

V2Soft

Viki Software

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This document is one of the most important steps of software project development that is analysis report of Restaurant software project RAS-2005.

V2Soft RAS-2005 Project proposal				
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1. INTRODUCTION

1.1 Problem Definition

RAS-2005 (Restaurant Automation System) is detailed software for restaurants that helps the organization in restaurants to be handled more easily.

1.2 Scope

RAS-2005 is a restaurant automation system designed to facilitate the usage, for internet customers, restaurant owners, waiters in restaurants and customers at restaurant. With the help of this program, internet customers will be able to make online orderings, with special user names and passwords to get rid of internet based detailed jobs. Restaurant owners will be able to manage their basic accounting at any time such as income / expenditure position at any time they want. They will also have increase in customer number due to the fast service and well-organized system. Waiters in the restaurants will stop useless coming and going duty. They will get less tired, which will result in better communication with customers and improved performance. In terms of the customer at restaurant, they will not need to wait for waiter and they will save time. In conclusion, RAS-2005 will ease and automate ordering system over internet and palm devices. That is, better management and better organization in restaurants.

1.3 Current System Situation in the Market & Additional Goals

As a part of our project, we had examined some restaurant system software currently used in the market. The detailed analysis of these examinations was subjected to our supervisor Mr. Dalay before, but here, we need to give brief information about them, and others in the market.

Nowadays, restaurant software market is not very vivacious in Turkey; however there is a growing demand on these products. Since, these kinds of software are entering the market there had been a competition among these in the market. Apart from all these, most of the restaurant software is not well designed; there is still a big gap in the market. Most of the restaurant software is designed for the inside activities of the restaurant using it. Although, these are useful in the restaurant, they don't have anything to do with the outside market. This is the most important part that should be considered according to the statistics done on the restaurant customers. According to statistics %77.2 of the customers prefer not to go

to restaurant; instead they prefer to order meal via phone. This clearly states the importance of internet ordering.

Another aspect that most of the restaurant software eager to collapse is about the security, and reliability. Since these programs use database too much related security should be satisfied, but we see that it doesn't. All unsaved data can easily been deleted at restarting the computer, causing too much work done from the beginning. Another security problem we encountered was about the online payments via visa. Servers does not secure against web attacks, due to the servlet applications not carefully designed. Communication with the banks is also security problem, which can be handled with careful design.

To see the details and have idea about the customers' opinions about the software that they used, we went to customer visits. These visits help us to get familiar with the problem and helped us to look at the project from customers' parts. You can find the details below.

1.4 Customer Interview Analysis

Customer meetings are one of the most important works to do for project to be successful. Like other professional engineers, software engineers should be able to look at the problem with the customers' glasses. With the consciousness of that, we went to customer meetings. Furthermore, we met restaurant managers that are currently using some restaurant software and restaurant managers that haven't met this kind of technology to have ability to compare them. During these meetings we saw that, restaurants with this kind of stuff have much more customers than the ones without restaurant software. Users are generally happy with this software since they know that the money they paid to this software will turn back to them with much more customers. Mostly, users are pleased to see that the data flows inside the restaurant don't confuse and the easy use of the program. They say that before they buy this software, there have been confusing and too much data loss occurs due to the order transfer between the waiters and other stuff. For example, Mr. Ferit BAYRAM (restaurant manager of Mis Simit Café) says that approximately one of the 50 orders were not delivered to customer or wrong meal delivered to them before. He also stated that, the bill procedure became much better than the one before they started

to use the program. These kind of mistakes make their approximately 10 per cent of the customer unhappy and they loose their customers and their position in the market. He was also very happy to be able to see the profit-loss and other basic accounting stuff at any time he wants.

These were the parts that make him happy, but when we asked him about the features that their program does not support, he first said that lack of communication between the customers at home, which shows the internet options importance on restaurant software. He also complained about the price of the software that they paid. Except the hardware part he paid \$1000 to main program, and still paying for additional service like training, maintenance and technical support.

When we met with the restaurant managers of the restaurants not having such software, we saw that, they don't buy this software because of two main reasons; they are money and knowledge. They think prices are very high when all prices included such as hardware. In terms of knowledge, they don't believe that they can use this kind of software and think their money will be thrown to garbage at the first failure of this software.

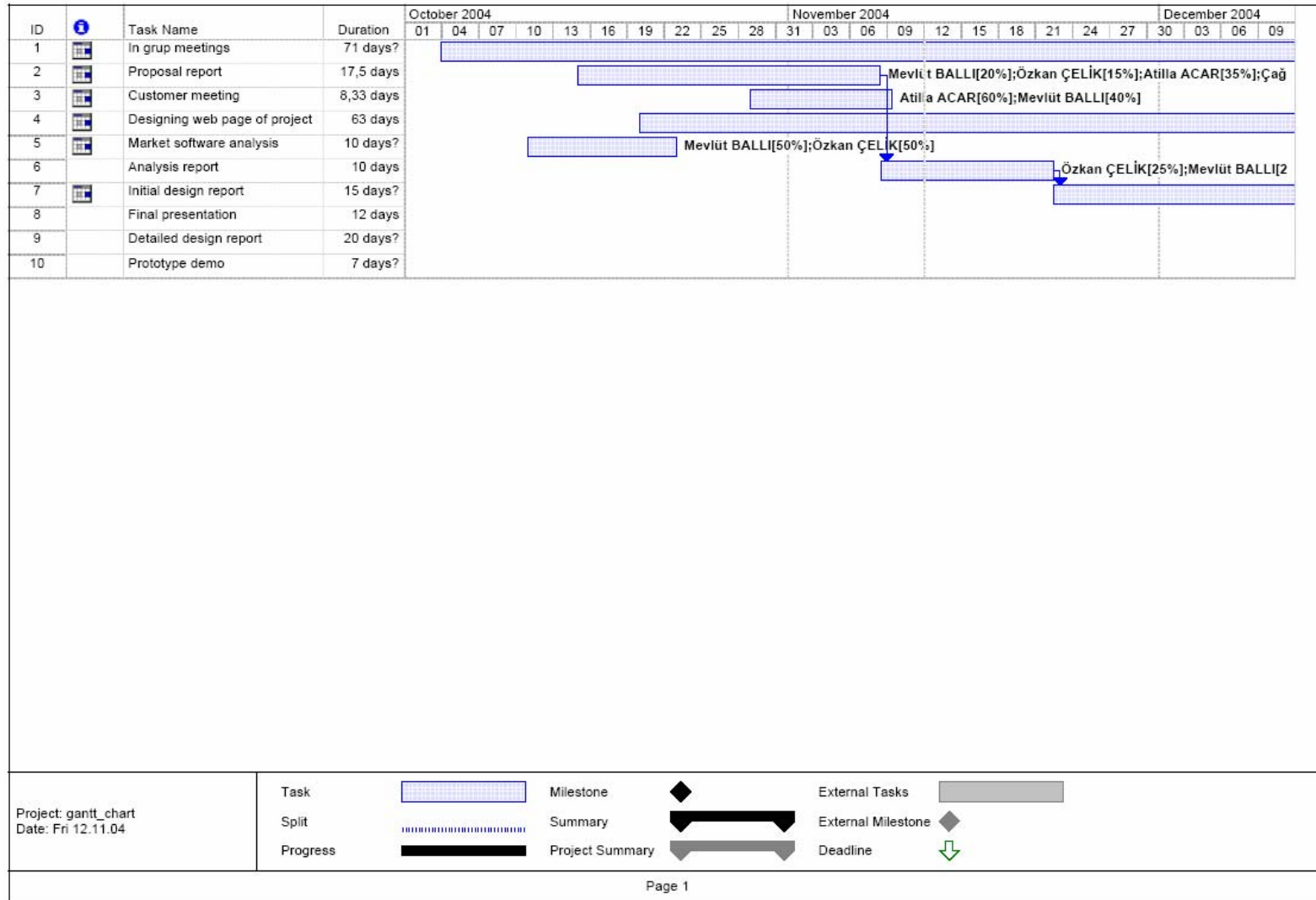
If we try to list general expectations of restaurant managers:

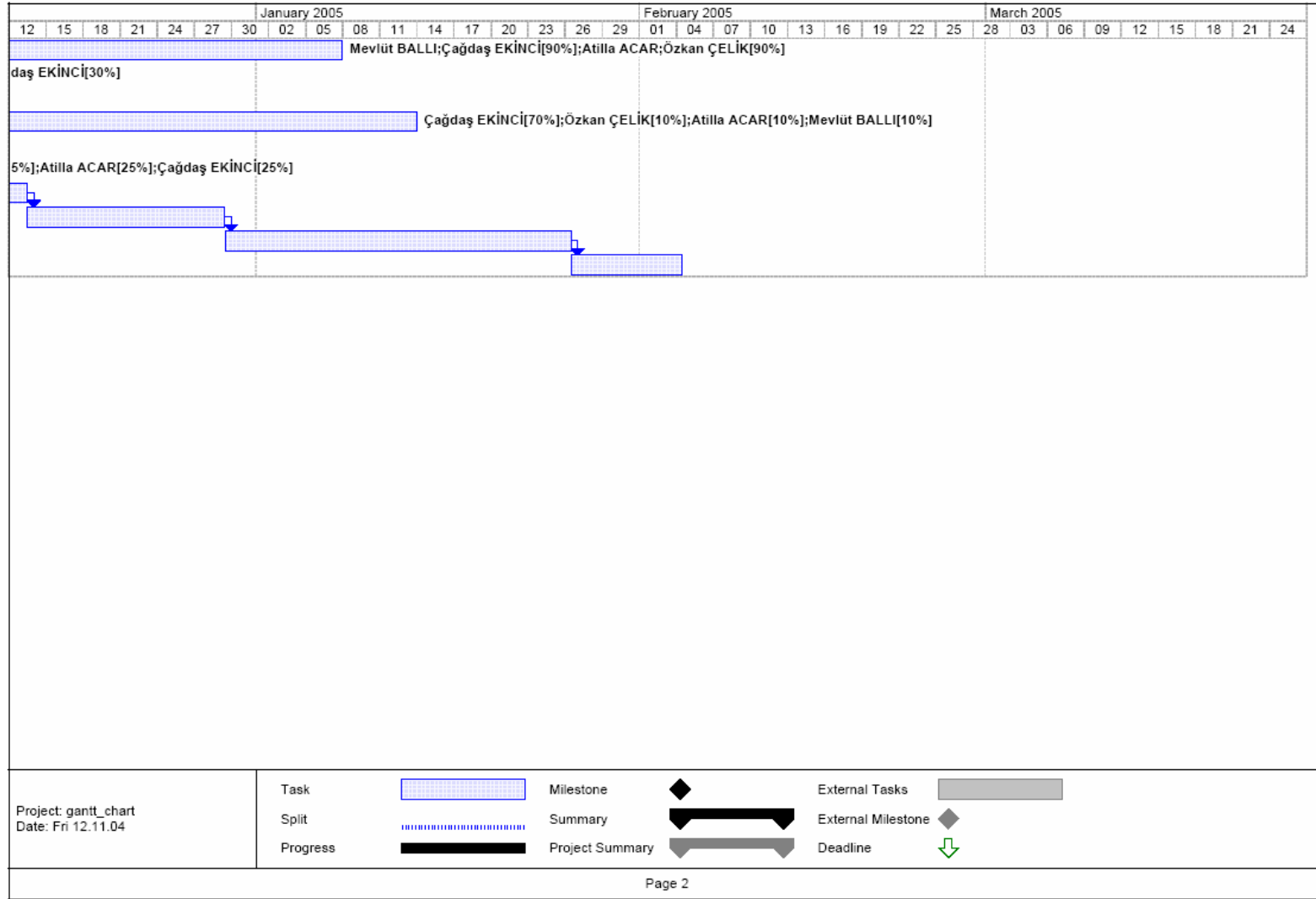
- Low price
- Easy to use
- Online ordering and reservation
- Able to handle basic accounting
- Easy to adapt to
- Free technical support
- Long term guaranty
- Security end integrity

To sum up, if we can arrange the prices and develop software that can fulfill restaurant managers' expectations, there is no reason for our program to expand rapidly in the market.

2. PROJECT SCHEDULE

2.1 Gantt Chart





3. CONSTRAINTS

3.1 Time and Effort Estimation

3.1.1 FP

MEASUREMENT PARAMETER	COUNT	WEIGHT	
Number of User Input	50	7	350
Number of User Outputs	35	5	175
Number of User Inquiries	25	4	100
Number of Files	20	7	140
Number of External Interfaces	20	7	140
Algorithms	5	4	20

Count Total			925
Complexity Multiplier			0,65+0,01*44
Feature Points			1008

1	Does the system require reliable backup and recovery?	3
2	Are data communications required?	5
3	Are there distributed processing functions?	3
4	Is performance critical?	2
5	Will the system run in an existing, heavily utilized operational environment?	2
6	Does the system require on-line data entry?	5
7	Does the on-line data entry require the	4

	input transaction to be built over multiple screens or operations?	
8	Are the master files updated on-line?	4
9	Are the inputs, outputs, files or inquiries complex?	3
10	Is the internal processing complex?	3
11	Is the code to be designed reusable?	3
12	Are conversion and installation included in the design?	2
13	Is the system designed for multiple installations in different organizations?	3
14	Is the application designed to facilitate change and ease of use by the user?	4
		TOTAL:44

FP=count total*(0,65+0,01*44) =1915*1.02=1008

3.1.2 LOC

Functions	Lines of Code
User Interface And Control Facilities	6500
Database Management	4000
File Repository	2000
Communication Functions	1500
Core Functions	2000
Security and Access Functions	1000
TOTAL	17000 LOC=17 KLOC

LOC Oriented Estimation Model

$$E=5.2*(17)^{0.91}= 68,500 \text{ (Walston-Felix Model)}$$

$$E=5.5+0.73*(17)^{1.16}= 25,027 \text{ (Bailey Basili Model)}$$

$$E=3.2*(17)^{1.05}= 62,678 \text{ (Boehm Simple Model)}$$

$$E=5.288*(17)^{1.047}= 102,700 \text{ (Doty Model)}$$

FP Oriented Estimation Model

$$E=-13.39+0.0545*1008=68,326 \text{ (Albrecht and Gaffney Model)}$$

$$E=60.62*7.728*10^{-8}*(1008)^3=4798,04 \text{ (Kemerer Model)}$$

$$E=585.7+15.12*1008=15826,66 \text{ (Matson, Barnett, and Mellichamp Model)}$$

3.1.3 COCOMO

COCOMO Model

$$E=2.4*(17)^{1.05}= 47,010 \text{ person*month}$$

$$D=2.5*E^{0.38}= 10,798 \text{ months}$$

$$N=E/D=47,010/10,798=4,35 \text{ people}$$

4. REQUIREMENT SPECIFICATION

4.1 Functional Requirements

Since we have 3 different applications, we will first deal with the functions that are used at all of them. After that, you can find the functions that only belongs one of Server, Internet and Palm parts.

4.1.1 General Functions

1. Login Function

We have defined 4 different types of user. They are; administrator, cashier, waiter and customer who will be able to use the software from the internet. We prepared a database for user names and passwords for all of these people. All these people will be able to enter the system by typing their related user name and password. There exist "CLEAR" and "OK" buttons. When one types his/her username and password wrong, he/she will be able to clear the username and password fields by clicking "CLEAR" button. After typing username and password one will be able to enter the system. If username and password are miswrite 3 times consequently then the user will be banned and need to get authorization from admin.

4.1.2 Server Part

1. Select Operation Function

Administrators and cashiers are the only people that have permission to access to server applications. After successful login, one will face an interface which has 4 choices, which are Basic Accounting, Reservation, Table Management and Stock Management. These are also names of the buttons of related functions. Clicking the related button yields desired action that is going to be performed.

2. Basic Accounting

When one click to the Basic Accounting button, he/she will face an interface having the choices Profit/Loss and View Capital in Box. When one selects View Capital in Box, he will be able to see the money that is in the box at that time. And if he wants, he will be able to print it.

When we came to Profit/Loss part, one will face an interface having View Income, View expenditure with a fixed panel(***) having choices for daily, weekly

and monthly to see the related operations daily, weekly or monthly report, if wanted again it will be able to printed by clicking the PRINT button.

When clicking the View Income button we will face to an interface with names Online and In Restaurant with the fixed panel(***). Again, when one clicks on online button or In Restaurant button he will face to the fixed panel and will be able to see daily, weekly or monthly report. Again PRINT button appears in fixed panel(***) too.

Very similar to View Income, when one clicks on View Expenditure button one will face to an interface with names General and Personal and Feedstock with the fixed panel(***) .

Again, when one clicks on General Button or Personal or Feedstock button he will face to the fixed panel and will be able to see daily, weekly or monthly report. Again PRINT button appears in fixed panel(***) too.

3. Reservation

When one click to the Reservation button, he/she will face an interface having the choice View Reservation. When one selects View Reservation, he will be able to see the reservations done until that time. And if he wants, he will be able to print it.

4. Table Management

When one click to the Table Management button, he/she will face an interface having the choices Close Table, Transfer to Another Table and View Order.

When one selects Close Table, he will face an interface having Show Bill and Print buttons. When he clicks Show Bill button he will be able to see the Bill of the related table. And if he wants, he will be able to print it.

When we came to Transfer to Another Table part, one will face an interface having Transfer Order button. If he clicks that button he will see an information message "Order Transferred"

When clicking the View Order button we will face to an interface with names Change Order and Cancel Order. When he clicks Cancel Order button the order will be cancelled and when he clicks Change Order, he will come across an interface having Add Item to Order and Clear Item from Order buttons. Clicking these buttons will either add a new item to the order or will clear one or more items from the order.

5. Stock Management

When one click to the Stock Management button, he will face an interface having the choices Add New Item, Delete an Item, Update Stock and View Stock.

When one selects Add New Item, he will be able to add new item that was not registered before.

When one click Delete an Item button, he will be able to delete the specified item from the stock database.

Clicking to the Update Stock, one will be able to make changes on an already registered item, For example, the amount of flour.

When one click to the View Stock button he will be able to see the current situation of the stock, after seeing the situation one can want to update stock or add new item or delete an item, so there will be an interface for that too.

When clicking the View Income button we will face to an interface with names Online and In Restaurant with the fixed panel(***). Again, when one clicks on online button or In Restaurant button he will face to the fixed panel and will be able to see daily, weekly or monthly report. Again PRINT button appears in fixed panel(***) too.

Very similar to View Income, when one clicks on View Expenditure button one will face to an interface with names General and Personal and Feedstock with the fixed panel(***).

Again, when one clicks on General Button or Personal or Feedstock button he will face to the fixed panel and will be able to see daily, weekly or monthly report. Again PRINT button appears in fixed panel(***) too.

6. Messages from Palms

This type of messages can come to server at any time, even during working at different interfaces. At that time user will be able to handle the required jobs. These messages can be for Request for Open Table, Request for Order and Request for Reservation. When one of these messages arrives to server, administrator or cashier will be able to get a print of them if it is necessary by clicking to the Print button there.

7. Messages from Web

This type of messages can come to server at any time too, even during working at different interfaces. At that time user will be able to handle the required jobs. These messages can be for Request for Order. When a message arrives to

server, administrator or cashier will be able to get a print of them if it is necessary by clicking to the Print button there.

4.1.3 Web based Part

4.1.3.1 Order or reservation function

After a successful login of a customer with user name and password, user see an interface in which drinks and meals are categorized. Also free tables for reservation are listed. User can click on a drink category and rightmost of the available drinks in stock appears. There exists checkboxes near the any available drink and a there exists a button namely “add to basket”. User can add any order by clicking checkbox and clicking “add to basket” button. In a same manner user can click on a meal category then in rightmost of the interface available meals in stock appears. User can add any order by clicking checkbox and clicking “add to basket” button. After user has given all the orders , user clicks submit order button ,and he/she receive a message from our system server about to order delivery time. In the middle of the interface user shall be able to reserve a table by clicking on free tables and then select date, and time of reservation and then by clicking “ok” button. User submit his/her request, after that user receive a message from our system server like “your request is applicable or not”. Also user has another two option to see his/her reservation and order.

4.1.4 Palm application

4.1.4.1 Select table function

After a successful login of waiters, user sees an interface that shows available tables in restaurant. Waiter can click by his electronically pen on free table and then click “select table” button waiter can give any available order.

4.1.4.2 View menu

After selecting a table user see available meals and drinks in a categorized way.

4.1.4.3 Select order

In view menu order can be selected by choosing available meals and drinks.

4.1.4.4 Select customer

For a given order in order to manage customer satisfaction and keep statistical data about which customer like which meals or drinks our program get customer name and update database with the help of system server. After all of these processes, waiter click on “ok” button and order is given.

4.2 Non Functional Requirements:

4.2.1 Easy to adapt

Friendly user interfaces and installation is very important for RAS-2005. Restaurant waiters and cashiers are not trained personals, because of that well designed GUI's became very critical for such a software. We have to consider these aspects to make profit from the RAS-2005. Simple, easy to understand and use GUI's could provide desired result.

4.2.2 Security

Security plays very important role in RAS-2005. It is mandatory for us because we keep customer information such as address, telephone number and make connections with bank accounts. Server and connection security have to be obtained by using intrusion detection systems. Beyond these, using secure Java libraries, doing security tests after software development and debugging will increase the reliability of our system. This is our primitive concern as developers of RAS-2005.

4.2.3 Reducible for 'Small' customers

After development we will have a system that consists of twp parts; web application and in restaurant application. For 'small' customers we can separate those parts and manufacture independently upon demand.

4.2.4 Scrupulous documentation

The intended lifetime of this product is more than a one can think, and development is expected to be passed down to new generations. Even within a lifetime many programmers may need to work on the same piece of code without having met each other. Documentation of the source code is vital for the system's long-term usefulness.

4.3 Software Requirements:

4.3.1 Operating system and development environment

Project will be developed using JAVA technology including all web interface, palm applications and server applications. Java1.4.2SDK is our development tool. Internet customers need at least java run time environment installed on their systems. We will use either of Windows and Linux platforms while developing project. But working platform will be Windows. Reason of this choice is that Windows is much more widespread than Linux if we regard the restaurants. Moreover operating system of the palms used by waiters is Windows CE, and Linux may cause some consistency problems. There is also an option that developing software platform independent but this could increase the cost, so we discard this option.

Server of the RAS-2005 will handle critical operation such as fund transaction between banks, so security is main subject on the web side. Because of using Windows, we have to focus on deeply and take extra measures as mentioned above. Firewall can be an example of solution.

4.3.2 Database management

There are many well known databases such as Sybase and Oracle. But when we consider the price and needed efficiency Mysql seemed to be the best choice. We will use Java servlets and Java server pages for web applications and JDBC for database access.

Admin of the system is the only person who could do changes on database and inputs of the software. Some operations such as modifying menu can be done by cashier but updating web application is not so easy. So, customers need service on this topic which can be handled by us. This is a side revenue source for us.

4.4 Hardware Requirements:

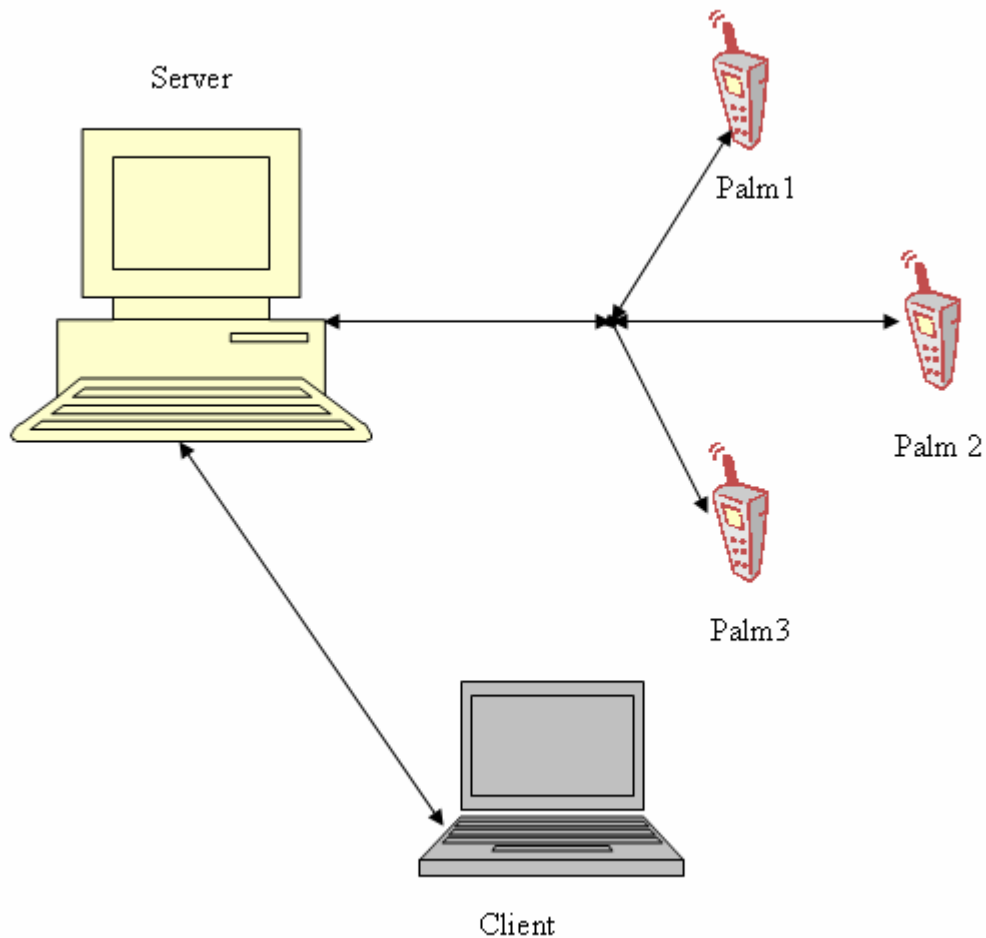
RAS-2005 need following computer systems:

One computer system for being server of web site and database.

Some palms (number of it changes from restaurant to restaurant).

For developing processes:

- ★ Four computers those have at least following properties:
 - IBM PC or compatible
 - Intel Pentium III 500Mhz processor
 - 128 MB SDRam
 - 20 GB Hard disk
 - Internet connection
- ★ One palm which runs on Windows CE operating system.
- ★ Bluetooth for providing connection between palm and server.



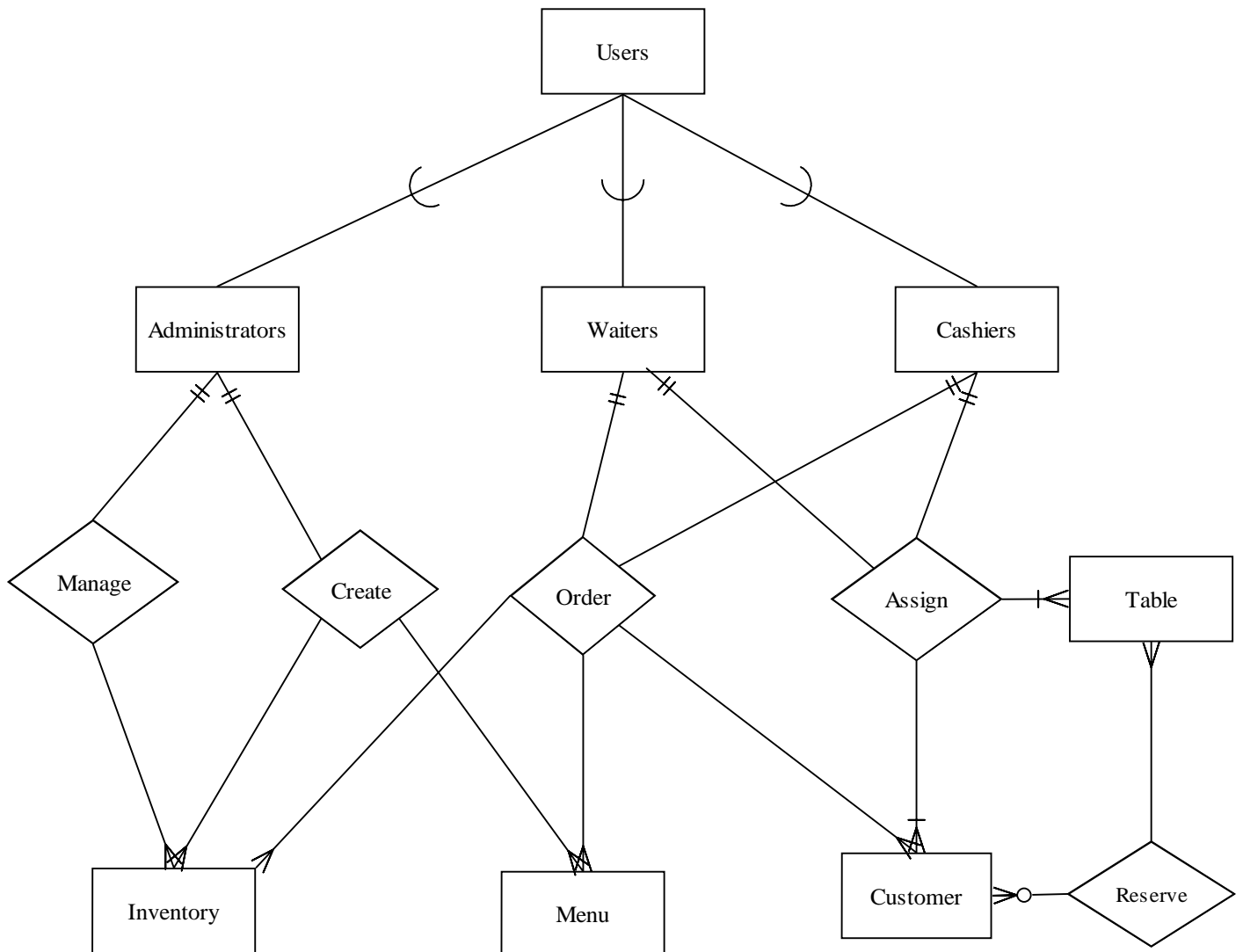
For operating RAS-2005:

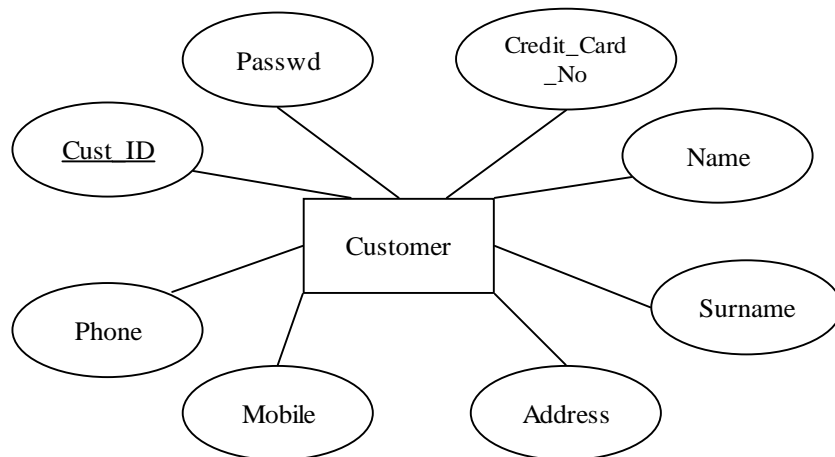
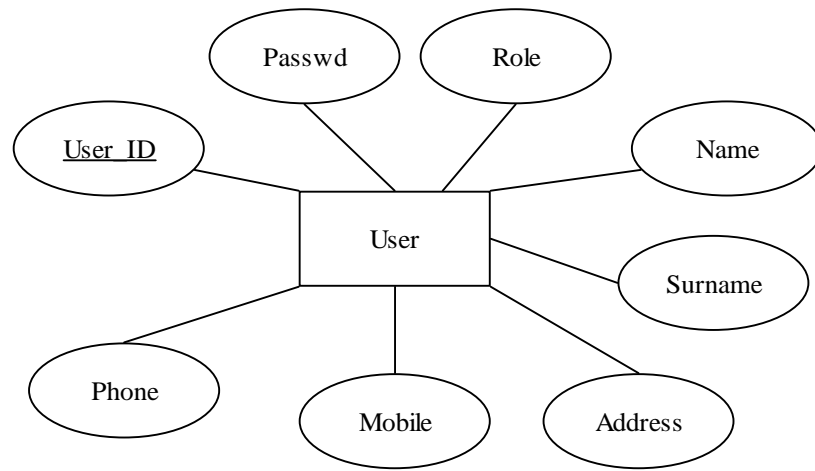
- ★ One computer that has at least following properties:
 - IBM PC or compatible
 - Intel Pentium III 800Mhz processor
 - 512 MB SDRam
 - 40 GB Hard disk
 - Internet connection
- ★ At least one palm which runs on Windows CE operating system.
- ★ Bluetooth for providing connection between palm and server.

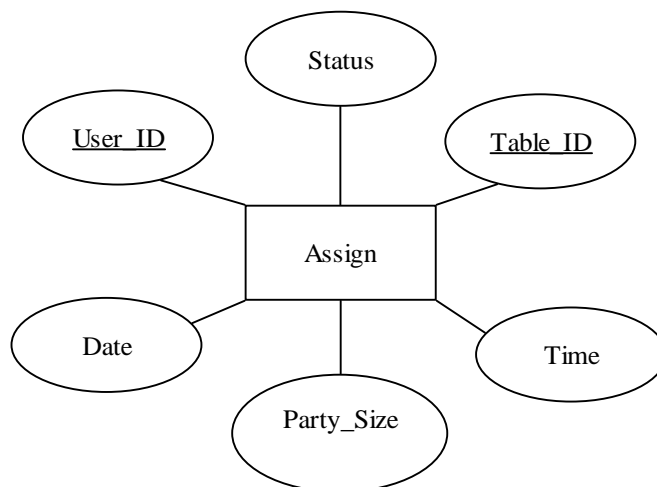
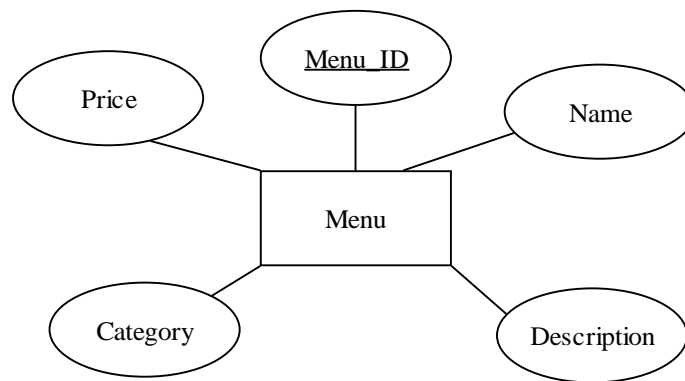
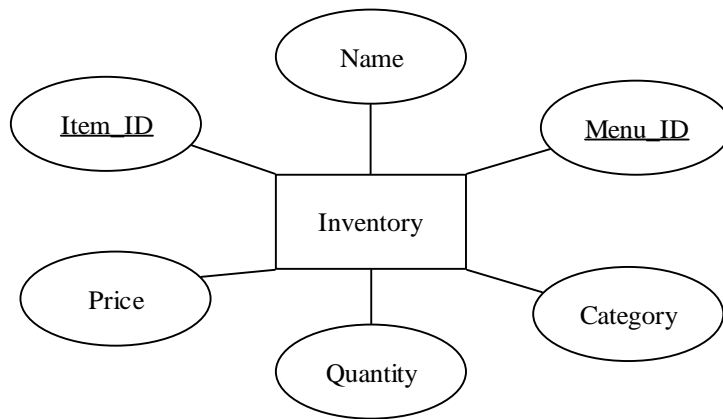
5. MODELLING

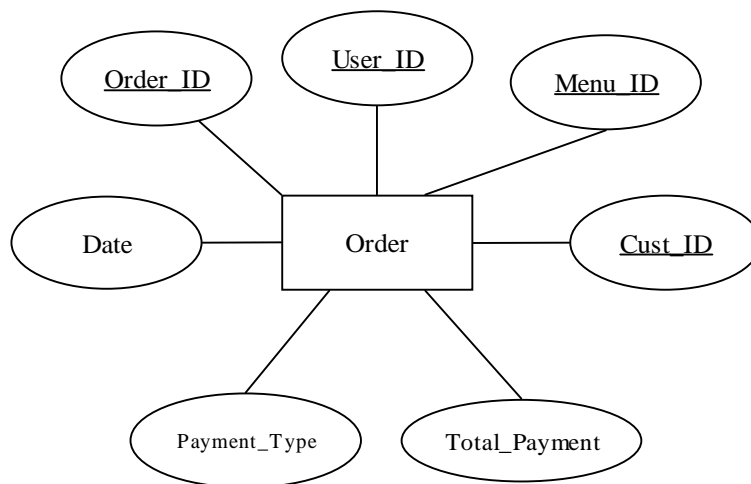
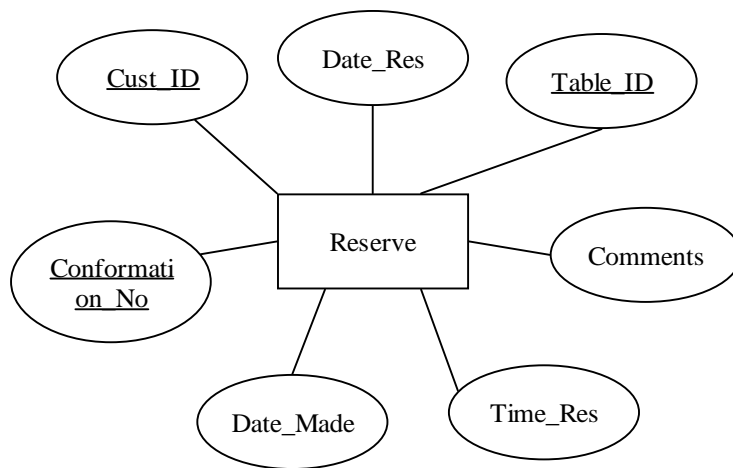
5.1 Data Model

5.1.1 Entity Relationship Diagrams (ERD)









5.1.2 Data Description

User

1. User_ID:

Unique primary key for user

2. Passwd:

Password of the user

3. Role:

Determine the role of user such as Administrator, Cashier and Waiters

4. Name:

Name of the user

5. Surname:

Surname of the user

6. Address:

Address of the user

7. Phone:

Home phone number of the user

8. Mobile:

Mobile phone number of the user

9. E-Mail:

E-Mail of the user

Customer

1. Cust_ID:

Unique primary key for customer

2. Passwd:

Password of the customer

3. Name:

Name of the customer

4. Surname:

Surname of the customer

5. Address:

Address information of the customer

6. Phone:

Home phone number of the customer

7. Mobile:

Mobile phone number of the customer

8. Credit_Card_No

Valid credit card number of the customer

Inventory

1. Item_ID:

Unique primary number of the item

2. Menu_ID:

Menu _ID that relates with that item

3. Name:

Name of the item

4. Category:

Category of the item

5. Quantity:

Current quantity of the item

6. Price:

Price of the item

Menu

1. Menu_ID:

Menu id for each element in the menu list

2. Category:

Category of the food or beverages

3. Name:

Name of the food or beverages

4. Description:

Description of the food

5. Price:

Price of the food or beverages

Assign

1. Table_ID

Table id for each table

2. User_ID

User id who assigns the table such as cashier or waiters

3. Party_Size

Total number of the customer.

4. Date

Date of the assigned table

5. Time

Arrived time of the assigned table

6. Status

Last condition of the table, occupied or not

Reserve

1. Conformation_No:

Unique number given for each reservation

2. Date_Made:

Date when the reservation made

3. Table_ID:

Id of the reserved table

4. Cust_ID:

Customer ID who makes reservation

5. Date_Res:

Date of the reservation

6. Time_Res:

Time of the reservation

7. Comments:

Comments if there is additional request

Order

1. Order_ID

Unique number given for each order.

2. User_ID

User id who serves

3. Menu_ID

Menu_ID of the food or beverages ordered

4. Cust_ID

Customer id that is served

5. Date

Served Date

6. Payment_Type

Payment type such as cash or credit card

7. Total_Payment

Total payment of the order

5.1.3 Explanation of Relations**5.1.3.1 *Manage* relation between User (Admin) and Inventory**

User as administrator ads, deletes or updates the information of the inventory table. One too many cardinality relationship is built between entities; one administrator can manage one or more item.

5.1.3.2 *Create* relation between User (Admin), Inventory and Menu

User as administrator creates the menu list with the existing inventory. One to many cardinality relationship is built between entities; one administrator can create one or more menu with one or more item.

5.1.3.3 *Order* relation between Menu, Waiter, Cashier, Customer and Inventory

This relation provides the order from customer and sends the invoice information to the cashier moreover the related menu item decreases from the inventory. One to many cardinality relationship is built between entities; one waiters can take one or more order from one or more customer.

5.1.3.4 *Assign* relation between Cashier, Customer and Table

In this relation cashier or waiters assign a suitable table to the customer. One cashier can assign one or more customer to one or more table, so one to many cardinality relationship is built.

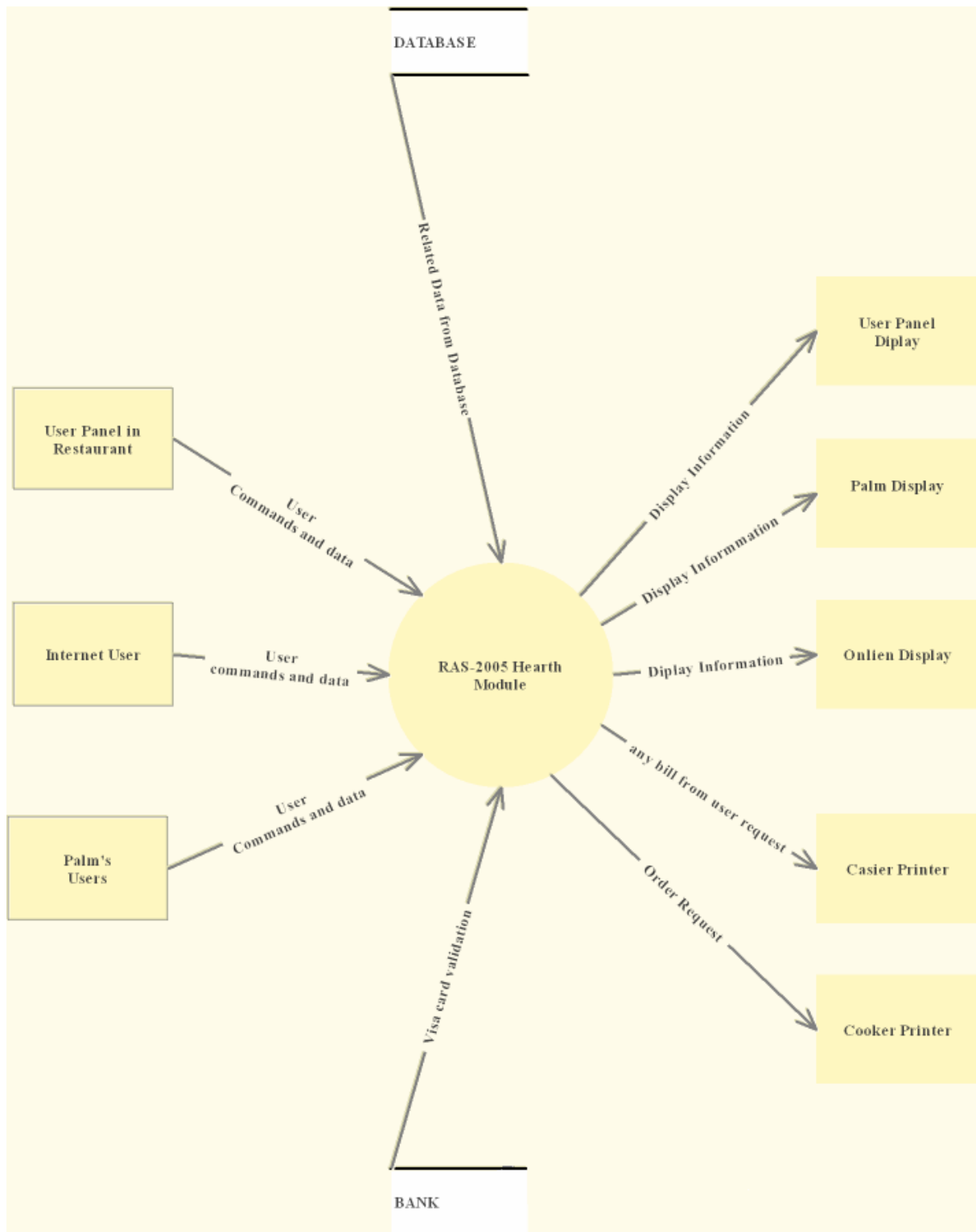
5.1.3.5 *Reserve* relation between Customer and Table

In this relation customer can reserve a table. One customer can reserve many tables, therefore cardinality relationship is one to many.

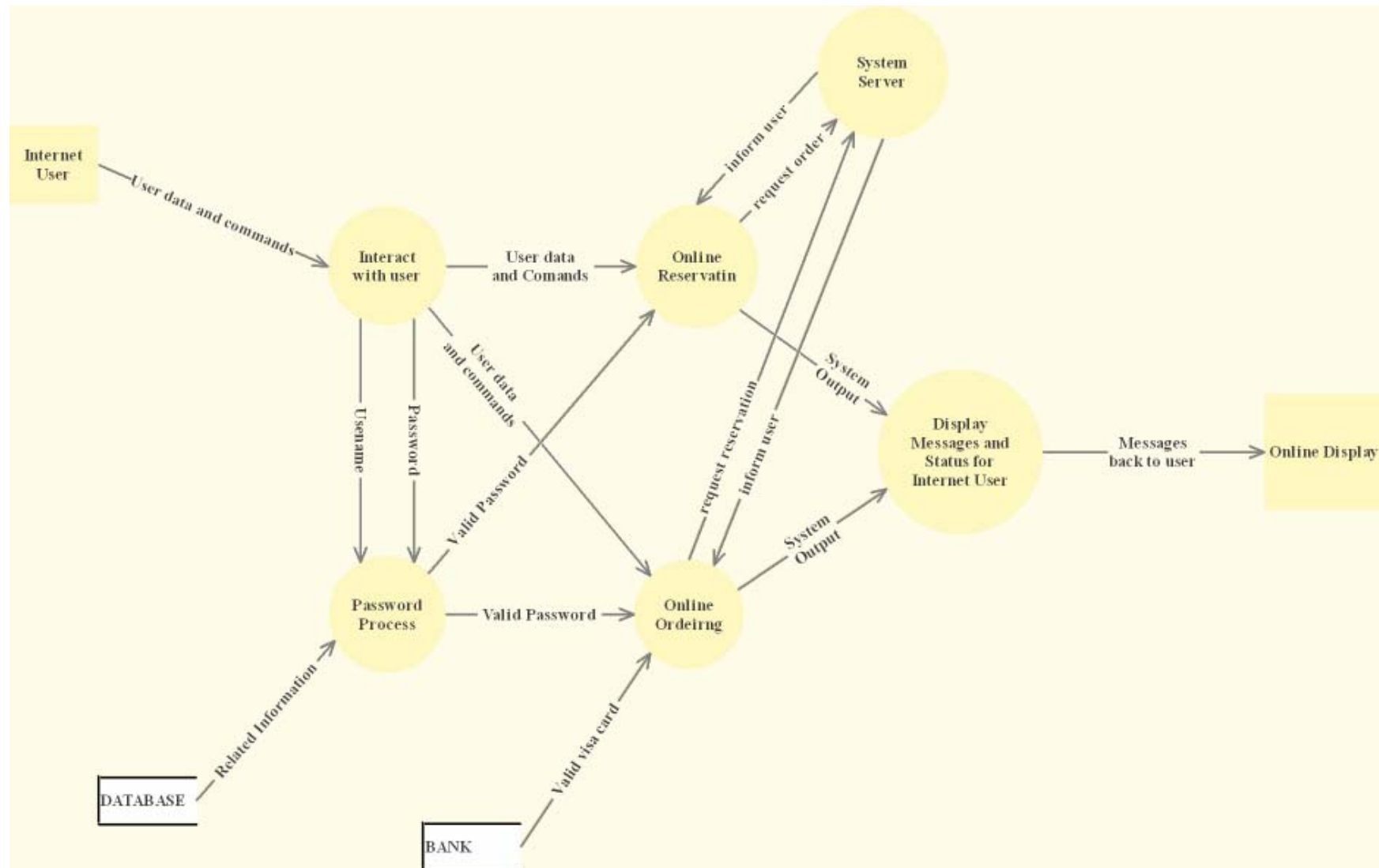
5.2 Functional Model

5.2.1 Data Flow Diagrams (DFD)

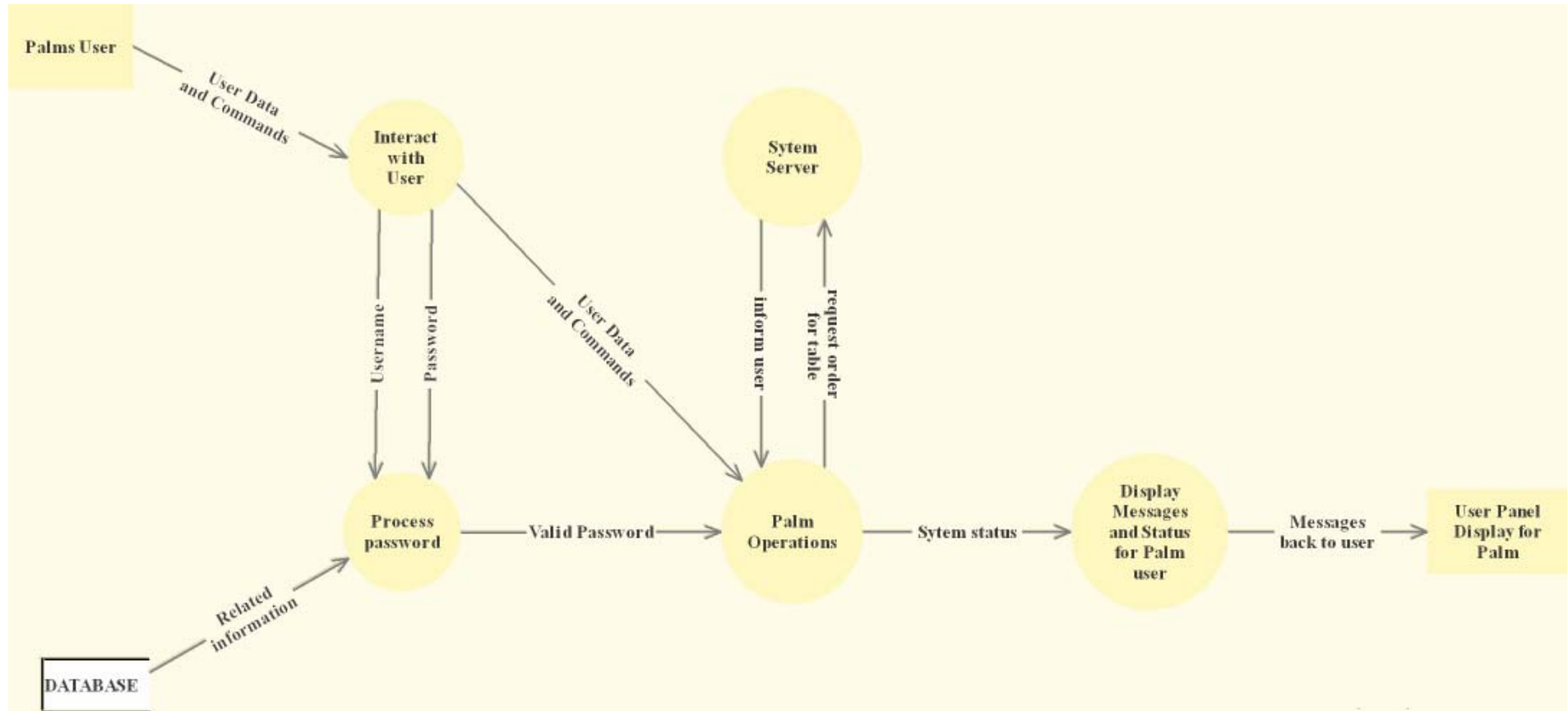
DFD level 0.



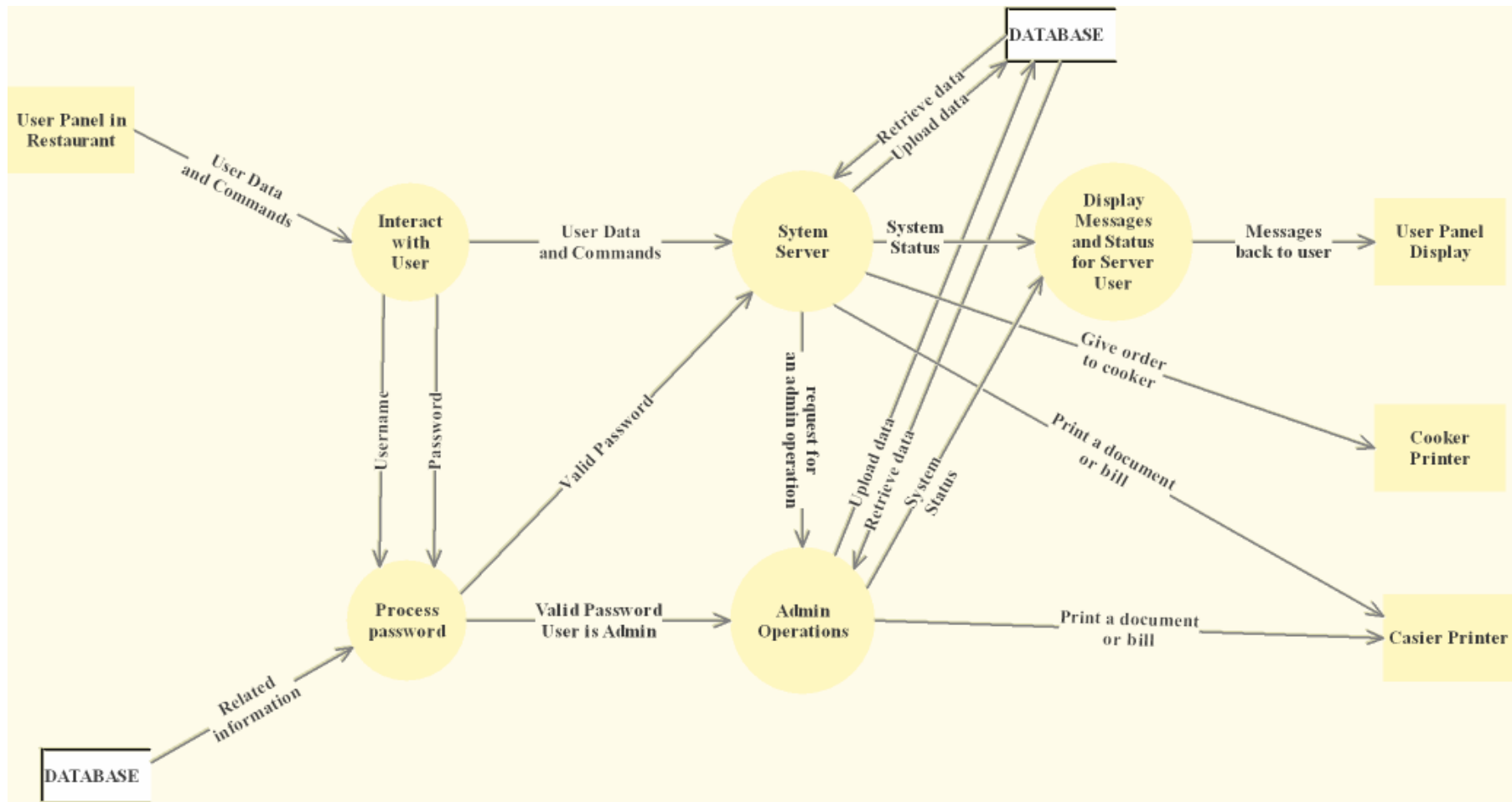
DFD level 1 for web based application.



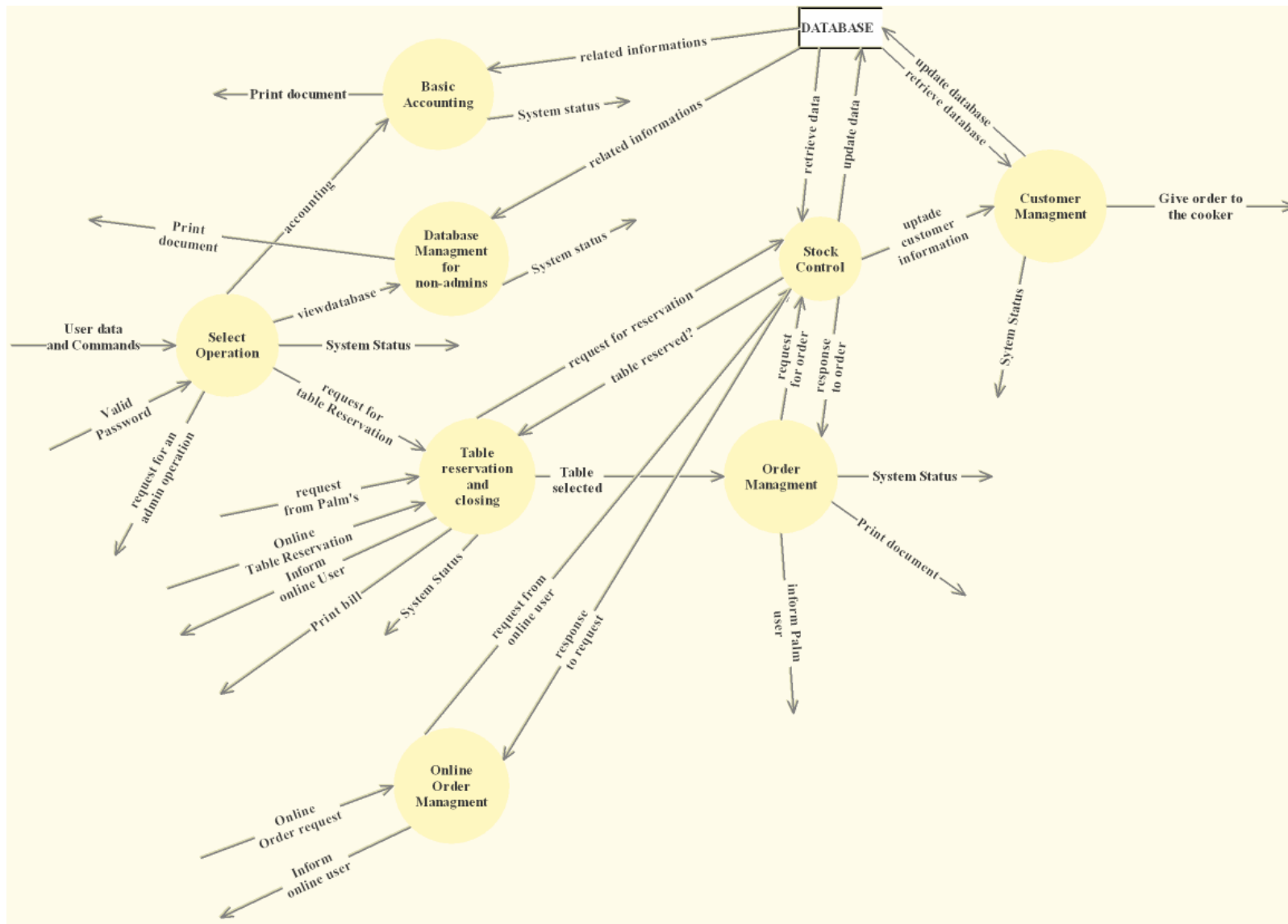
DFD level 1 for palm applications.



DFD level 1 for system user panel.



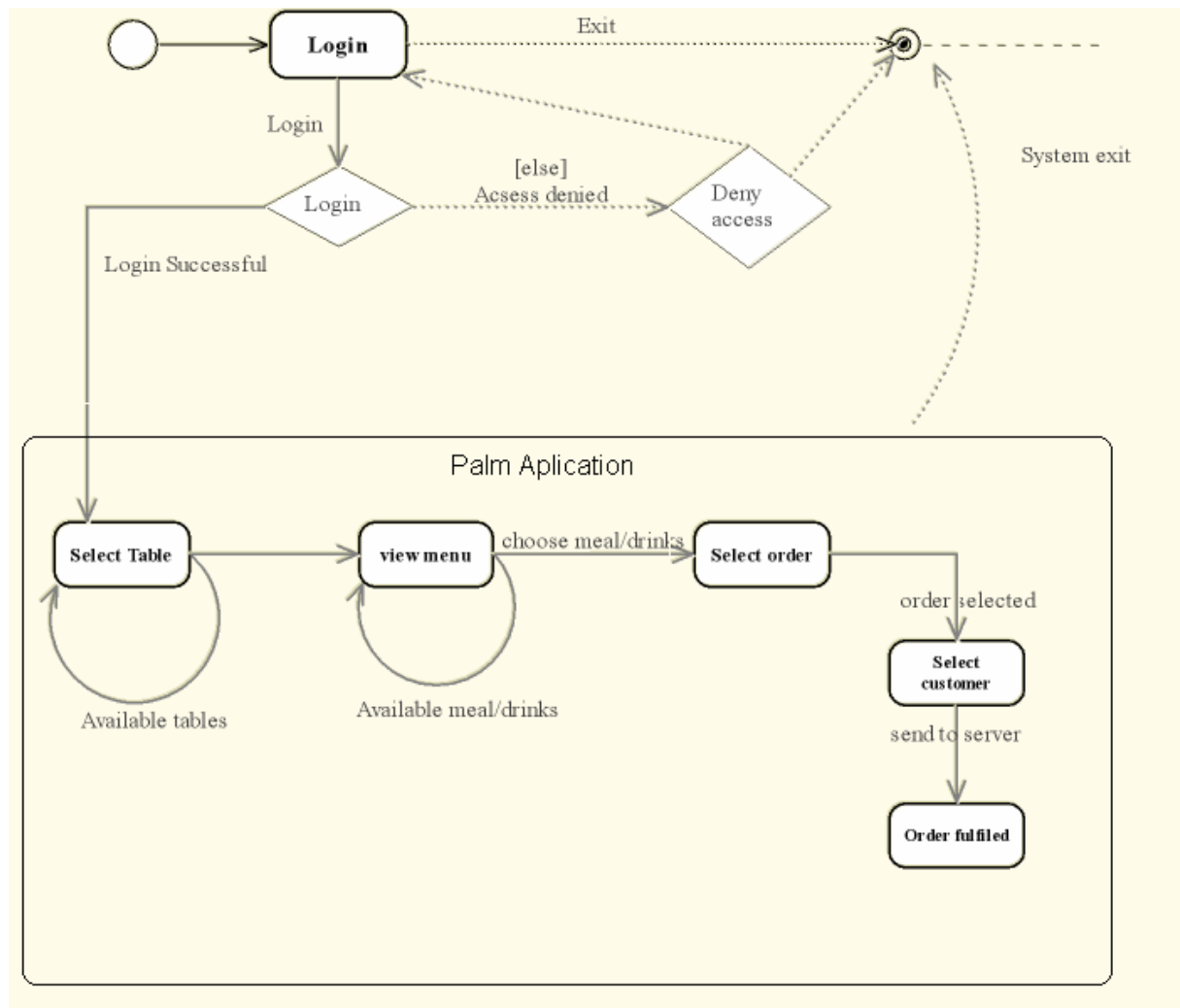
DFD level 2 for system server in user panel.



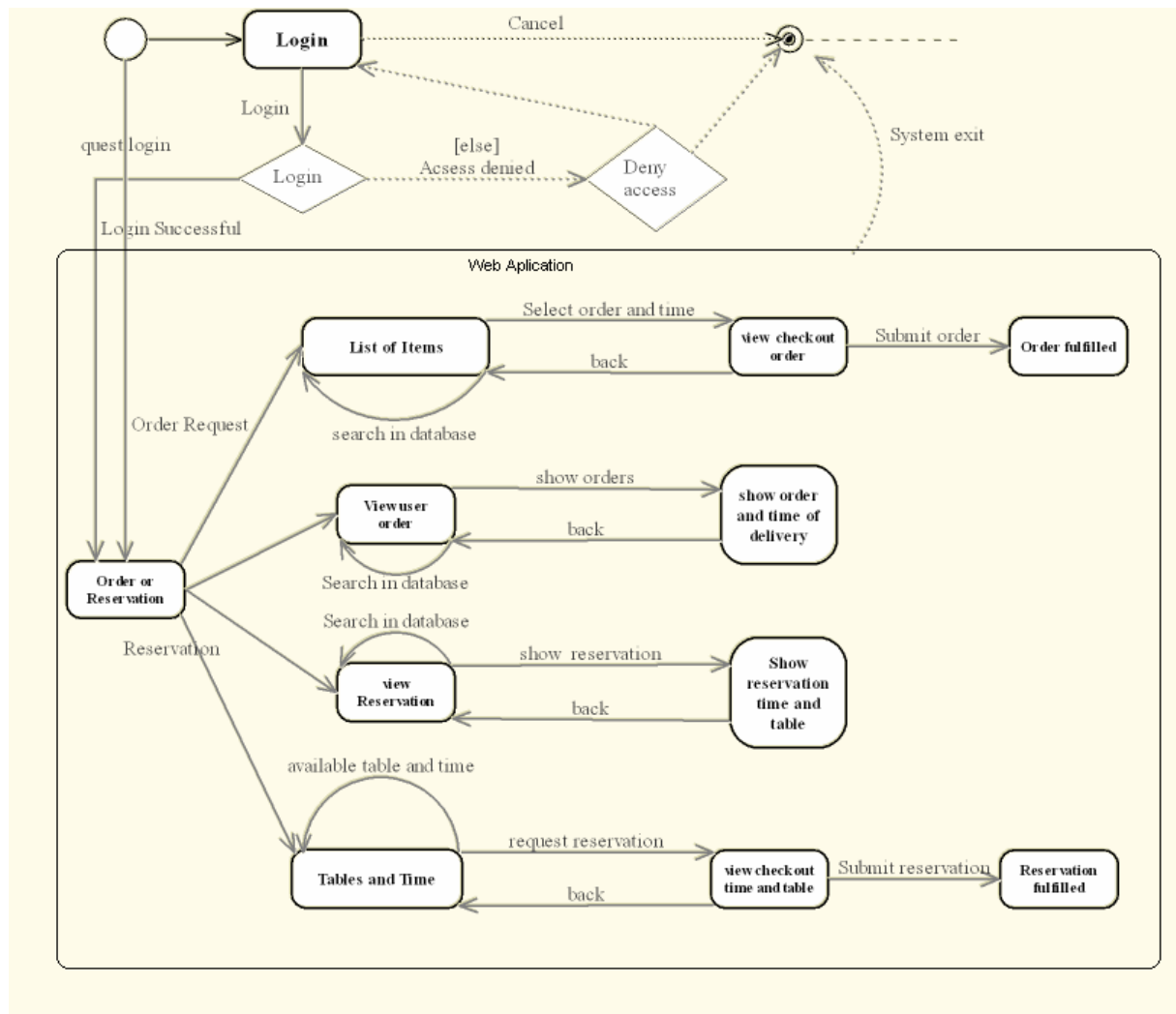
5.3 Behavioral Model

5.3.1 State Transition Diagrams

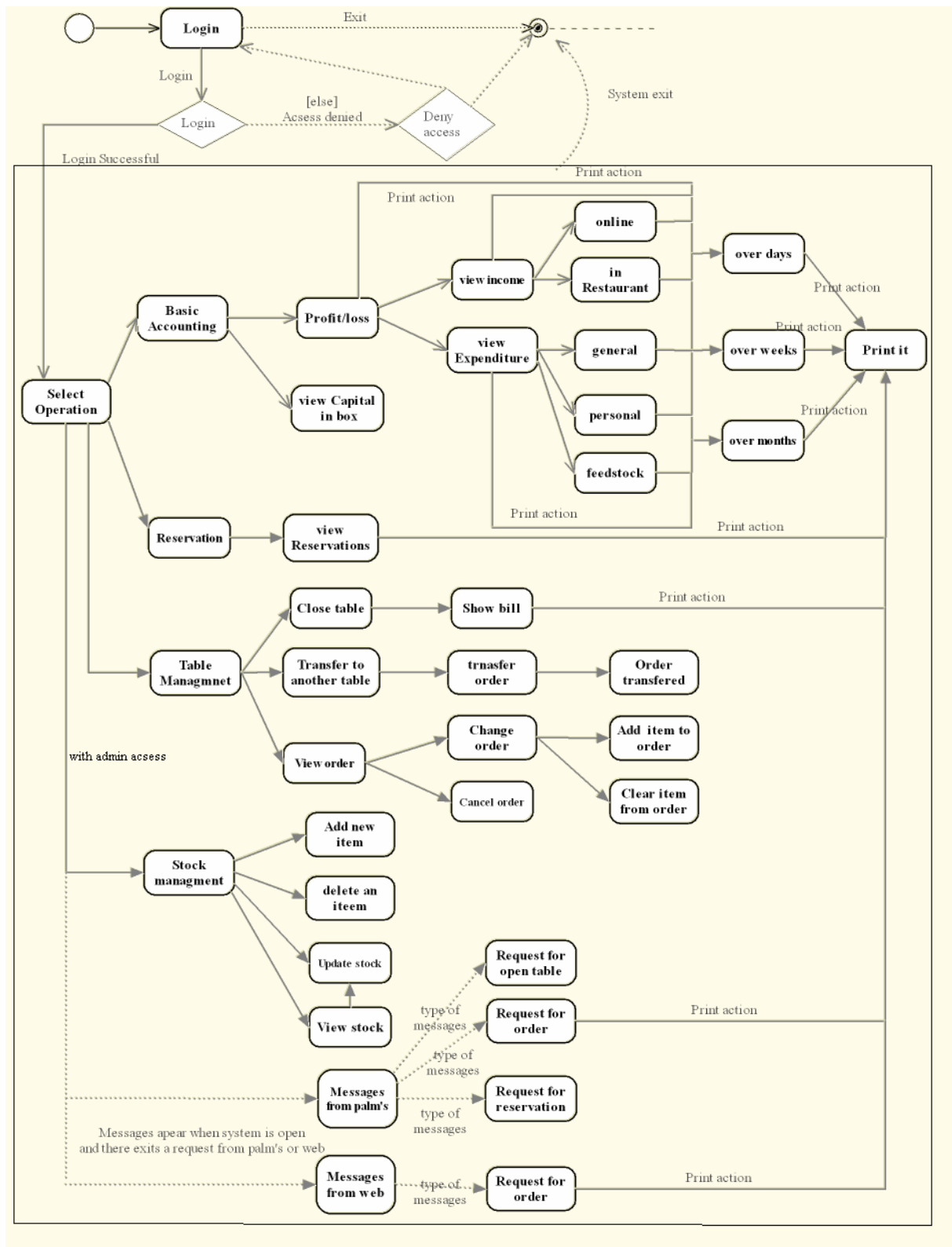
For palm



For web based application



For system server in the restaurant



5.4 UML Modeling Language

5.4.1 Use Cases

We have 4 different actors namely admin waiters online-customers and waiters.

5.4.1.1 for administrators

1. Login to our system by typing him/her username and password. If wrong password or users name a message appear and after typing 3 time's wrong password or username system wait 1 minutes.
2. After user login our system He shall be able to view all options like cashier.
3. In addition to cashier operation. Admin has an access to Stock Management he clicks Stock Management in user panel and enters stock management.
4. He shall be able to add a new item into database.
5. He shall be able to delete an item from database.
6. He shall be able to view stock by means of drinks, customers, waiters and their attributes. While he views stock he shall be able to add delete item from database, by clicking "ADD ITEM" and "DELETE ITEM" buttons.
7. He shall be able to increase amount of one item in database. When new items come he enters their amount and its id and increase amount in stock.
8. At any time he can respond answers from either palms or internet for reservation and orders its operation likes cashier.

5.4.1.1 for cashiers

1. Login to our system by typing him/her username and password. If wrong password or users name a message appear and after typing 3 time's wrong password or username system wait 1 minute.
2. After user login our system he can select reservation, basic accounting and table management. He can enter one of the interfaces by clicking related button.
3. If user selects Basic accounting user can selects view profit/loss and capital in box by clicking on them in Basic accounting menu. User can click "PRINT" button for all accounting operation to get a printed document which over the day over the week and over the month.
4. If user go deep in profit/and loss he shall select income and expenditure in terms of their related components.

5. If user selects reservation. He can access current reservation and clicking "PRINT" button to get a document about current reservation.
6. If user selects table management. He can close table. He can transfer a table and he can view order for a table.
7. If user selects view order for a table he can cancel an order for a table or he can add something to order or he can delete something from order for a table.
8. If he close table bill of order message appear and user can print it by clicking "PRINT" button.
9. At any time message from internet or palms cab be received and if message is an order Cashier select send it to cooker button to send order to cooker.

5.4.1.1 for online customers

1. User login to our system by typing his /her username and password. If wrong password or username written in 3 times system wait 1 minute. If again such a thing occur then user must be contact our admin to get his/her password back.
2. After a successful login he selects order or reservation.
3. If order is selected, then user select items from menu and add them to basket after finish order process he click submit order button to submit his /her order to system server.
4. If reservation is selected, then user selects free tables and times from menu and submits his/her request to us.
5. User can see his/her order and reservation at any time he want.
6. User exit from system by clicking log off button.

5.4.1.1 for waiters

1. User login to our system by typing his /her username and password. If wrong password or username written in 3 times system wait 1 minute. If again such a thing occur then user must be contact our admin to get his/her password back.
2. After a successful login he selects table number.
3. After select table number, he can see items menu by means of drinks and meals. Meals and drinks by clicking on them and then after order finished he can submit his/her request to system server.
4. User can exit from system by clicking log off button.

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Best regards to who help us with their deep knowledge in Restaurant automation:

Palmiye Restaurant Manager

Arjantin Restaurant Manager

MIS Simit Restaurant Manager

Hocam Piknik Restaurant Manager

7. APPENDIX

Questions ask to Restaurant Managers:

1. What you like most of your current automation?
2. What you hate most of your current automation?
3. What features can be added to your software?
4. Effects of Automation on your job related to profit?
5. Did it improve your customer amount?
6. What customer wants most of from you in terms of the automation benefits?
7. Is your current system easy to use?
8. How much money did you paid whole system?
9. How much money did you paid for software part of system?
10. Are you satisfied of your automation?
11. In what condition you can think to change it?
12. Is there any web based application?
13. If there exists web based application is system becomes more efficient?
14. If we product a good system then current system how much money will you pay it?
15. If we say that our program will be best than yours and we show technical papers and features to you could you sponsor us?

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