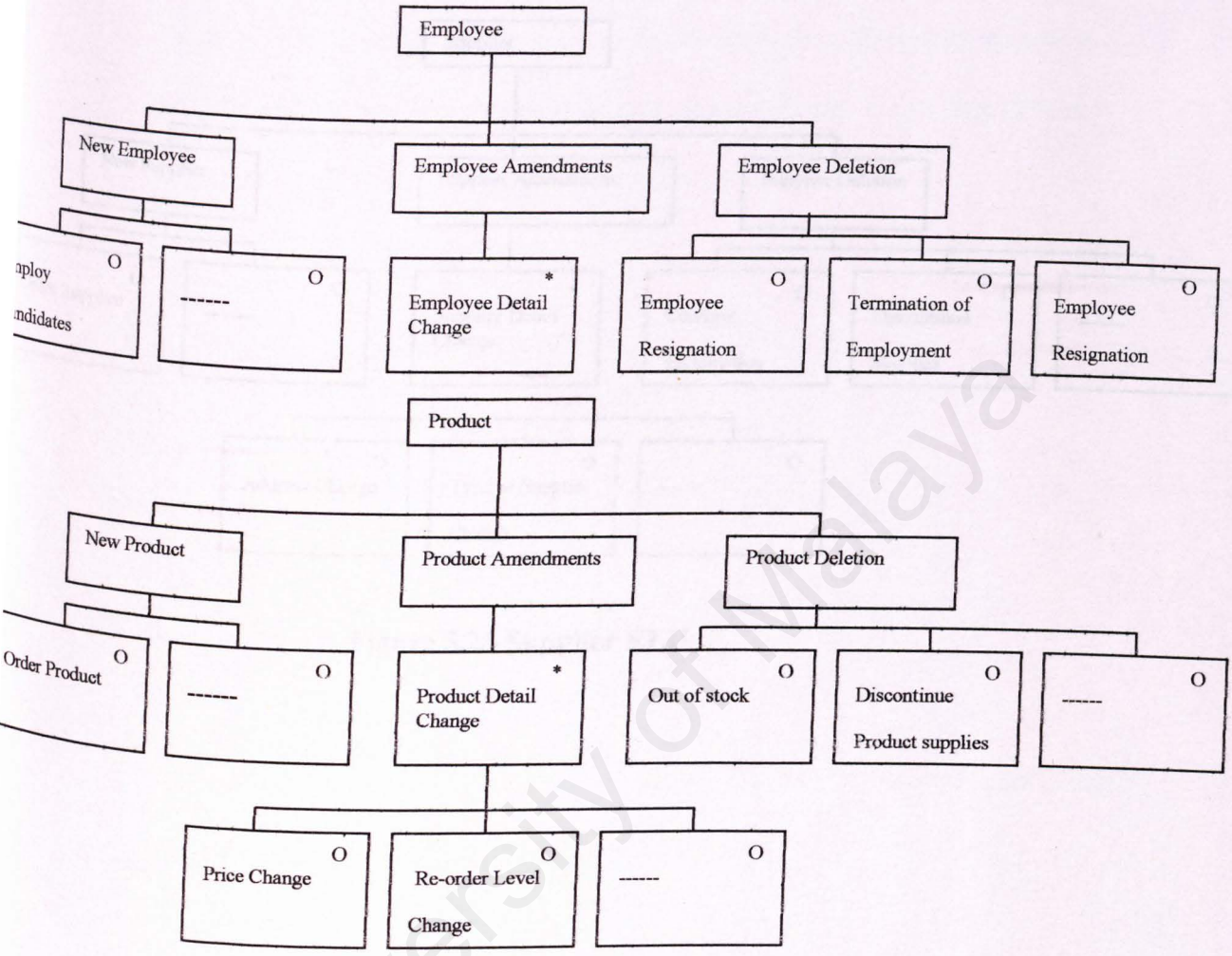


Figure 5.24 Product ELH

University of Malaya

Supplier :

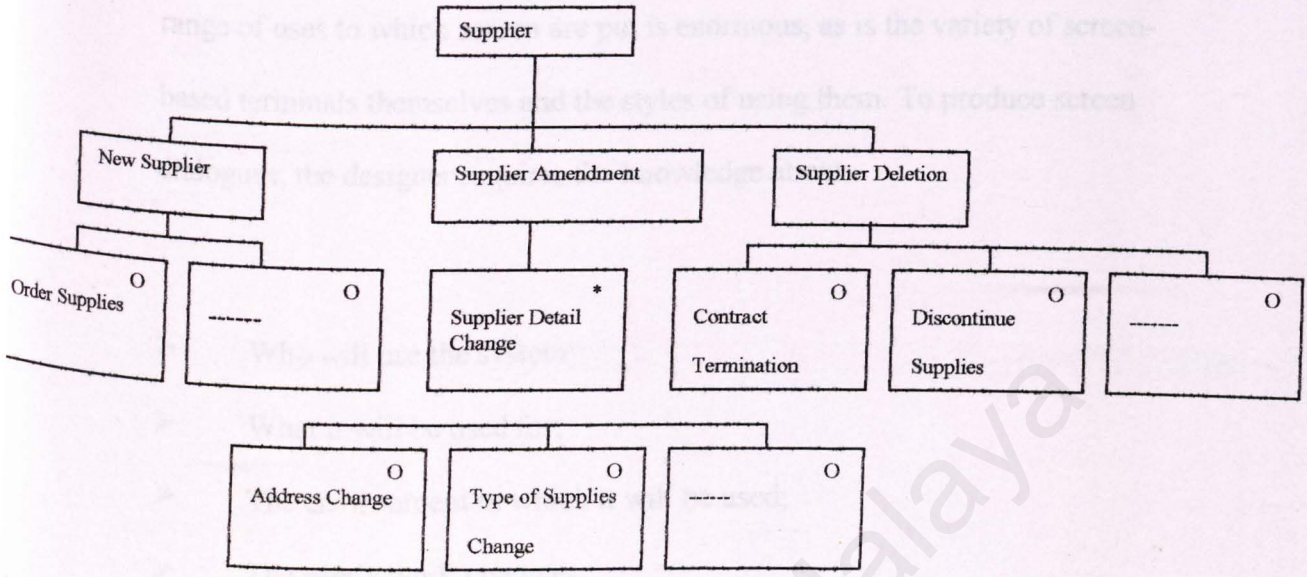


Figure 5.25 Supplier ELH

University of Malaya

5.7 Screen Design

For most computers the main contact with the computer is through the screen. The range of uses to which screen are put is enormous, as is the variety of screen-based terminals themselves and the styles of using them. To produce screen dialogues, the designer requires the knowledge about:

- Who will use the system;
- What it will be used for;
- The environment in which it will be used;
- The user's work practices;
- What is technically and logically feasible?

The information on the screen should only be what is necessary for users to carry out their tasks. Consideration should be given to:

- Concise wording;
- Data formats familiar to the user;
- Tabular formats with column headings;
- Not too much unnecessary detail;
- Understandable use of any abbreviation.

University of Malaya

Below shows the screen designs for the proposed RCOS system :

Welcoming Screen :

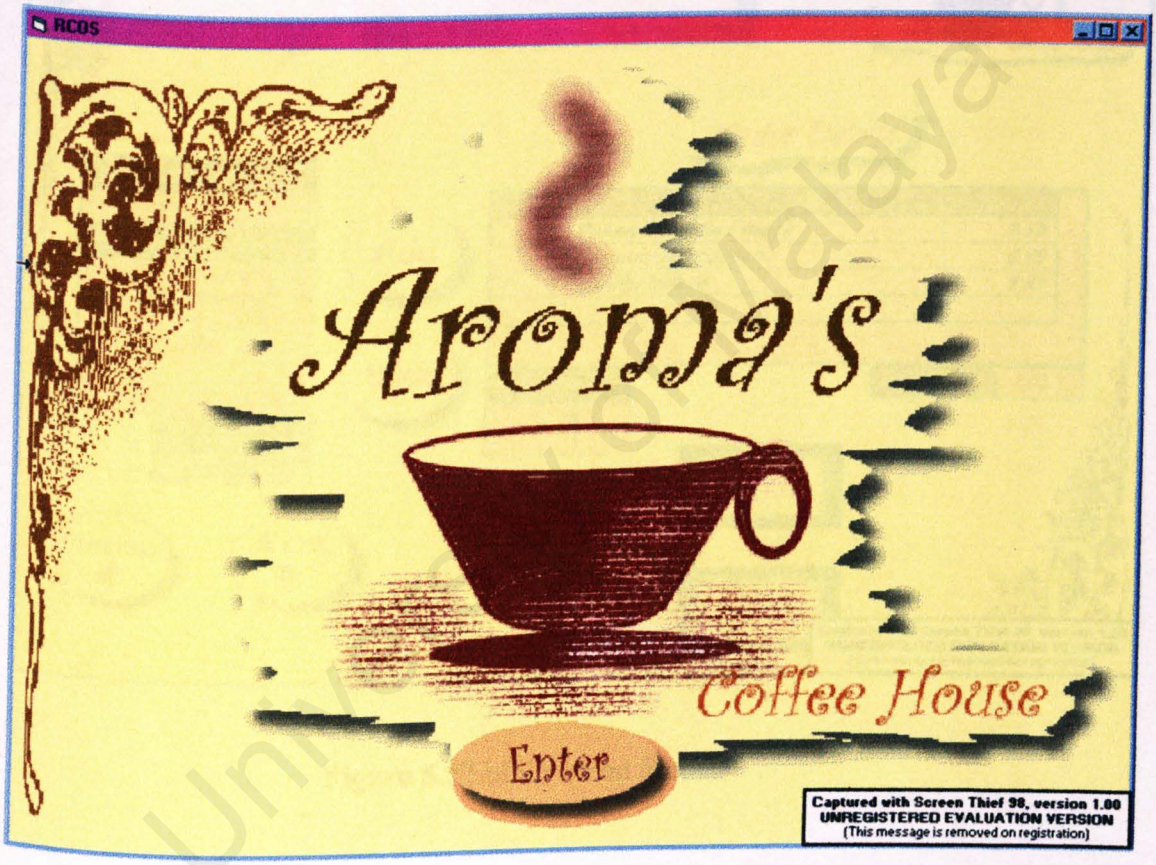


Figure 5.26 Welcoming Screen

Main Menu Screen :

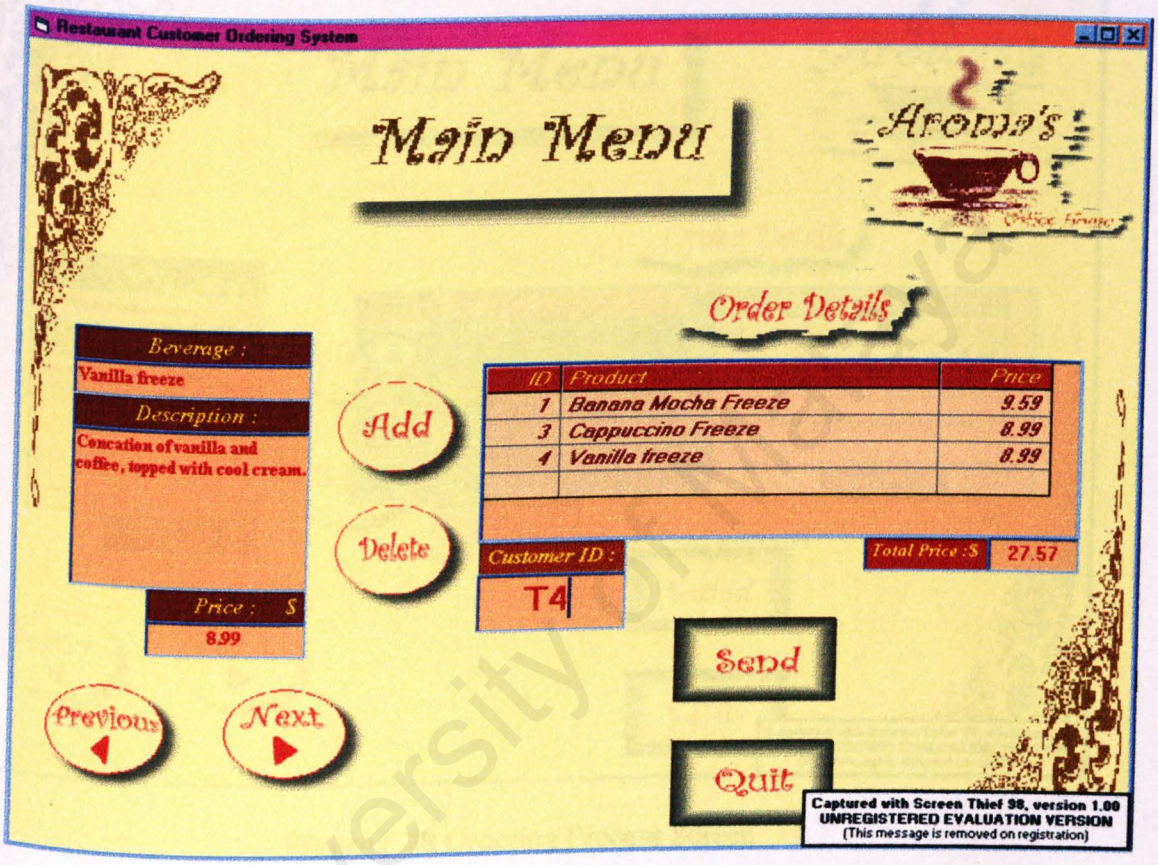


Figure 5.27 Main Menu Screen

Ordering Process :

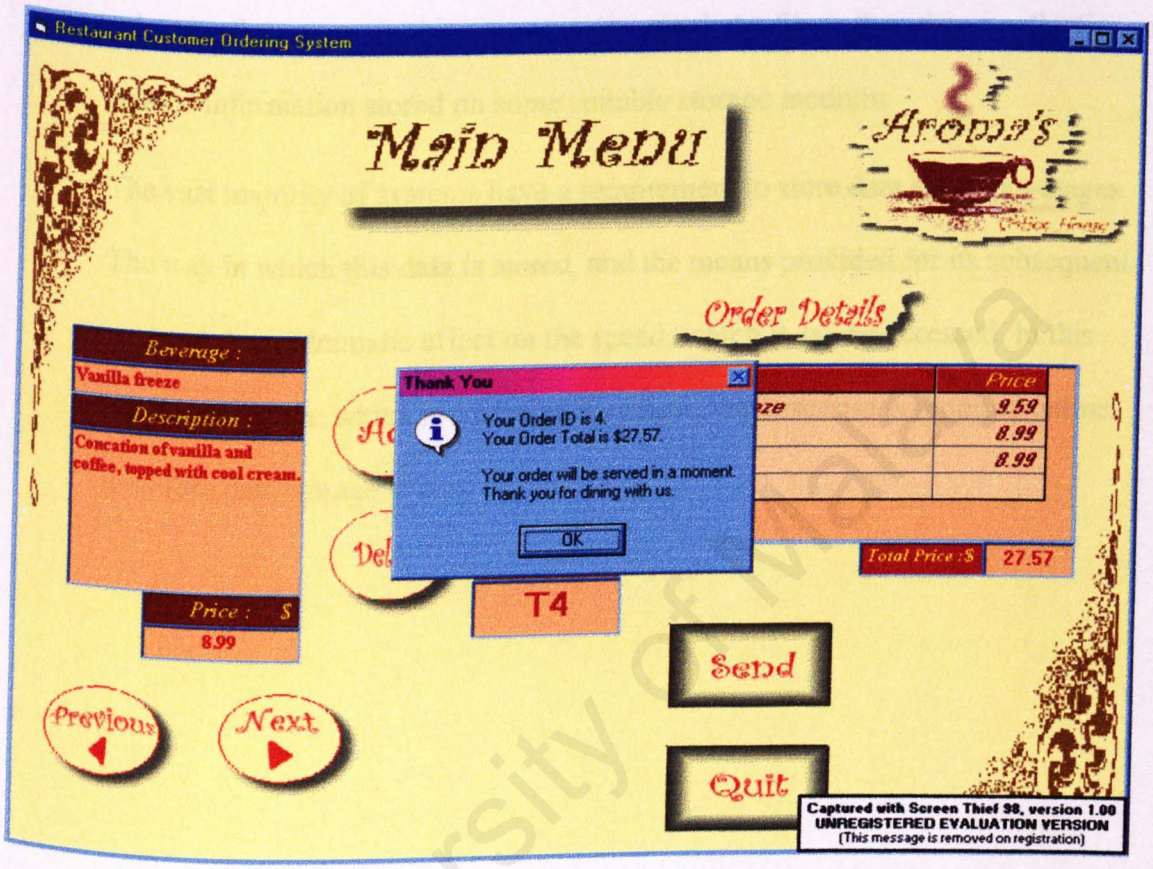


Figure 5.28 Ordering Process Screen

University of Malaya

5.8 File Design

A file is logically organized as a collection of records, and usually contains related information. In this sense we can say that a file is therefore a collection of related information stored on some suitable storage medium.

The vast majority of systems have a requirement to store data at various stages. The way in which this data is stored, and the means provided for its subsequent retrieval, has a dramatic effect on the speed, which it can be accessed. In this proposed system, which is a computer system, fast response is required online; therefore data storage is very critical.

University of Malaya

5.9 Form Design

Form design is very important in retrieving and collection of information. A form can be any surface on which information is to be entered. The surface for example can be paper, a wall- board, a piece of plastic, or the front of a cathode ray tube.

The most widely used medium for communication between computer and user is paper because it is versatile, cheap and relatively permanent. In some cases, where rapid transfer of information is needed and which does not to be on a hard copy, the Visual Display Unit (VDU) screen is most common, together with similar screens such as liquid crystals displays and light emitting diodes.

The principles, which apply to the design of paper documents for the collection, transmission and storage of information, can be applied equally to the design for the layouts of screens. Both of this technique is to receive or convey information quickly and completely.

The creation of a form must serve the objectives and purpose of the organization, which provides it. Specifications of the form must include the purpose and the cost. A form, which allows the required information to be obtained, transmitted, interpreted, filed and retrieved at minimum total cost is considered a good form design.

When designing a form the main guidelines a designer are to:

- Try out the form with users, first in draft and then again when a prototype or proof copy is available;
- Be certain of the form's accuracy and practically before implementing it.

University of Malaya

The design of forms must be done in the context of the system as a whole and must take consideration several interrelated factors. The stages of form design follow the stages of the project. There must be:

- A definition of the objectives;
- Comparison of present results with required objectives;
- Specification of information requirement;
- Design of layout;
- Testing
- Education and training of user management and staff;
- Implementation.

The next page shows the forms created for the RCOS system. The forms are designed to help the management of the restaurant to retrieve, enter, amend, and update certain records stored within the RCOS system main database.

University of Malaya

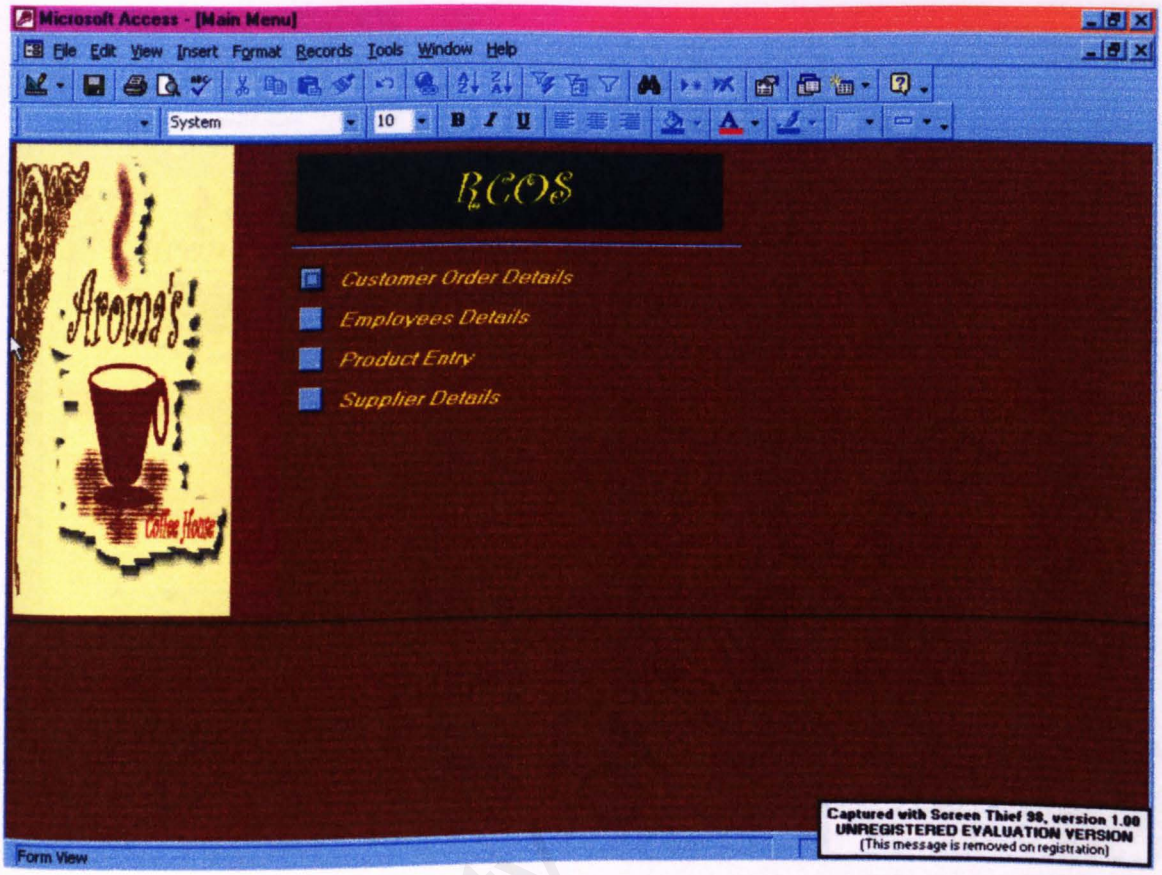


Figure 5.29 Main Menu

University

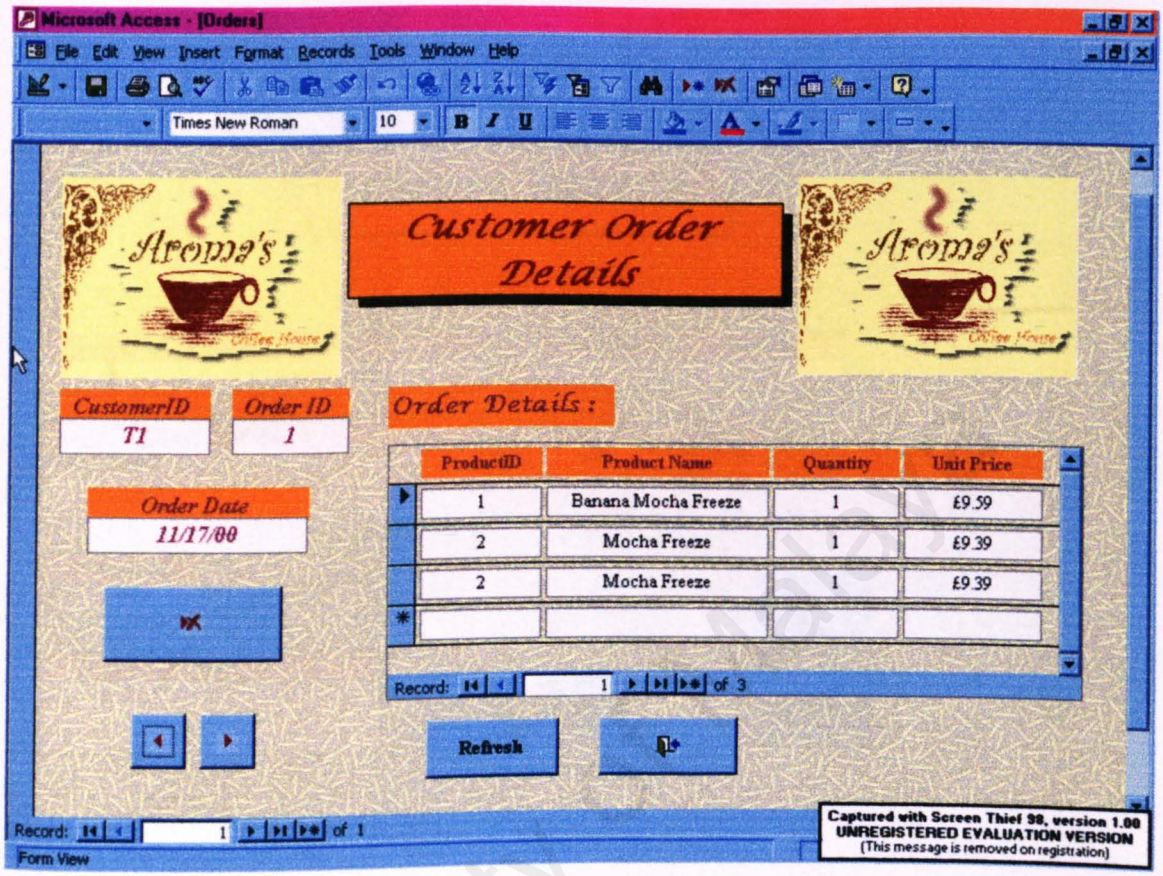


Figure 5.30 Customer Order Detail Form

University of Malaya

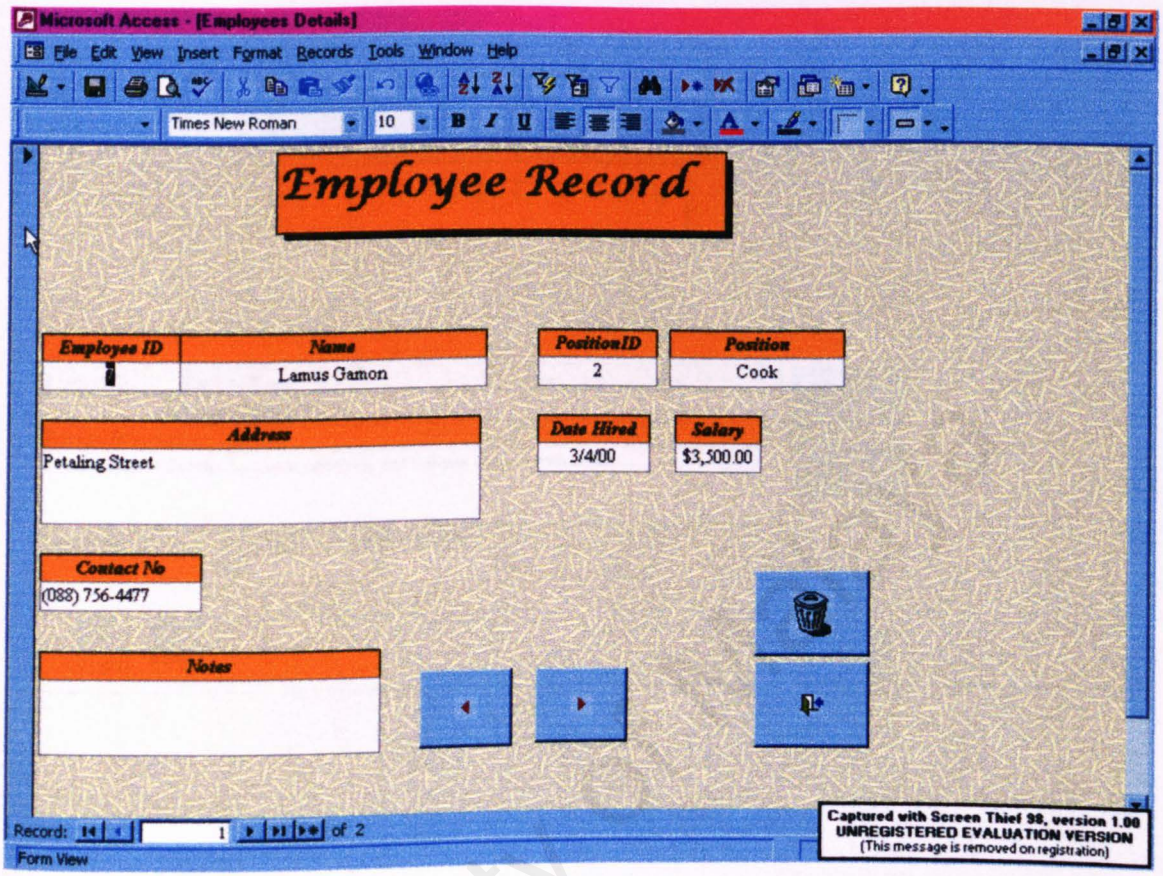


Figure 5.31 Employee Record Form

University

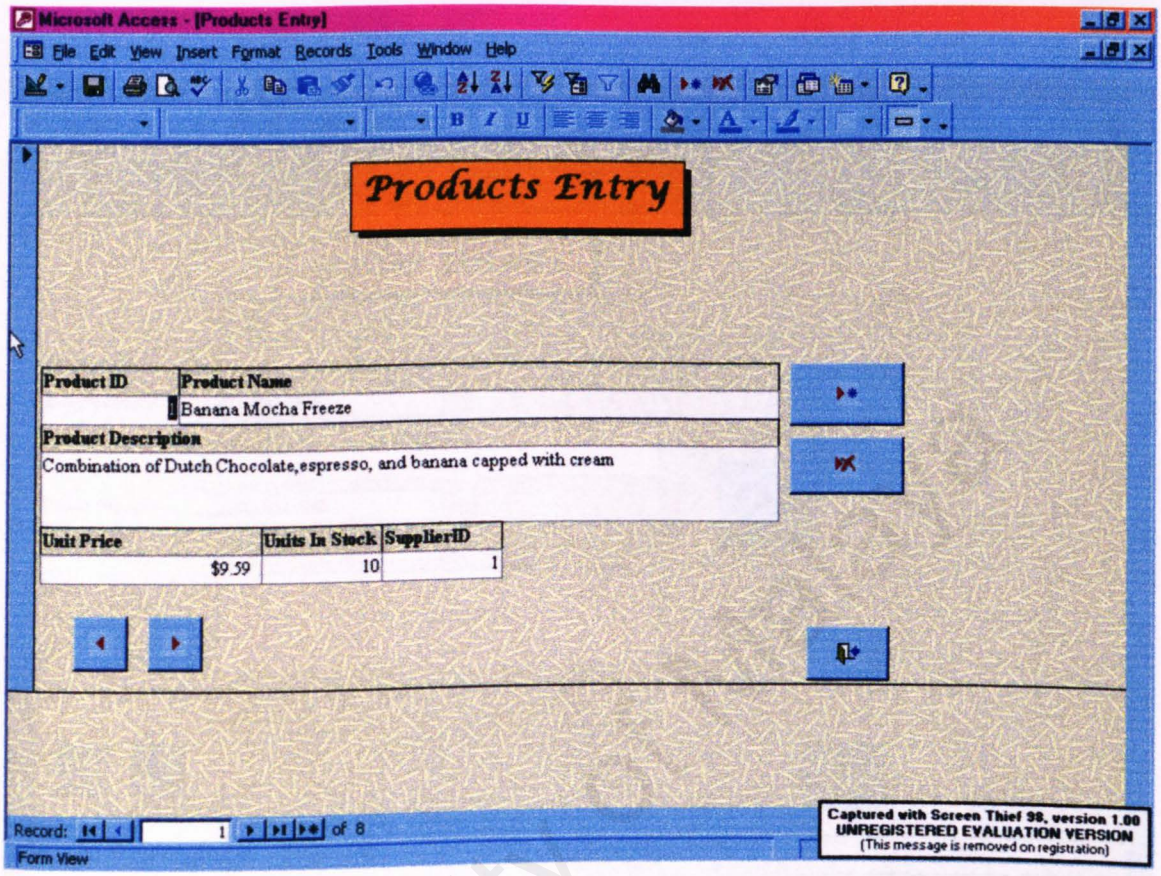


Figure 5.32 Product Entry Form

University

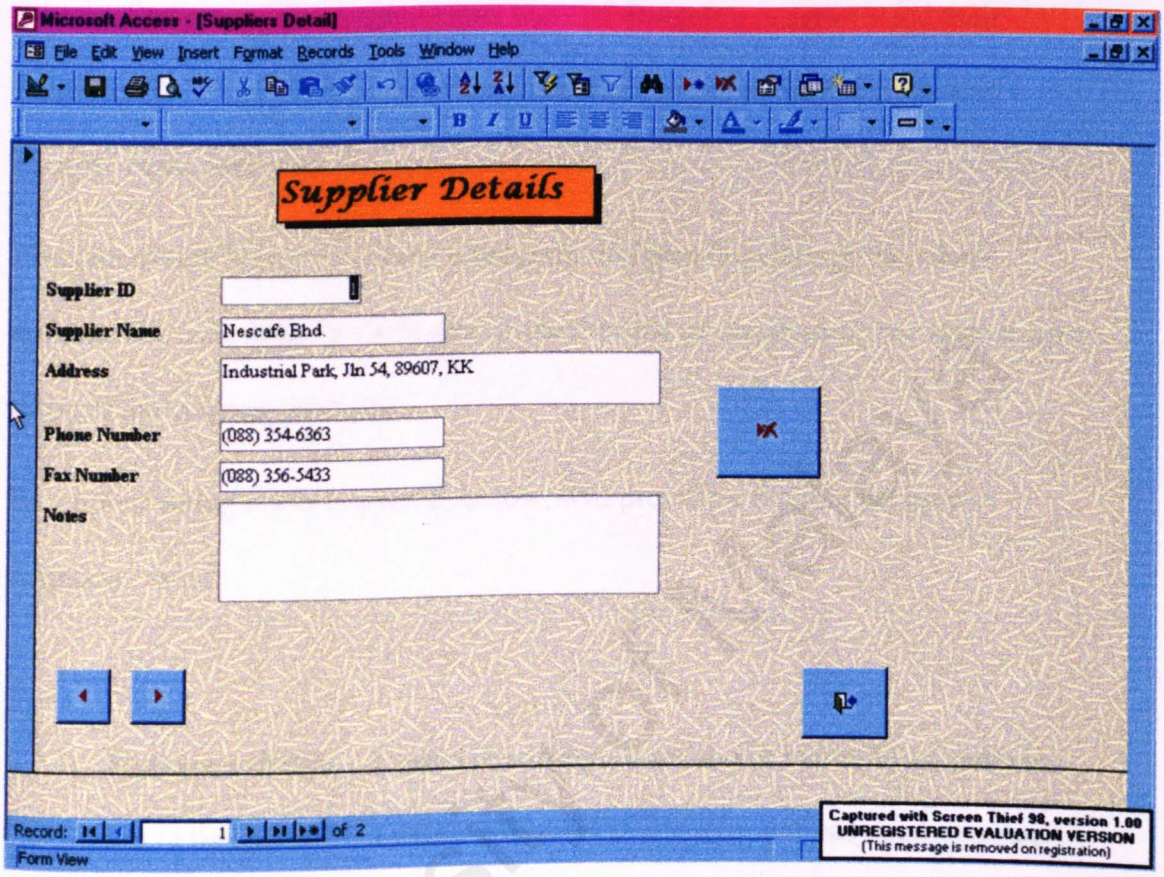


Figure 5.33 Supplier Detail Form

5.10 Program design

Maintaining a system once implemented is said to be more costly than developing it in the first place. There are various ways of designing programs and their relationships to each other which can make maintenance much simpler and cheaper in the long run.

Program design is basically how a program designer is to design the whole system. The overall design will determine the cost of maintaining the system later through the systems life cycle.

By implementing features such as below, will provide a flexible yet easy to maintain system:

- ***Top-down design*** - A top-down design consist of a hierarchy of modules where by each with a single entry and single exit. For easy maintenance and modification of the system, there should be a separation between parts of the system represents the underlying philosophy and parts which are in more detail. By implementing a top-down approach, the philosophy is embedded in the higher level modules, while the detail parts are performed by the lower level modules.
- ***Each module manageably small*** – As each module is smaller, it will be easier to find errors in the code and make amendments to that code where necessary. The only problem with the size of these modules is that there will be a huge number of these small modules in the system therefore the

University of Malaya

time saved to make amendments of an error may be lost in trying to locate the correct module.

- ***The black-box approach*** – In this approach, the module is looked in terms of its inputs and outputs rather than looking at the codes. Therefore if given any input, the output will be predictable because the module has been designed as a black-box which makes the system easy, quickly readable, and maintainable.
- ***Isolation of function*** – If a module has a function, which is completely within that module, then modifications to that function will only affect one module. By doing so, it easy to identify where changes is to be made and therefore should be simpler to do test and implement.

University of Malaya

5.11 Network Design

There are a number of ways to implement a network in an organization. The process to implement such a network can be very simple if the design alternatives are restricted and the selection of equipment is straightforward.

But in usual cases, this is not so because as the network grows larger in size and complexity so do the process of network design.

There are six general steps to the model which should be used throughout the design process:

- Define network objectives;
- Plan alternative solutions;
- Analyze alternative solutions;
- Design network;
- Implement network;
- Evaluate results.

The RCOS network design is based using the STAR topology network design. Although it is more difficult to set up, it does ensure the continuous transfer of data and reduces the risk of transfer breakdown. This Network uses a central node, which is the host or main terminal connected to a number of other terminals individually. Therefore should a communication line breaks down it only affects a single terminal and not the entire network. Star Topologies are very popular

University of Malaya

because of the relatively low cost incurred and the central control that they provide.

The physical transmission used in the proposed system is the Unshielded Twisted pair (UTP) cable. It is preferred because it is more economical than Coaxial Cable or Fiber optics. It is also easier to install and is capable of providing transmission speeds of up to 100 Mbps, as well as the fact that most buildings are pre- wired with existing feeder networks used originally for telephone systems. Therefore making it easier to extend onto the available network. It is also the most widely used mediums for LANs.

The Network Interface Card used in the business is a requirement needed to interface to the LAN physical transmission Medium. It is normally in the form of a card or circuit board, which is slotted into the system bus of the motherboard in the computer system to provide the physical implementation of the protocols used. The Network Hub provides an easy way to connect cables as well as concentrator with multiple ports, which allows connection from network cables from different PCs. It also acts as repeater or amplifier to extend the maximum distance length for the network cables. The PCs attached to the network allows the user, access to local shared devices or resources such as disks and printers that are connected to the network.

We have chosen a File Server to be used in our network environment, which will allow a single, central file store. Centralization makes updating of data easier and also provides better security. To gain access to the Internet, High grade Modems will be used in conjunction with the server for better access to the Internet.

University of Malaya

Modems are Modulators changing Analogue signals to Digital ones and vice versa.

The various terminals will be arranged according to the number of PCs, which will be made available upon opening of the business, and therefore the Network design will then be done according to the Star topology which uses individual links to the host. And thus this will be decided later on, as well as according to the design and outlay of the Restaurant Customer Ordering System (RCOS).

Below shows a diagram of a proposed network layout for the RCOS system

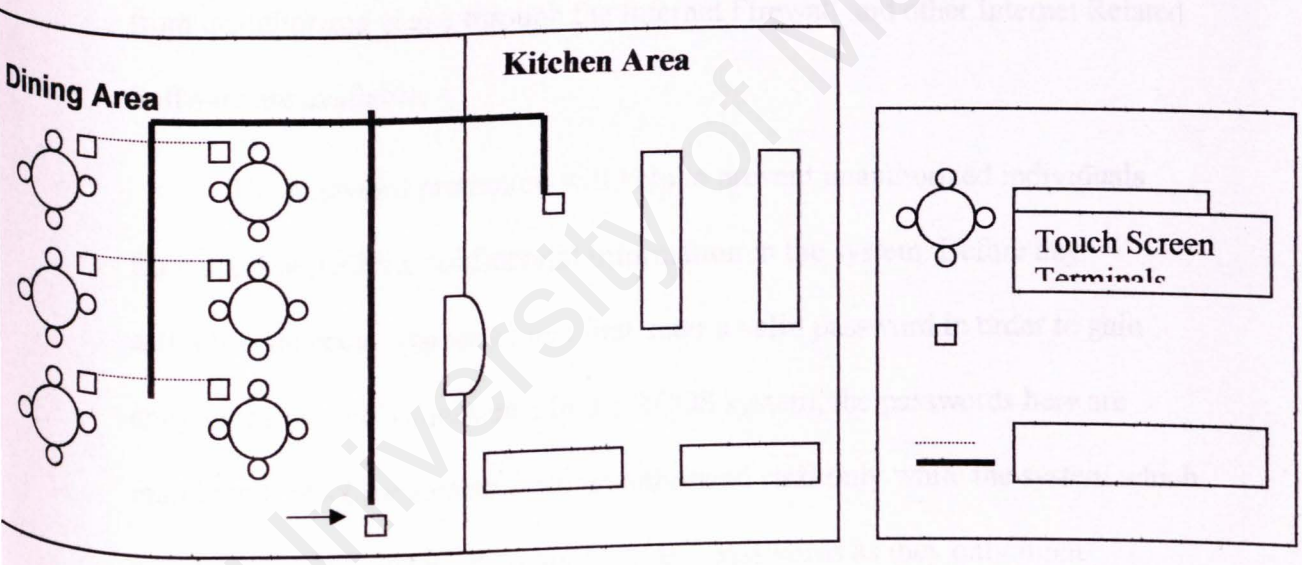


Figure 5.34 Proposed Network Layout

University of Malaya

5.12 Security Design

A system is subjected to numerous threats be they accidental or deliberate, the consequences however are very serious causing losses of availability, integrity and confidentiality of a system. These effects might even lead to the downfall of the system.

Therefore to protect the RCOS system some security measures are implemented which includes password protection, back up systems, Anti virus programs and even an Uninterruptible Power supply (UPS) facility. For protection from unauthorized usage through the Internet Firewall and other Internet Related Software are available.

The password protection will help to prevent unauthorized individuals from accessing all the confidential information in the system. Before any activities can occur, the user must first enter a valid password in order to gain entry to the system's functions. In the RCOS system, the passwords here are mainly to protect the system from unauthorized staff only while the system which interacts with the customer do not have any passwords as they only input information which would not affect the overall system integrity.

This request will only appear upon opening the system .To prevent warding eyes from glimpsing at the password as they are entered, the password will be changed on a monthly basis.

University of Malaya

The Back up system is designed to protect the system against loss of data. Duplicate copies of data are regularly made and therefore a back up of the system and its information would always be available should any major system failures or other occurrences involving the loss of data occur. This can be done by using a function in Windows 98 that is going to be installed in all the computers in the RCOS system. Note that this precaution will only be effective by constantly backing up the system regularly.

Viruses can be spread through almost any transference of data and thus need to be prevented. Anti-virus programs are designed with a sole function in mind and that of catching viruses and dealing with them. These programs detect virus like behavior and alert the user of its existence, it then searches for the virus's identification through a large list of previously identified viruses which usually comes with these programs. The most common software now are: Norton, Pc-Cillin and Mc Afee Anti virus programs. Any of these programs are sufficient to protect the system, although regular updates are required to catch up with the ever-growing number of viruses appearing every day.

An Uninterruptible Power Source (Ups) will ensure data from being lost by automatically providing power to the system should a Power outage occur. This unit can be purchased to accommodate the main terminal or host to ensure data loss or data corruption does not occur. Although the power provided is limited it does however allow the user sufficient time to save their current work.

Firewall is just an example of an Internet Protection software designed to protect users from being interrupted or even invaded by an unauthorized user

University of Malaya

through the Net. The use of Internet, in the restaurant system is optional as some restaurants have a closed network in place, which do not require an Internet service.

The firewall program protects the user's I.P address thus disabling access by other users. Firewall is basically a control to prevent unauthenticated logins from the outside. This prevents Network Problems from spreading through out the entire network as well as limiting the amount of damage these problems might cause. Alongside Firewall other newer and more advanced software are currently available in the market.

University of Malaya

5.13 Hardware and Software Requirements

Hardware is very important for any particular program to work. A program or software needs hardware for it to work or as a base for the software or program to be installed to. The whole PC is made of hardware, or as we can say, it consists of parts of hardware.

There are many variety of hardware that we can find in the market, and installation of those hardware is simple because normally these hardware often comes with user manual and installation guide.

The RCOS system, requires a network in place, therefore, a number of hardware and software in reference to this network is required to make the RCOS system to function operationally. Below shows some of the Hardware and software requirements for the RCOS system:

- Intel® Pentium® III Processor 450MHz
- Intel® SE440BX-2 Motherboard
- 64MB 100MHz SDRAM
- 10GB Seagate U-ATA/66 Hard Drive
- 1.44MB Floppy Drive
- Creative Riva TNT2 16MB AGP Graphic Card
- 40X LG Multi-Read CD-ROM Drive
- 10/100 Fast Ethernet Adapter

University of Malaya

- LG Digital Monitor with MPRII
- Touch Screens
- 108 Acer AccuFeel Windows 98® Keyboard
- ATX MID Tower Casing
- Microsoft PS/2 Mouse & Pad
- ALTEC LANSING ACS 91/ACS 22 Speaker

As for other main hardware used in the RCOS system are as follows:

- Printers
- Touch screen terminals
- Magnetic stripe reader
- Cables
- Network interface card (NICs)
- 1 unit of Uninterruptible Power Supply UPS

And for the server, the purchase of PC with the following specification are needed:

- Intel® Pentium® III Processor 500MHZ
- Intel® T440BX Server Board (ORIGINAL BOX)
- 64MB 100MHz SDRAM (upg to 768MB)
- 4.5GB Seagate Medalist LW SCSI Hard Drive
- 1.44MB Floppy Drive

University of Malaya

- Cirrus Logic® 2MB SGRAM Integrated Graphic
- 40X LG Multi-Read CD-ROM Drive
- Ultra Wide Integrated SCSI Connector
- Intel® EtherExpress™ Pro+ 10/100Mbps Integrated Network Adapter
- LG Digital Monitor with MPRII
- 108 Acer AccuFeel Windows 98® Keyboard
- Premium ATX MID Tower Casing
- Emergency Management Port & Intel Server Control
- Microsoft PS/2 Mouse & Pad
- Intel Validated Server c/w certificate

Meanwhile for the software requirements for the RCOS system the basic requirements are as follows:

- Microsoft® Office 2000
- Norton's Antivirus 5.0
- Internet Explorer 4.01
- Netscape Navigator 5.0
- Visual Basic 6.0 (Interface of the program)
- Microsoft Windows 2000

Added with these software, additional programs which might be required by the user will also be included once the RCOS system is fully operational.

University of Malaya

5.13.1 Visual Basic 6.0

Visual Basic 6.0 is a object oriented programming. This software has 3 main component that is object , properties , and method .

- Object is a thing or name
- Properties describes the object characteristic such as name , size , and color.
- Method is function that is done by the object .Example move , print , resize , calculate and clear.

Visual Basic 6.0 combines one set of software technology that is called as Active X . This technology accept creating , integration , reuse software component that is known as control.

5.13.2 Advantage Using Visual Basic 6.0 :

- Many interesting user interface feature .
- Easy to change the feature of a form or sub program using program.
- Easy integration and automation using other application such as ODBC , Excell , Fox Pro, Paradox and etc.
- Easy designing graf and charts using programs.
- This software can combine with Microsoft Access which can reduce to cost of designing a system.

University of Malaya

5.13.3 Microsoft Access

After doing some observation over some software that can be used , I found out that Microsoft Access is suitable for developing the Database for the Restaurant Customer Ordering System . The reason of using this software is :

- Can enter table or query .
- Can import , export data from list html table in a web site
- Easy and faster in creating records compared creating using codes
- Can combine with software Visual Basic 6.0
- Easy specification of types of data.
- Easy to find and fix fault in codes

University of Malaya

5.14 System Justification

The features of the Restaurant Customer Ordering System :

1) The system will be develop using software Visual Basic 6.0 as the user Interface and Microsoft Access 2000 as the database.

2) Easy to understand the system , with familiar icon.

3) Password protection will help to prevent unauthorized individuals from accessing all the confidential information in the system.

4) This system got protection data because the system is a "stand-alone" system and not a "web-based".

The reason developing the system as a "stand-alone" :

1) Easy for the Management to do the restaurant operation without any hassle with busy internet line.

2) The cost of developing the system as a "stand-alone" is more cheaper Compared "web-based" because we do not need connection internet.

University of Malaya

CHAPTER 6

SYSTEM IMPLEMENTATION

University of Malaya

System Implementation

6.1 Introduction

The stage of implementation brings us to the final stage of the project, which all theoretical work that has been done, is turned into practice. This is where the system design is transferred into a working operational system.

A lot of careful planning and control is required at this stage, as the impact will be disastrous to the organization if not done so. Plans for the implementation is done early in the design stage to avoid delay.

Although the system has been implemented, the system must still undergo changes and amendments where necessary, which also need to be tested and implemented once again.

Below shows what is to be covered in this System Implementation stage in reference to the RCOS system:

- Hardware and Software Installation
- System Implementation and Planning
- System Testing
- Implementation

University of Malaya

6.2 Hardware and Software Installation

The process of installation of the hardware for the RCOS system will be implemented gradually as it arrives and is installed. Based on the network design, all hardware's will be connected to its respective places.

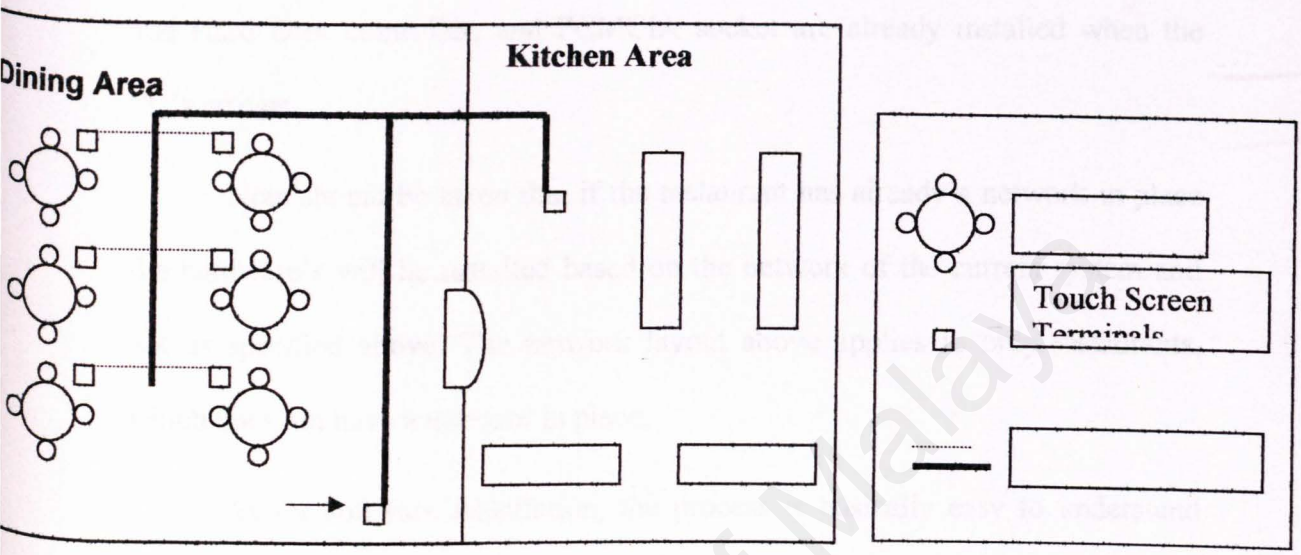


Figure 6.1 Network Layout of the RCOS system

The number of touch screen and PC's in the restaurant depends on the requirements of the restaurant itself. The general network layout will stay the same in all cases. Firstly, after identifying the different parts of the hardware's, we then proceed to connect the various connectors to their respected ports. In the case of the plug and play devices in the computer such as the graphics and sound cards, we merely slot them in their proper slots, the plug and play mechanism will detect the devices automatically as many devices in the market are plug and play. The procedure of installation will be quite easy as everything will come with user-

University of Malaya

friendly instruction This applies to all the other devices as well, but in all cases the procedure will be done with network expertise to avoid any confusion during installation. Meanwhile, for the network card, Hardware controller, Floppy Disk and Hard Disk controller, and PCMCIA socket are already installed when the PC's arrives.

Note should be taken that if the restaurant has already a network in place the hardware's will be installed based on the network of the current system and not as specified above. The network layout above applies to only restaurants, which does not have a network in place.

As for software installation, the process is basically easy to understand because the installation process is user friendly and requires no specific expertise. For the project, the software that is being implement is tailor made, therefore the process of installing the system is quite user friendly whereas it only requires following the instructions stated. Included in this book is the user manual for reference to the user. The RCOS program comes in a compact disk, therefore, the user or management can just copy the installer into their system and then run it. Once the install execution is run the installation process will guide the user until the program is fully installed into the system. Just double-click the .exe file then the programs will load itself for the user or management to use.

University of Malaya

6.3 System Implementation and Planning

For the system to work properly it is first tested thoroughly by the designer and the group to ensure that it can function in almost any type of operating system that can accommodate it as well as finding out the flaws and errors that can be corrected.

The system is firstly compiled from it's initial environment and then made into a installation program, it is then installed into various computer of different operating systems and it was discovered that the system can only function properly when in use with conjunction of any Windows operating systems.

It is then tested thoroughly by testing its different functions separately and then tested altogether as a whole. It has come to the attention that although the system is functioning properly and within its specified requirements, it still lacks the level of user friendliness that was expected initially.

Once all the preliminary testing are done the system should then undergo trial testing by the time the business is operational. Then the system will truly be put to the test as to evaluate its efficiency and resourcefulness. During this trial run, the designer and any other qualified programmer so as to gain more insight on how to further improve the design as well as upgrade the system should regularly test the system.

Even through all this rigorous testing and trial, the program is expected to live up to its expectations and no serious damage is predicted to occur during the course of its usage. As a precaution to these dilemmas a technician preferably an

University of Malaya

employee of the restaurant who is well versed in the system's internal works should be present should anything happen.

Although we can prepare for the worse case scenarios and accidental mishaps, the biggest cause for computer error and system crashes is still user error, whereby the user neglects the system or tamper with its vital files out of curiosity and thus causing irreparable damage. This and a few more other possibilities must be accounted for in order to prevent situation where damages such as these might cause either the business to fail or suffer.

University of Malaya

6.4 System Testing

Before any implementation procedure commences, system testing is required to be carried out to ensure that the system works accurately and efficiently before it is put into full operational. System testing includes all clerical and computer aspects.

The system is tested on several levels, and throughout the project life cycle. All programs should be tested individually and later on as groups to verify that all links between the programs are correct. The programs are then tested as a complete system once all program links are validated.

In similar cases, the hardware's and communication links must be tested individually to ensure that they are functioning correctly as required before testing it as part of the complete system.

The final procedure under system testing before changeover to the new system is the link between all tested and verified programs with the tested hardware to ensure that the system is able to work under all operational conditions.

User staff may be involved in the testing phase to get their view on the system but being sure that all hardware's and software's have been thoroughly tested and validated. Result of not doing so is failures, which are cause from minor computer errors that can cause confusions and frustration for the user and result in lack of confidence in the system.

University of Malaya

Before systems testing can be carried out, certain checks must be made. These checks are as follows:

- A review of the information flow;
- A review of input and output volumes;
- Considerations of the interactive with other systems.

During the preparation of the RCOS system requirements, the most important thing that was in consideration is the specification of acceptance criteria, together with an acceptance plan or procedure. This process of system testing should first be reviewed and put into operation. The extent to which the system must be tested is up to the system analyst.

For the RCOS program, system testing is done often as necessary, to ensure that the system will always meet its user requirements whereby it can and always fit to do all the required process. Such system testing that was done on the RCOS system is as follows:

University of Malaya

- Implementation of the software into a PC which speed is Pentium155 and less (The program works).
- Installation of the program to a non-Pentium PC (The program works)
- Link of connection between 2 computers using a network adapter (The program works).
- Changing the destination folder of the program (The program works).
- System trials involving novice users. (Program accepted).
- Testing of the user interface both staff and customer. (Very good)

Attribu	Measuri	How	Worst	Planne	Best
Training need	Time to solo ability	Sample10 new users	1 Day	0.5 Day	2 Hours
User error rate	% of actions changed	Interaction with computer	>=5%	1-3%	2%
User min qualification	% of correct answers	Built-in 10 min. test	30%	70%	90%
Coherent	% who agree with our ideas	Sample opinion survey	95%	100%	100%
User opinion	% of users who approve/like	Survey 10 users	-	90-99%	100%

Figure 6.2 Usability Attribute Template

University of Malaya

6.5 System Implementation

Implementation may involve changes from a manual to a computerized system or from one computer system to another. In both case, the data's and procedures need to be changed.

Changeover may be defined as the time from start when the new system is operational (i.e. cut -over) to the withdrawal of support from the Information Technology (IT) department, exceptional for maintenance.

Before the changeover to the new system is done, certain tasks is required to be accomplished. One of these important tasks is the required master data must be assembled. These data may exist in a clerical or computer files, or on databases of the organization. These data can be acquired by the use of forms.

Due to the implementation of the new system, a new central hardware or remote terminals of various types are introduced. Reliability of the central hardware or remote terminals must be done. The telecommunications links must be checked for all remote terminals, which are involved in the system.

The changeover method depends on the type of application and operational constraints involved. The responsibility of changeover is usually done by a committee, which includes a computer technical staff and users. The activities of the committee will include scheduling of the task, consultation with the users, monitoring the process of implementation and communicating with users and IT staff.

University of Malaya

In addition to this, various acceptance criteria will be done, for example the response times, the degree of reliability expected from the system, and the error rate which can be tolerated on input. All of these should be agreed during the initial planning process and is necessary to provide both users and system developer with a target to the extent where the implementation can be measured.

The main tasks immediately prior to changeover are:

- Data conversion
- File setup
- Integration Testing
- Procedural conversion
- Control procedures
- Documentation

6.6 Data conversion

Before the system is implemented, all master files must be set up to support the new system. Setting up the master files can be a massive task and which is often underestimated. Thousands of records are prepared using data from a number of different sources.

University of Malaya

6.7 File setup

After collection of all the necessary data and conversion to machine readable form is done, the files must be set up for the first run of the new system. A file creation program is needed for this procedure. A utility program can be used to do the job if available but in others the normal programs for handling master file insertions can be used. Some of the major problems associated with file setup are to achieve accuracy, and further detect and correct any inaccuracies that are necessary.

6.8 Integration and Testing

Before proceeding with the changeover process, it is necessary to check that all hardware and software components, data communications and procedures are able to work together. During the program-testing phase all individual programs are tested in isolation. Once this is done, the system developer must now make sure that the programs can operate as a suite of programs and produce the expected results from the raw data acquired.

Factors to look out for in this process include:

- Files created by one program being processable by subsequent programs.
- Being able to go round each cycle of processing a number of times.
- Correct use of passwords.
- Adequate control and audit reports.

University of Malaya

If the system being implemented is on-line, additional checks must be made. Testing will have been carried out using a few terminals to ensure that all terminals work and the acceptability of response times when all terminals wish to transmit simultaneously.

A specialist, who will ensure that a given terminal is in working condition, normally does the installation of terminals. This means that all terminals is connected to the appropriate wires and that signals pass in both directions to the central machine. In either case, it does not ensure that the user of the terminal will actually be able to access the application system.

Terminal identities and passwords are often required to be specified to the telecommunications and applications software. Tests should be carried out before users are asked to try out the system. Integration testing is often considered a checkpoint for quality assurance.

6.9 Procedure Conversion

The actual conversion from old procedures to new computer procedures to new computer procedures must be considered. Planning for the method of changeover is dependent on the type of application and potential impact on the company of any problems which may arise.

There are 3 methods of procedure conversion, which are:

- Direct changeover,
- Parallel running,
- Pilot running.

University of Malaya

For this project the best approach for changeover would be parallel running changeover which is the method of processing current data by both the old and the new system and then cross-checking the results. This method is an extension of the testing phase, which enables better training and fuller testing being done. But for restaurants, which are new, direct changeover can be used because it involves less cost.

6.10 Control procedures

Control procedures are very important no matter what changeover method is used by the organization. The controls for the old system should be reviewed to determine if they could be transferred to the new system. Any changes or new controls required by the system needs to be established. The main reason for the introduction of a new system is a recognized need to improved controls.

6.11 Changeover documentation

Exceptional perhaps with a direct changeover, the operational requirements of the changeover phase, for both users and computer operations, are likely to differ from the requirements for normal running. Those concerned in implementing the changeover should be informed of these differences.

University of Malaya

Special procedures must be scheduled and carried out, and instructions given for them. It is recommended that, clear requirements of these should be documented in a formal manner.

The introduction to the documentation should include a brief introduction to the new system, reason for changeover and outline method for changeover. The responsibility for the changeover procedures should be clearly defined. This would include:

- Clerical and terminal input procedures;
- Computer input documentation;
- Computer output documentation;
- Non-computer documentation.

In addition to the operational documentation for changeover, there may need to be special instructions on:

- Computer requirements;
- Input data;
- Files;
- Output data;
- Programs;
- Operational procedures (normal, abnormal and restart).

University of Malaya

The changeover to the new computerized system is the end of the systems development cycle. This is the point at which the overall success or failure of all work during the project is demonstrated. Careful planning and control is done to ensure a smooth transition from old system to the new system. The accuracy and complete capture of data for the new system is of great importance. All components of the new systems, such as hardware and software should work together with no errors involved. Finally, a well-defined method of changeover from the existing system to the new system must be established.

Any problems faced at this stage of systems development can have a serious effect on the long-term viability of the system, and also upon user's perception towards other computer systems development.

University of Malaya

Conclusion

Based on the project documentation, it is hope that people are able to have a clear idea of the overall process of development and implementation with the use of SSADM method and techniques. The project has highlighted all problem areas and ways of improvement to the current system by introduction of the proposed RCOS system.

The intension of this completed project is hopefully that organizations such as the restaurant business are able to implement a system such as proposed to further improve their business efficiency especially in terms of management and customer service at a cost, which is justifiable.

The project documentation of the proposed system, is a basically a guideline and reference point for organizations such as the restaurant business on the objectives and ways of development and implementation of the system proposed.

The main stages involved in the development of the proposed system are :

- Preliminary Study
- System Analysis
- System Design
- System Implementation

Each stage has been discussed in detail through the documentation to give a clear idea of the overall process of the development life cycle of the proposed system.

University of Malaya

BIBLIOGRAPHY

University of Malaya

Bibliography

Ray Bradley (1987) Understanding Computer Science 3rd edition. Stanley Thornes.

C.S. French (1992) Computer Science 4th edition. ELBS.

NCC Education Services Limited (1998) System Design Techniques. NCC Education Service.

NCC Education Services Limited (1998) Business System Development and Implementation. NCC Education Service.

NCC Education Services Limited (1998) System Analysis Techniques. NCC Education Service.

Ian Sommerville (1995) Software Engineering 5th edition. Addison and Wesley.

The National Computing Centre Limited (1992) Network Design. NCC Education Service.

APPENDICES
University of Malaya

APPENDICES

University of Malaya

Interview

(Q) Does the restaurant have a current system in place?
(A) Yes.

(Q) Is there any backup of any kind in your current system?
(A) Yes.

(Q) Do you backup your system regularly?
(A) Yes.

(Q) What is the cost for implementing the current system?
(A) More than RM20,000.

(Q) Does the system fulfill the business requirements?
(A) Not really.

(Q) How many employees are needed to handle customer order?
(A) Usually we have only 3 but it depends really on the size of the restaurant.

(Q) Time needed to handle an order?
(A) Less than 5 minutes but sometimes there could be a delay.

(Q) Is there sufficient chairs and tables to accommodate customers?
(A) Sometimes when it is not during the peak hours or festive seasons.

(Q) What areas does the system cover?
(A) Management

(Q) Is the cost of maintenance high?
(A) Yes. If it concerns major problems.

(Q) What is your view of the proposed RCOS system?
(A) Sounds great as long as it does not concerns high cost.

(Q) Would you implement such a system?
(A) Yes.

(Q) Is customer service a great importance?
(A) Yes. Very much.

University of Malaya

User Manual

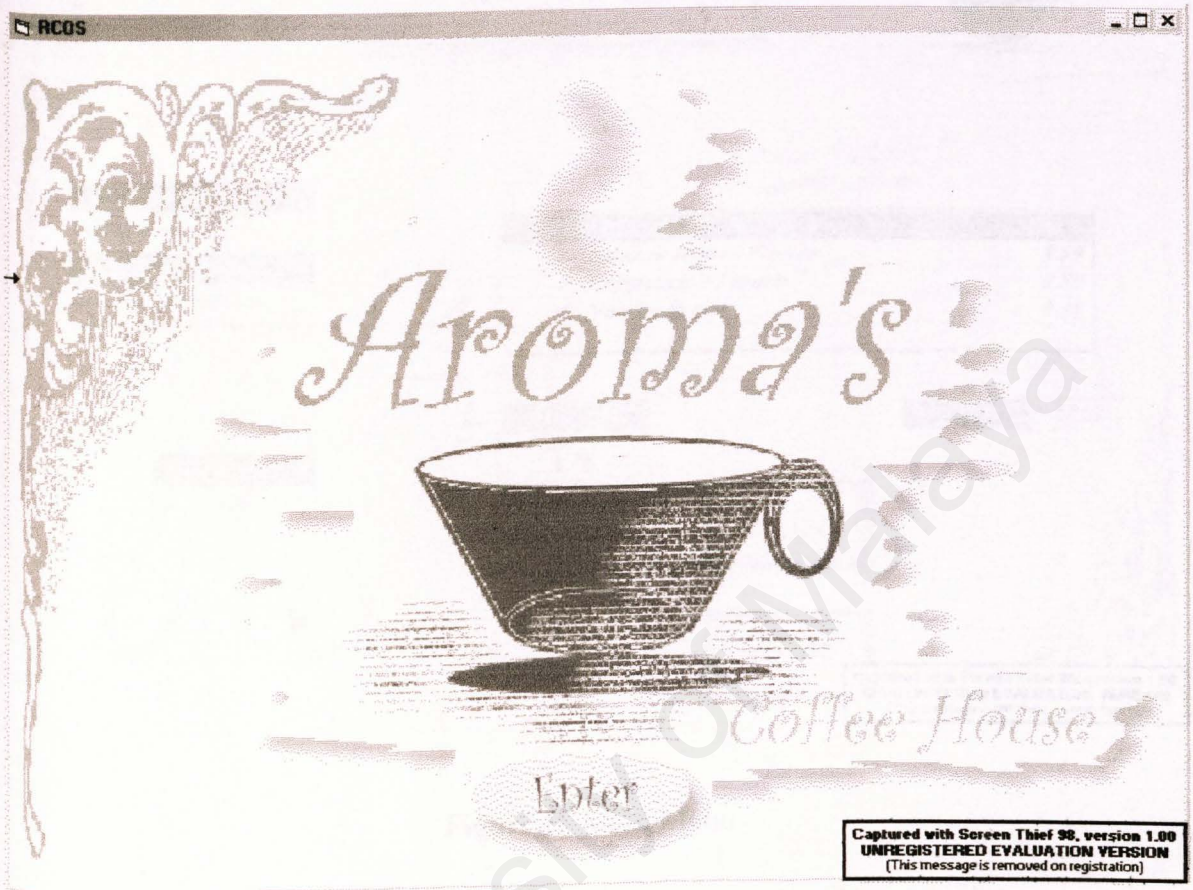


Figure A Welcoming Screen

Each table is equipped with a touch screen terminal, which is connected to the management system in the kitchen through a network line. On starting the system, each table will show the welcoming screen of the RCOS system. Below the screen is the button ***Enter.*** The customer will then press this button which bring to the next screen.

University of Malaya

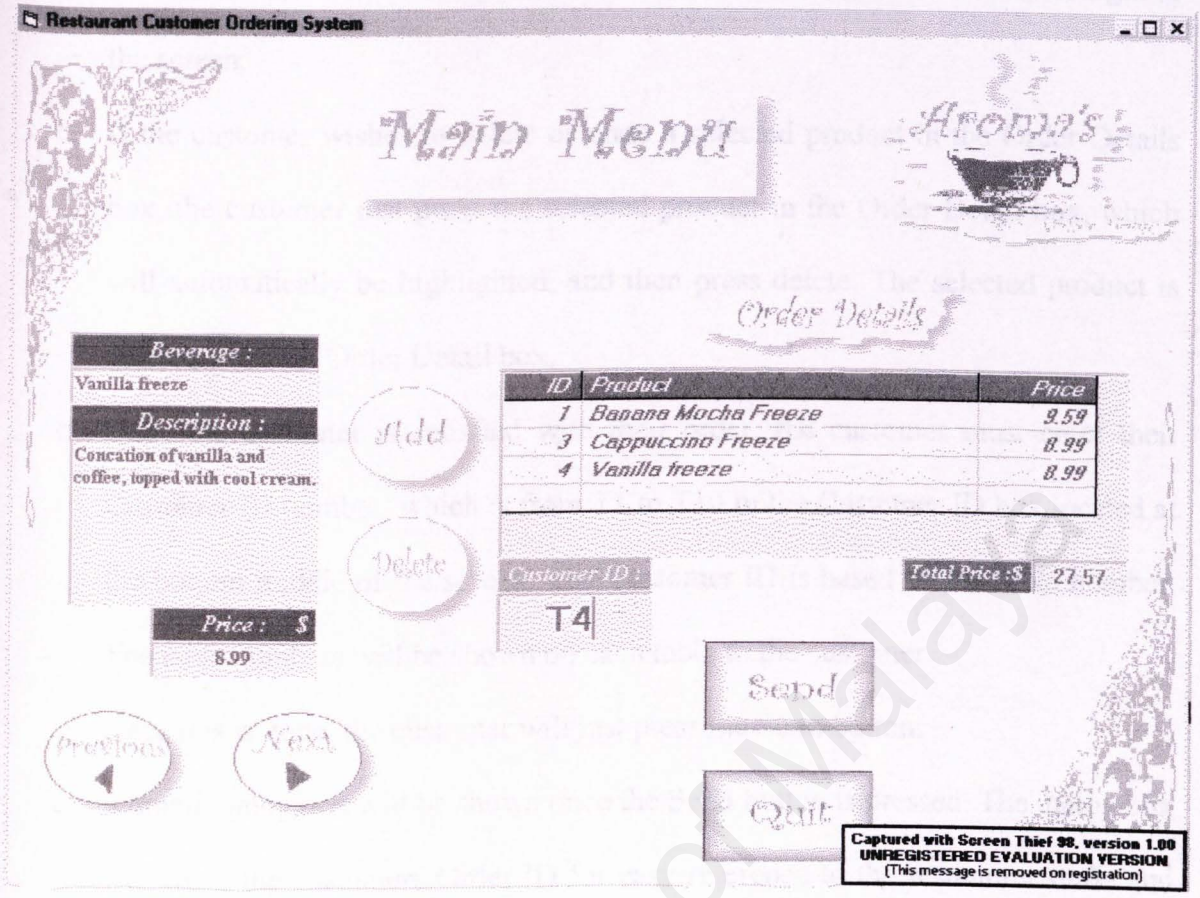


Figure B Main Menu

This screen shows the main menu where the customer makes an order. On the left of the screen shows some boxes where the details of the product are shown. There are buttons around the box, which performs the required functions once pressed. The first process of ordering will be the selection of product, which the restaurant has to offer.

- The customer scrolls through the menu by pressing ***Previous*** or ***Next*** button.
- If the customer finds what they are looking for, the customer then presses the ***Add*** button.

University of Malaya

- The selected product will be shown in the Order Details box located at the right of the screen.
- If the customer wishes to delete or undo a selected product in the Order Details box, the customer just press the selected product in the Order Detail box, which will automatically be highlighted, and then press delete. The selected product is deleted from the Order Detail box.
- Once the customer is satisfied with their order, the customer must enter their Customer ID number, which is from T1 to T10 in the Customer ID box located at the bottom middle of the screen. The Customer ID is based on the table number. The table numbers will be shown on each table to the customer.
- Once this is done, the customer will just press the **Send** button.
- A small dialog box will be shown once the **Send** button is pressed. The dialog box will show the customers Order ID for easy reference to the restaurant staffs and the total price of their order.
- The customer then presses the **OK** button on the dialog box and the Welcoming Screen will be shown.

University of Malaya

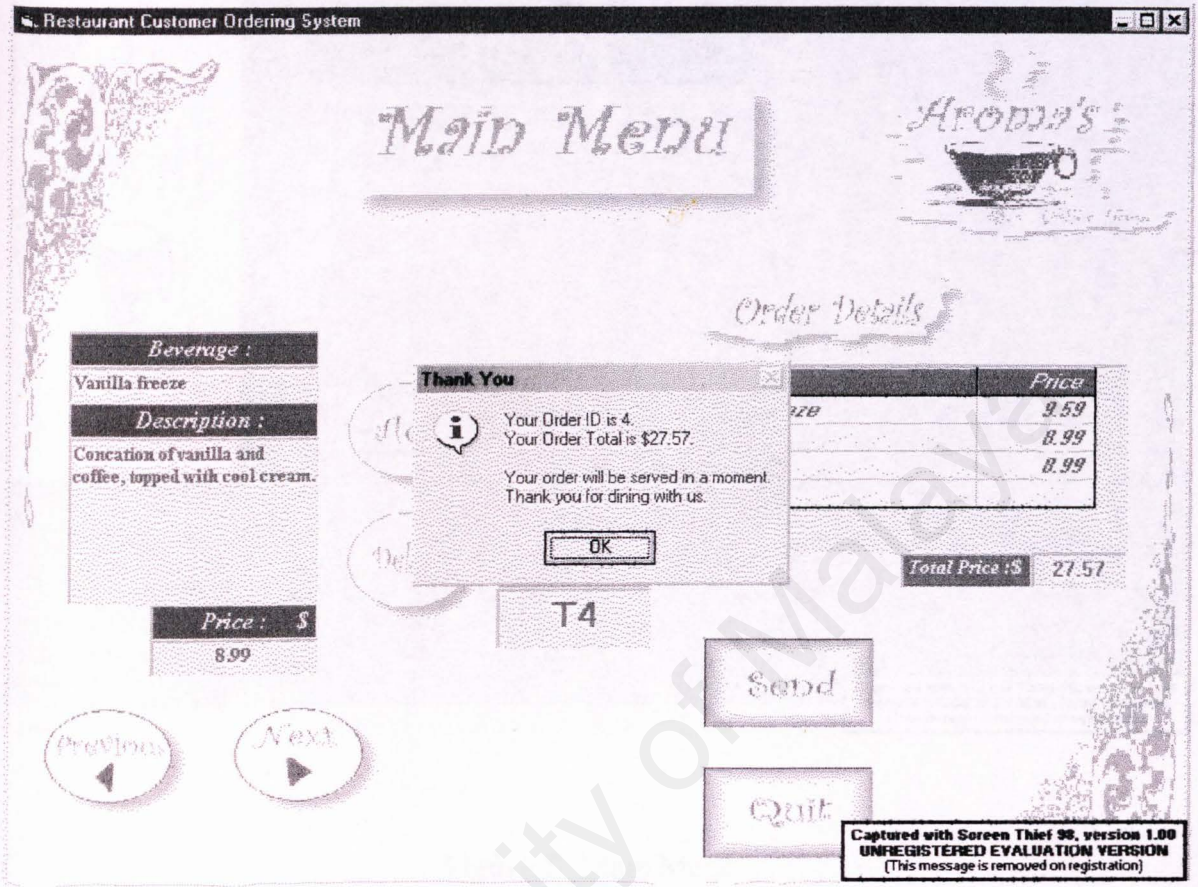


Figure C Ordering Process

University of Malaya

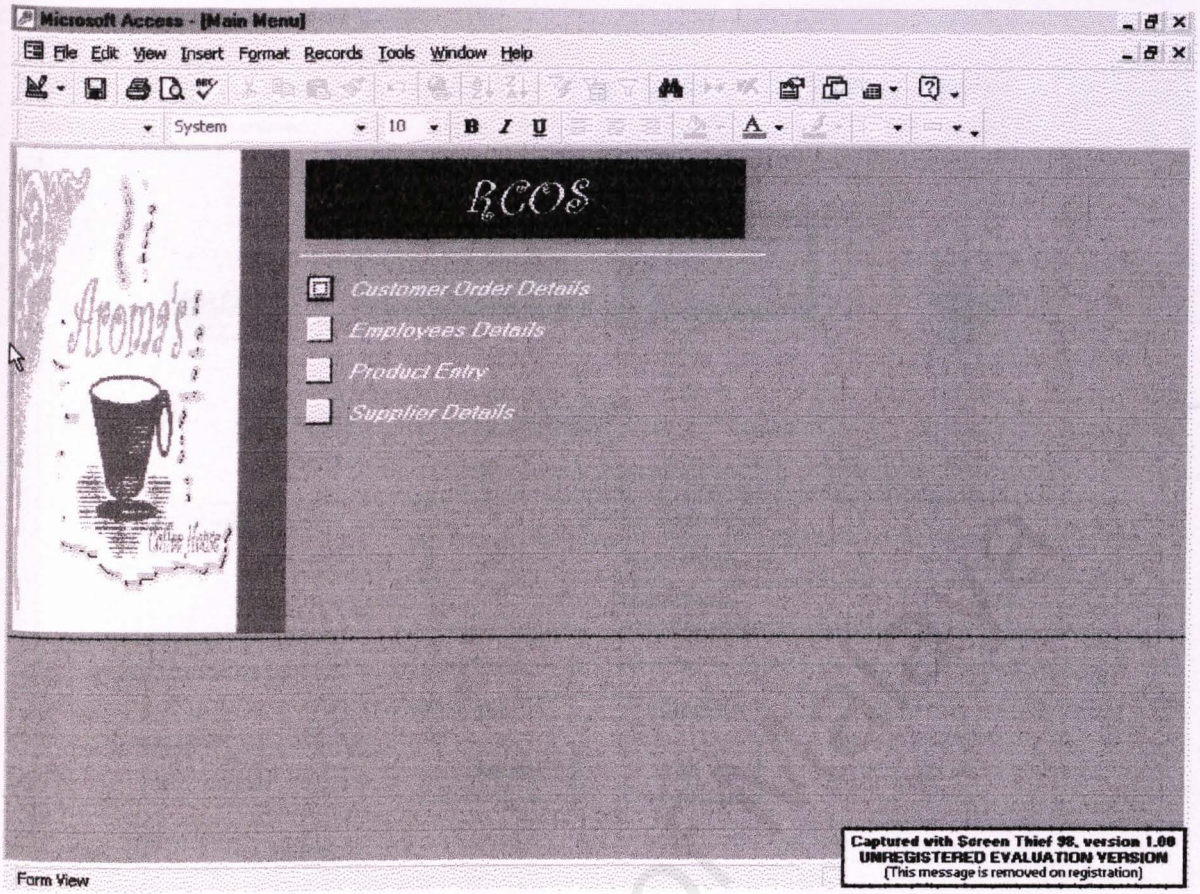


Figure D Main Menu

Figure D shows the main menu screen for the management staff in the kitchen. The staff will make a selection based on what is required by them.

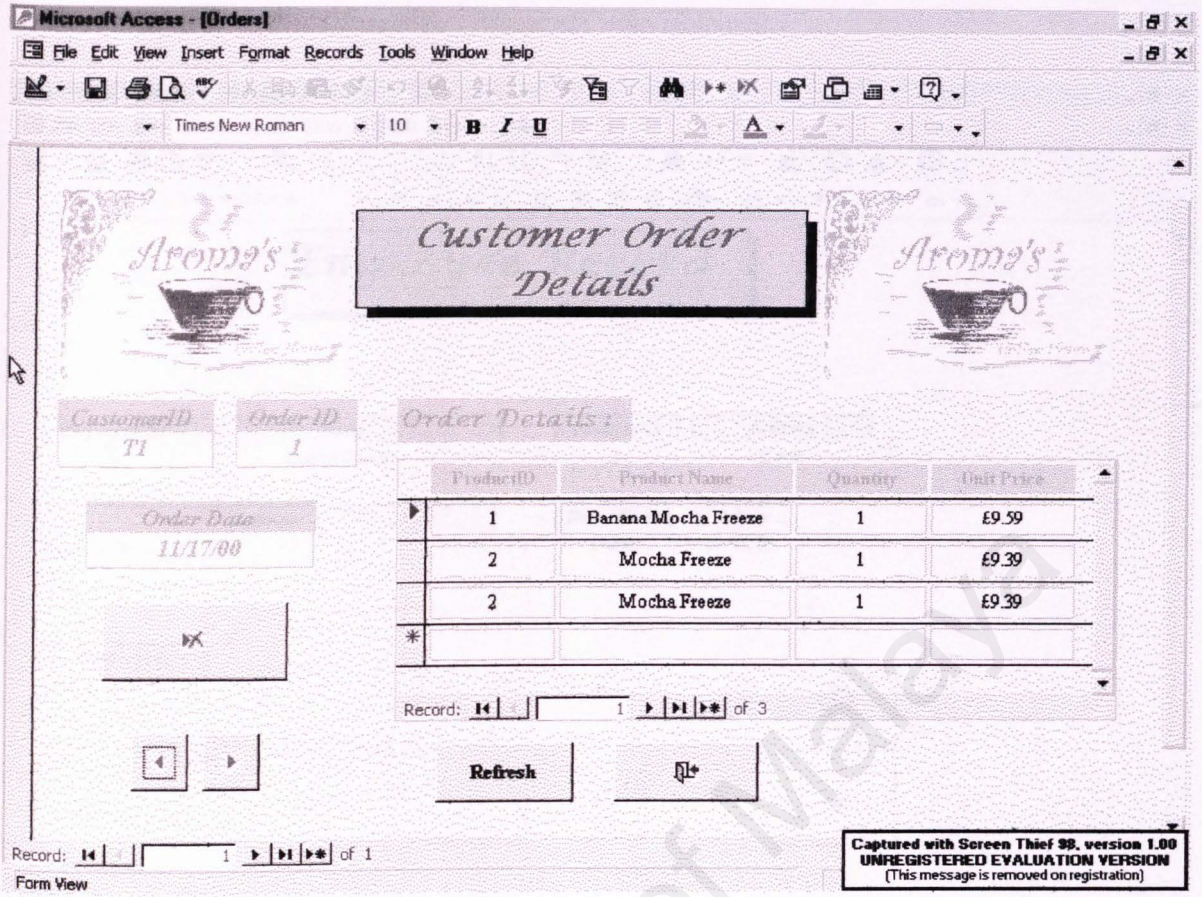


Figure E Customer Order Details

Figure E shows the customer order details. The customer orders are in sequence. Staff can also monitor the time the order was made by a particular customer by just clicking on the Order Date Box.

Staff can scroll the customer order records through arrow buttons situated at the bottom left of the screen. Once the order has been prepared and sent to the respective customers, staff then deletes the customer order details by pressing the delete button located at the bottom of the Order Date Box.

Staff can exit the Customer Order Details by pressing the exit button next to the refresh button on the right of the screen.

University of Malaya

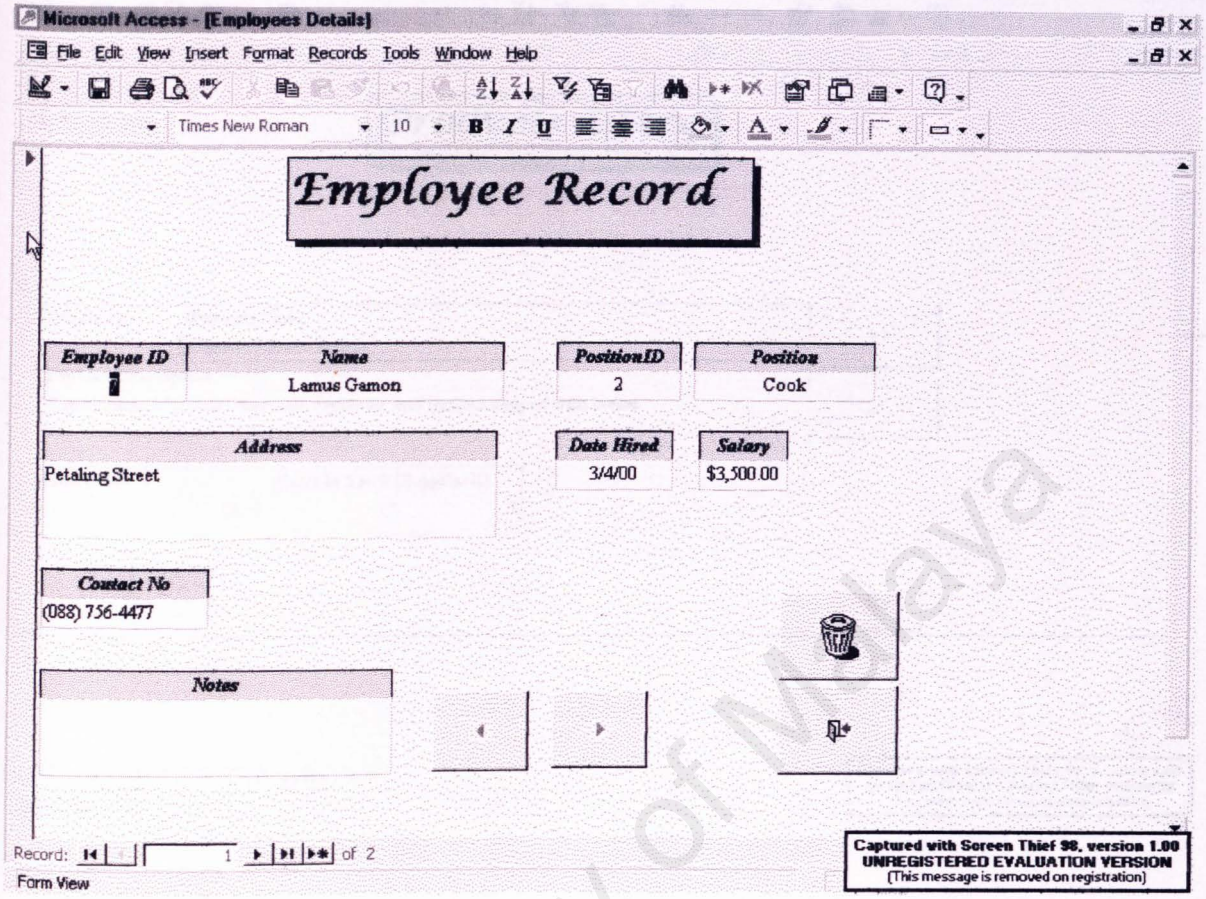


Figure F Employee Record

Figure F shows the Employee Record. To scroll through the records, just press the arrow buttons. To delete a record, just press the button which looks like a dust bin situated at the top of the exit button. To enter a record, just scroll to the last of the records and enter employee details directly to the form.

University of Malaya

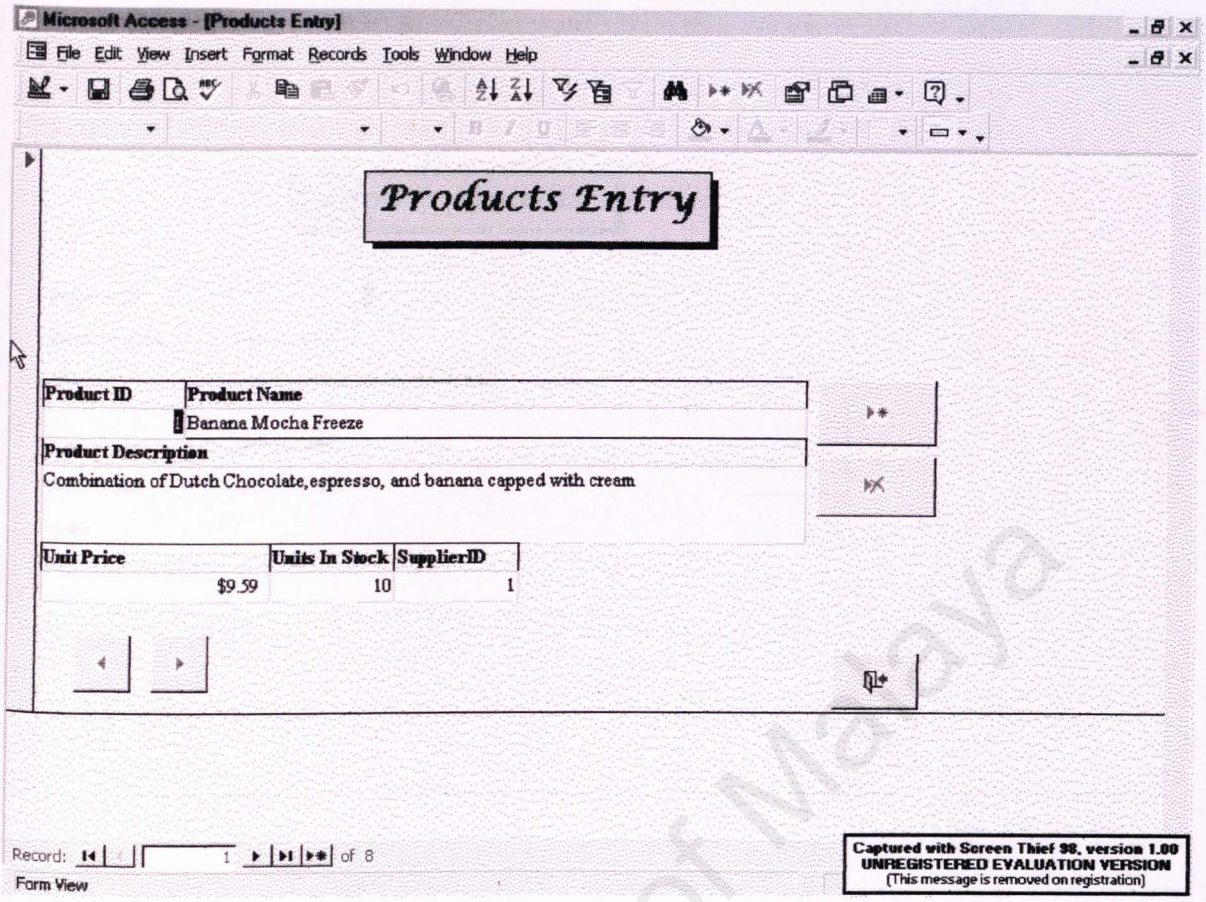


Figure G Product Entry

Figure G shows the Product Entry form. To add an entry to the product records, just press the add button located at the top of the delete button. Scrolling through the records will be the same as the other forms through the arrow buttons.

University of Malaya

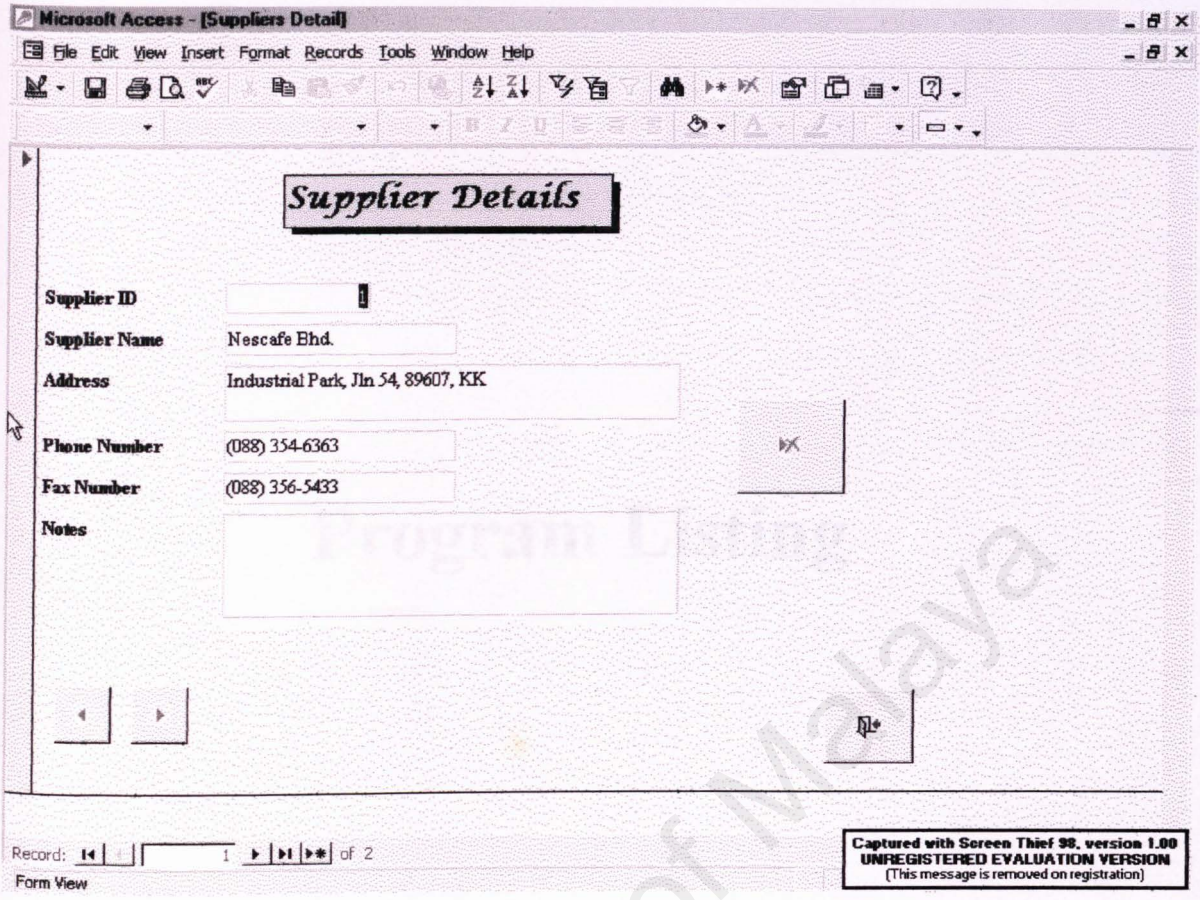


Figure H Supplier Details

Figure H shows the Supplier Details. Scrolling is done through the arrow buttons at the left of the screen. To add just scroll to the last empty record and directly enter the supplier details. To delete a record just press the delete button. To exit the form just press the Exit button at the bottom right of the screen.

University of Malaya

Program Listing

University of Malaya

```
Private Sub Form_Load()

End Sub
```

```
Private Sub Image1_Click()

End Sub
```

```
Private Sub imgEnter_Click()
frmMenu.Show
End Sub
Option Explicit

' Module-level variables
Private mlngNoOfOrders As Long

Private Sub cmdAdd_Click()
   ' Add selected product and its price to the msgOrders
   With datMenu.Recordset
      msgOrders.AddItem .Fields("ProductID") & vbTab _
         & .Fields("ProductName") & vbTab _
         & .Fields("UnitPrice"), mlngNoOfOrders + 1

      ' Calculate total cost of orders
      txtTotal.Text = Format(CSng(txtTotal.Text) + .Fields("UnitPrice"), "###,#0.00")

      ' Increase mlngNoOfOrders by 1
      mlngNoOfOrders = mlngNoOfOrders + 1
   End With
End Sub
```

```
Private Sub cmdDelete_Click()
   With msgOrders
      If .Row > 0 And .Row <= mlngNoOfOrders Then
         ' Calculate total cost of orders
         txtTotal.Text = Format(CSng(txtTotal.Text) - .TextArray(.Row * .Cols + 2),
"###,#0.00")

         ' Remove the selected row
         .RemoveItem .Row

         ' Reduce the mlngNoOfOrders by 1
```

University of Malaya

```
        mlngNoOfOrders = mlngNoOfOrders - 1
      End If
    End With
End Sub
```

```
Private Sub cmdNext_Click()
    ' Move to the next record
    datMenu.Recordset.MoveNext

    ' If End Of File encountered,
    ' move to the last record
    If datMenu.Recordset.EOF Then
       datMenu.Recordset.MoveLast
    End If
End Sub
```

```
' Similar procedure with cmdNext, using
' WITH STATEMENT to simplify coding
Private Sub cmdPrevious_Click()
    With datMenu.Recordset
       ' Move to the previous record
       .MovePrevious

       ' If Beginning Of File encountered,
       ' move to the first record
       If .BOF Then
          .MoveFirst
       End If
    End With
End Sub
```

```
Private Sub cmdQuit_Click()
    ' Unload current form
    Unload Me
End Sub
```

```
Private Sub cmdSubmit_Click()
    Dim strSQL As String, strOrderKey As String
    Dim lngCustomerID As Long
    Dim intRow As Integer

    ' Check if Customer ID has been entered
    txtID.Text = Trim(txtID.Text)
    If txtID.Text = "" Then
       MsgBox "Your Customer ID is required!", vbExclamation, "Customer ID"
       txtID.SetFocus
```

University of Malaya

```
        Exit Sub
    End If

    ' Check if Customer ID is valid
    datID.RecordSource = "SELECT * FROM Customers WHERE CustomerID = '" &
txtID.Text & "'"
    datID.Refresh
    If datID.Recordset.BOF Or datID.Recordset.EOF Then
        MsgBox "Invalid Customer ID!", vbExclamation, "Customer ID"
        txtID.SetFocus
        Exit Sub
    End If

    ' Check if any orders have been placed
    If mlngNoOfOrders = 0 Then
        MsgBox "You have not placed any orders!", vbExclamation, "Orders"
        Exit Sub
    End If

    ' Generate a unique order key, to make it easy to retrieve
    ' the order id
    strOrderKey = txtID.Text & Year(Now) & Month(Now) & Day(Now) _
        & Hour(Now) & Minute(Now) & Second(Now)

    ' Submit order into database
    With datOrders.Recordset
        .AddNew
        .Fields("OrderDate") = Now()
        .Fields("CustomerID") = txtID.Text
        .Fields("OrderKey") = strOrderKey
        .Update
    End With

    ' Select the newly submitted order and get the order id
    With datOrders
        .RecordSource = "SELECT * FROM Orders WHERE OrderKey = '" & strOrderKey
& "'"
        .Refresh
        txtOrderID.Text = .Recordset.Fields("OrderID")
    End With

    ' Submit order detail into database
    With datOrdersDetail.Recordset
        For intRow = 1 To mlngNoOfOrders
            msgOrders.Row = intRow
            .AddNew
```

University of Malaya

```
        .Fields("Quantity") = 1
        .Fields("UnitPrice")      =      CSng(msgOrders.TextArray(msgOrders.Row      *
msgOrders.Cols + 2))
        .Fields("OrderID") = txtOrderID.Text
        .Fields("ProductID") = msgOrders.TextArray(msgOrders.Row * msgOrders.Cols
+ 0)
        .Update
      Next
    End With

    ' Inform client that the order has been submitted
    MsgBox "Your Order ID is " & txtOrderID.Text & "." _
      & Chr(13) & "Your Order Total is $" & txtTotal.Text & "." _
      & Chr(13) & Chr(13) _
      & "Your order will be served in a moment." _
      & Chr(13) & "Thank you for dining with us.", vbInformation, "Thank You"

    ' Return to the Welcoming Screen
    Unload Me
End Sub
```

```
Private Sub Form_Load()
    ' Hide frmIntro
    frmIntro.Hide
    mlngNoOfOrders = 0
    txtTotal.Text = "0.00"

    Call initData
    Call initGrid
End Sub
```

```
' Set DatabaseName for the following DATA CONTROLS
' to the right database
Private Sub initData()
    datID.DatabaseName = App.Path & "\RCOS.mdb"
    datID.RecordSource = "Customers"

    With datMenu
      .DatabaseName = App.Path & "\RCOS.mdb"
      .RecordSource = "Products"
    End With

    With datOrders
      .DatabaseName = App.Path & "\RCOS.mdb"
      .RecordSource = "Orders"
    End With
```

University of Malaya

```
    datOrdersDetail.DatabaseName = App.Path & "\RCOS.mdb"
End Sub
```

```
Private Sub initGrid()
    With msgOrders
        ' Format column header
        .FormatString = ">ID|<Product|>Price"

        ' Set width of each column
        .ColWidth(0) = 800
        .ColWidth(1) = 4000
        .ColWidth(2) = 1200
    End With
End Sub
```

```
Private Sub Form_Unload(Cancel As Integer)
    ' Show frmIntro
    frmIntro.Show
End Sub
```

```
Private Sub Image1_Click()
  ' Add selected product and its price to the msgOrders
    With datMenu.Recordset
        msgOrders.AddItem .Fields("ProductID") & vbTab _
            & .Fields("ProductName") & vbTab _
            & .Fields("UnitPrice"), mlngNoOfOrders + 1

        ' Calculate total cost of orders
        txtTotal.Text = Format(CSng(txtTotal.Text) + .Fields("UnitPrice"), "###,#0.00")

        ' Increase mlngNoOfOrders by 1
        mlngNoOfOrders = mlngNoOfOrders + 1
    End With
End Sub
```

```
Private Sub Image2_Click()
With msgOrders
    If .Row > 0 And .Row <= mlngNoOfOrders Then
        ' Calculate total cost of orders
        txtTotal.Text = Format(CSng(txtTotal.Text) - .TextArray(.Row * .Cols + 2),
"###,#0.00")

        ' Remove the selected row
        .RemoveItem .Row
```

University of Malaya

```
        ' Reduce the mlngNoOfOrders by 1
        mlngNoOfOrders = mlngNoOfOrders - 1
      End If
    End With
End Sub
```

```
Private Sub Image3_Click()
 ' Move to the next record
   datMenu.Recordset.MoveNext

   ' If End Of File encountered,
   ' move to the last record
   If datMenu.Recordset.EOF Then
      datMenu.Recordset.MoveLast
   End If
End Sub
```

```
Private Sub Image4_Click()
  With datMenu.Recordset
      ' Move to the previous record
      .MovePrevious

      ' If Beginning Of File encountered,
      ' move to the first record
      If .BOF Then
         .MoveFirst
      End If
   End With
End Sub
```

```
Private Sub Image6_Click()
Dim strSQL As String, strOrderKey As String
   Dim lngCustomerID As Long
   Dim intRow As Integer

   ' Check if Customer ID has been entered
   txtID.Text = Trim(txtID.Text)
   If txtID.Text = "" Then
      MsgBox "Your Customer ID is required!", vbExclamation, "Customer ID"
      txtID.SetFocus
      Exit Sub
   End If

   ' Check if Customer ID is valid
   datID.RecordSource = "SELECT * FROM Customers WHERE CustomerID = '" &
txtID.Text & "'"
```

University of Malaya

```
    datID.Refresh
    If datID.Recordset.BOF Or datID.Recordset.EOF Then
       MsgBox "Invalid Customer ID!", vbExclamation, "Customer ID"
       txtID.SetFocus
       Exit Sub
    End If

    ' Check if any orders have been placed
    If mlngNoOfOrders = 0 Then
       MsgBox "You have not placed any orders!", vbExclamation, "Orders"
       Exit Sub
    End If

    ' Generate a unique order key, to make it easy to retrieve
    ' the order id
    strOrderKey = txtID.Text & Year(Now) & Month(Now) & Day(Now) _
       & Hour(Now) & Minute(Now) & Second(Now)

    ' Submit order into database
    With datOrders.Recordset
       .AddNew
       .Fields("OrderDate") = Now()
       .Fields("CustomerID") = txtID.Text
       .Fields("OrderKey") = strOrderKey
       .Update
    End With

    ' Select the newly submitted order and get the order id
    With datOrders
       .RecordSource = "SELECT * FROM Orders WHERE OrderKey = '" & strOrderKey
& "'"
       .Refresh
       txtOrderID.Text = .Recordset.Fields("OrderID")
    End With

    ' Submit order detail into database
    With datOrdersDetail.Recordset
       For intRow = 1 To mlngNoOfOrders
          msgOrders.Row = intRow
          .AddNew
          .Fields("Quantity") = 1
          .Fields("UnitPrice")      =      CSng(msgOrders.TextArray(msgOrders.Row      *
msgOrders.Cols + 2))
          .Fields("OrderID") = txtOrderID.Text
          .Fields("ProductID") = msgOrders.TextArray(msgOrders.Row * msgOrders.Cols
+ 0)
```

University of Malaya

```
        .Update
      Next
    End With

    ' Inform client that the order has been submitted
    MsgBox "Your Order ID is " & txtOrderID.Text & "." _
      & Chr(13) & "Your Order Total is $" & txtTotal.Text & "." _
      & Chr(13) & Chr(13) _
      & "Your order will be served in a moment." _
      & Chr(13) & "Thank you for dining with us.", vbInformation, "Thank You"

    ' Return to the Welcoming Screen
    Unload Me
End Sub
```

```
Private Sub Image7_Click()
Dim strSQL As String, strOrderKey As String
    Dim lngCustomerID As Long
    Dim intRow As Integer

    ' Check if Customer ID has been entered
    txtID.Text = Trim(txtID.Text)
    If txtID.Text = "" Then
      MsgBox "Your Customer ID is required!", vbExclamation, "Customer ID"
      txtID.SetFocus
      Exit Sub
    End If

    ' Check if Customer ID is valid
    datID.RecordSource = "SELECT * FROM Customers WHERE CustomerID = '" &
txtID.Text & "'"
    datID.Refresh
    If datID.Recordset.BOF Or datID.Recordset.EOF Then
      MsgBox "Invalid Customer ID!", vbExclamation, "Customer ID"
      txtID.SetFocus
      Exit Sub
    End If

    ' Check if any orders have been placed
    If mlngNoOfOrders = 0 Then
      MsgBox "You have not placed any orders!", vbExclamation, "Orders"
      Exit Sub
    End If

    ' Generate a unique order key, to make it easy to retrieve
    ' the order id
```

University of Malaya

```
    strOrderKey = txtID.Text & Year(Now) & Month(Now) & Day(Now) _
      & Hour(Now) & Minute(Now) & Second(Now)

    ' Submit order into database
    With datOrders.Recordset
      .AddNew
      .Fields("OrderDate") = Now()
      .Fields("CustomerID") = txtID.Text
      .Fields("OrderKey") = strOrderKey
      .Update
    End With

    ' Select the newly submitted order and get the order id
    With datOrders
      .RecordSource = "SELECT * FROM Orders WHERE OrderKey = '" & strOrderKey
& "'"
      .Refresh
      txtOrderID.Text = .Recordset.Fields("OrderID")
    End With

    ' Submit order detail into database
    With datOrdersDetail.Recordset
      For intRow = 1 To mlngNoOfOrders
        msgOrders.Row = intRow
        .AddNew
        .Fields("Quantity") = 1
        .Fields("UnitPrice")      =      CSng(msgOrders.TextArray(msgOrders.Row      *
msgOrders.Cols + 2))
        .Fields("OrderID") = txtOrderID.Text
        .Fields("ProductID") = msgOrders.TextArray(msgOrders.Row * msgOrders.Cols
+ 0)
        .Update
      Next
    End With

    ' Inform client that the order has been submitted
    MsgBox "Your Order ID is " & txtOrderID.Text & "." _
      & Chr(13) & "Your Order Total is $" & txtTotal.Text & "." _
      & Chr(13) & Chr(13) _
      & "Your order will be served in a moment." _
      & Chr(13) & "Thank you for dining with us.", vbInformation, "Thank You"

    ' Return to the Welcoming Screen
    Unload Me
End Sub
```

University of Malaya

```
Private Sub Image8_Click()
 ' Unload current form
    Unload Me
End Sub
```

University of Malaya