Middle East Technical University
Department of Computer Engineering

CEng 490 Senior Project

SOFTWARE PROJECT ANALYSIS REPORT

For

RA-1

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TusubasaSoft

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1. INTRODUCTION

1.1 Project Scope and Description

RA-1 is a software automation system which is mainly composed of the following parts:

- ➢ Stock management
- ➢ Ordering via handheld computers
- ➢ Online reservation and order management over the Internet
- ➢ Customer management
- ➢ Accounting system
- ➢ Executive information system (Reporting System)

Stock management is the management of the main ingredients which are required for the restaurant's meals and drinks to be serviced. Possible functions provided by this system will be tracking of incoming and outgoing goods. Stock management module will be responsible from preventing the restaurant running out of inventories. The module informs the user by using audible and written alerts when an inventory amount falls under a predefined level.

With the help of palm operated handhelds, orders of the customers in the restaurant will directly be transferred to the kitchen where the meals are prepared. Reducing the chaos in the restaurant, easy communication among the personnel and increasing service efficiency are the qualifications of this system which makes our automation much more powerful and practical for all users of the application.

There will be a simple user interface providing the personnel to select the necessary options and insert the data according to the order of the customer on the screen of the handheld. This user interface belongs to the program embedded inside the handheld that communicates with the main computer.

Online reservation and order management module provides solutions for the online customers. By using the web site constructed by the automation, customers will have easy access to any facility provided by the restaurant. In order to use this web site, each customer has to have an account. This account will not only provide online ordering but also be used by

the users to keep track of all promotions, special announcements prepared for registered customers.

Main concern of customer management system is customer related data. This data consists of individual information such as customer's name, address, telephone etc, order related information like monthly ordering amount, special dates, preference lists. This module has a capability of sending SMS for informing customers about the promotions planned by the manager of the restaurant. If the customer doesn't want to take advantage of this usage, s/he can disable this option by changing account setting. If this option is enabled, system also sends SMS's to the customers on the special dates recorded by them. Customers can benefit from being a registered user to the system by gaining bonuses whenever they order from the restaurant.

Accounting system module can be divided into three main parts:
1. Accounts receivable: We can describe this functionality as keeping and controlling the income of the restaurant in the database. As easily understood, income is directly related to the order prices and amounts.
2. Accounts payable: It is the accounts of all outcomes such as cost of ingredient, monthly salaries of the personnel, bills etc.
3. Cost accounting: This is basically used for determining and keeping the cost for one portion of each meal and the drinks.

An executive information system (reporting system) mainly deals with displaying all kinds of required graphical inference by using the data kept from all other systems described above. This system is used by the manager as a guide during the management business.

1.2   Software Process Model & Team Organization

In order to complete our project in total of nine months duration, what we should do exactly is following the analysis, design, and implementation and testing parts one by one and in each one of these parts returning the previous ones and do some modifications where necessary. What we need is definitely the characteristics of the incremental model. The incremental combines elements of the linear sequential model with the iterative philosophy of prototyping. As done in the incremental model, we will produce prototypes in some periods,

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and each prototype will have a certain part of the total project. We will present the first prototype at the end of this semester.

Our project team is most suitable for democratic decentralized team organization. First of all, although we have a defined leader s/he can be changed if it is necessary. Decision on problems and approach are made by all of the group members. There is no hierarchy among the team members.

1.3   Definitions, Acronyms, and Abbreviations

Online customer: Customer using the web site of the restaurant.

Table customer: Customer in the restaurant.

Phone customer: Customer making ordering or reservation by phone

Zero customer: Not registered customer.

Phone Operator: A general user who takes orders and reservation by using the phone.

Cashier Printer: Printer near the cashier, on which additions are printed.

Package/Reservation Printer: Printer near the phone operator, on which package order additions and reservation information is printed.

Kitchen Printers: Printers on the different sides of the kitchen, which are sided according to the group of products prepared near.

Package Addition: Addition on which the address, telephone number, meals ordered and their prices and total price is written.

Table Additions: Addition on which the table number, waiter id, user ids (if any), meals ordered and their prices and total price are written.

Kitchen Addition: Addition on which the table number, meals ordered is written. Different groups of meals printed from different printers.

Auto SMS sending option: An option customer can change by using account settings menu, to able/disable the SMS sending property of the system.

General user: It is used for the employees who are taking orders, which are waiter/waitress and phone operator.

Current Database: Temporary database in which daily operations stored. This database is emptied at the beginning of the day, and transferred to the stock database at the end of the day.

Stock Database: Considerably permanent database with respect to current database. System initialization data and customer accounts are stored here.

1.4 References

1. http:// www.teknomim.com/: The web site where "Restoran Otomasyon Sistemi (ROS)" is explained.

2. http://www.rop.com.tr/ : The web site where "Restoran Otomasyon Programi (ROP)" is explained.

3. http://www.biltekbilgisayar.net/resto/resto.php : The web site where "RESTO" is explained.

4. http://www.polar-ltd.com.tr/english/restomation/restomation.htm : The web site where "RESTOMATION" is explained.

5. http://www.tutku.gen.tr.tc/ : The stock program examined can be found from this site.

6. http://www.amazon.com : The web site which is examined for its 'Customer Management' facilities.

7. http://www.opentable.com : The web site which is examined for its 'Online Reservation' facilities.

8. http://www.papajohnsonline.com : The web site which is examined for its "Online Ordering" facilities.

9. http://www.amazon.com

2. DETAILED SYSTEM DESCRIPTION

RA-1 is the software automation which has online ordering and reservation, table order via handheld, accounting system, stock management and customer management as the main functions. The system has five user categories which are customer, manager, cashier, phone operator and waiter/waitress. Below, all of the rights and capabilities of each user will be explained in detail.

2.1 Customer

Customer is the user who participates in the system as a member of the web site of the restaurant using the automation. Being a member requires getting a customer id and a password to logging in to taken account for each online user. As a member, a customer has lots of options to perform in this web site.

The first option is online ordering. After logging on to his/her account, the customer can display all products according to their groups existing in the restaurant. By selecting the products from the list, the customer prepares his/her menu and orders it. When s/he selects a product, she has to choose which ingredients will be included and which will not. This option gives the chance to the customer to prepare his/her own meal. S/he also has the chance to save the prepared menu to the preference menus list. This list serves as the quick access to a menu previously prepared by the customer. In order the customer to complete the online ordering process, s/he has to specify the type of the payment that is whether it will be by credit card or cash. If the user chooses paying by credit card, s/he must give the credit card information also. At this time, s/he either selects one of the previously defined cards or introduces a new one to the system. The system uses the encryption technique to store the card information due to provide a secure and reliable system for the customers.

In addition to that, the customer can make online reservation. To make a reservation from the web site of the restaurant, the current reservation status schema should be displayed first. The customer can see the availability of the tables for the specified time before displaying the schema. Next process is to select an available table to be reserved. Finally, time duration for the reservation is specified before completing the online reservation process. When the reservation process is completed by the online customer, a reservation paper is printed from the printer near the phone operator in the restaurant. This paper is put on the table at the arranged time to indicate the reservation of that table at that time.

Maybe the most important feature for the customers whose even ten minutes is so valuable is ordering at the same time with reservation. This means that, the customers can also select the meals for the reservation in the reservation process. So, the meals will be ready on time of the reservation and when the customer comes, there will be no time spent by waiting for the meals to be prepared.

The customer can evaluate products that s/he ordered before. Evaluation is performed by assigning a number from one to five meaning one of very bad, bad, not bad, good, and excellent for the selected product. These evaluations are used as a feedback for restaurant to be one of the most favorite restaurants. Any additional comment or critic can be made by e-

mail. These mails are collected by the manager in order to read them and make some changes and corrections accordingly.

The online customers record all personal information in the profile management part of their accounts. They can make any necessary change on their personal information recorded previously such as change of the address or the telephone of the customer. This part of the customer account also brings an agenda facility to the account of the customers rather than just being an account for ordering and reservation. In this agenda, any kind of special date can be recorded such as birthdays, anniversaries, profession related important dates, etc. The user can make the alert on or off for each recorded special date. For the entries of which alerts on, the customer also specifies an alert date and time so that the system send a SMS to alert on the given date and time. If user prefers not to receive any message from the restaurant, s/he can turn off the auto SMS sending capability of the system.

Final feature presented to the users is that the customers can gain some bonuses each time when they order some meal either online or in the restaurant. The bonuses are collected in the accounts of the customers and they gain some promotions periodically according to their bonus amounts.

2.2 Manager

Manager, who can be also thought as the boss of the restaurant, is the user having the most crucial rights and responsibilities for the system which will be explained below:

The manager is the user who initializes the system when it is set up to the restaurant's computer. Here are the items defined by the manager:

- ➢ The manager gives the employee information such as employee name, employee address, telephone, bank account number and ssn. S/he also opens their user accounts according to their position in the restaurant.
- ➢ S/he creates the inventory list. For each item, cost, which firm it has been taken from, which groups it belongs to is specified.
- ➢ The manager is also the one listing all products of the restaurant with their ingredient and cost-profit information.

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> ➢ S/he defines the plan of the restaurant. That is, s/he gives the restaurant's table information and creates the table schema by himself/herself by putting the tables to the appropriate places in the empty schema.
> ➢ S/he also records the information of all firms where the inventories are taken from. Related account information is also recorded with each firm.
> ➢ Initiates automatic SMS sending mechanism by specifying the advertisement type messages' theme. The message generated by the manager will be received by the registered customers who didn't turn off the auto SMS sending capability of the system.

The manager is also the only user having the right to update and/or delete any information s/he initially recorded when needed. For instance, if there is a product which is no more produced in the restaurant is deleted from the database or any new product can be added to the product list only by the manager of the automation. These changes include any update or deletion about of the user accounts of employees. If the employee no more works in the restaurant, then the existing user account of the employee is closed by the manager. Also any change about the personal information of an employee such as address or telephone number is updated by the manager.

Another important right of the manager is viewing reports to have the statistical information and results about restaurant's processes. Contents of the reports can be related to accounting; that is, cost-profit related charts or product-sale charts; employee-performance comparison, time sale relation, day sale relation, table preference chart, stock inventory flow charts etc. All these reports can be displayed in different representations. After the manager selecting the content of the report to be displayed, s/he selects the form of the graphic. It can be a pie chart, line chart, column chart, bar chart etc. If the manager wants to display any information specific to a certain time interval, before displaying the report this time interval is given. For example, if the manager wants to see the sale amount of drinks in the last week, then s/he must give the dates of the first and the last days of the last week.

Lastly, the manager can update his/her personal information or user information. Personal information includes the name, address; telephone, etc. whereas the user information keeps the user name of the manager and the password.

2.3   Cashier

The responsibility of the cashier can be explained briefly as recording the incoming & outgoing money during the day and compare the result at the end of each day. Now let's explain these responsibilities in detail.

Incoming money can be expressed more precisely as the payments of the customers for their bills. These bills can be categorized into two as bills of table customers and the ones of the phone customers. If the customer paying the bill have customer id, then cashier records the bill as belonging to that customer and the system automatically adds the last payment to the customer's total payment amount existing in his/her account and used for calculating the bonuses. When the cashier takes the payment and completes the process for the specific table, the status of the table changes from open to close. If more than one customer id exists in the bill, then unless all of the payments for different customers at the same table are taken, the status of the table will not turn to closed.

The same procedure occurs for the phone customer also except two minor differences. First, the cashier close the addition opened when the customer's calling the restaurant after the payment of the order taken from the customer and given to the customer. In fact here the logic is not different from the previous case but the procedure is a little bit different. The second difference is that the addition is closed directly after recording the customer's payment since the addition of the phone order belongs exactly to one customer.

Second, the cashier records the money given from the restaurant's cashbox. S/he records the payments according to the names of the firms which are uniquely defined. In fact, the cashier does nothing except recording the outgoing money since the arrangement and the management parts are controlled by the manager.

2.4   General user

General user can be observed in two groups as the waiters/waitresses and the phone operators. Let's begin with explaining the duties of the waiters/waitresses:

1. Waiter/waitress

Waiters are the users of the handhelds and therefore they are responsible from the table orders. At this point it is worth mentioning table order taking procedure:

First, the waiter opens the table according to its table id; and s/he records the order of each customer at the table according to his/her customer id. This means that, customers having an id have the chance to add their orders to their own accounts even they are at the same table. But, if customers don't have specific ids, then default id zero is assigned to them for the current order and added to the collection of previous given orders as id zero. Any additional order can be made later on before the cashier closes the opened table.

After taking the orders of the customers at the table, the waiter/waitress sends the addition of the table to the related printers. The system divides the products in the addition according to their groups and sends them to related printers. That is, drinks are grouped together and sent to the drinks printer and all grilled products are sent to the kitchen printer which is near where the meats are grilled.

When the customers want to pay the bill, the waiter/waitress sends the addition to the cashbox printer and after the payment of the bill is completed, the table is closed by the cashier. At the same time the table currently appears as closed on the waiter's handheld screen.

When a handheld is started, first of all, a name list of waiters is displayed. Waiters choose their names from the list. This is for keeping track of each waiter's performance.

2. Phone operator

The second type of general user is the phone operator who deals with the orders and reservation by the phone. Let's first explain the ordering process for the customer on the phone:

When a customer calls the restaurant, first the caller id detection takes place. By this feature the phone number of the customer can be taken and whether that number is in the database is queried. If the number belongs to a specific customer id, then the information of the customer is displayed on the screen of the phone operator. This feature saves the phone

operator from recording the customer's personal information like customer id, address and phone number again and again for each call. If the information of the customer is displayed on the screen, then the phone operator opens an addition for his/her customer id; but if not, then the operator record the order as the general customer id zero and remaining procedures goes like previously defined order accounts with id zero. After taking the order the operator sends it to the related printers in the same procedure with the table orders. Before the order is prepared and sent, the customer can make any change or addition on the order. When the order is ready the phone operator sends the addition to the package-order printer with the address and the payment information on it. Since the payment part is related to the cashier as explained previously the duty of the phone operator in the phone order procedure is finished.

The second important work of the phone operator is recording the phone reservations. The phone operator records the reservations by using the same table schema with the online customers who makes online reservation. In fact, the same procedure is performed here. The only difference here is that this time the arrangement is done by the phone operator instead of the customer himself/herself. When the operator records a reservation for a customer with the specific table, date and the time interval information, then a reservation paper is printed from the printer near the phone operator. This paper is put on the table at the specified time interval.

General user can update their personal and user information like all other users defined previously.

3. REQUIREMENTS

3.1 Software and Hardware Requirements

1 Hardware:

Oracle Database:

Operating System: Windows 2000 / NT / XP (Home / Professional Edition)

Recommended Processor: Pentium I 266

Recommended RAM: 128MB

For FAT file system:

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Oracle home drive 861 MB

System drive 51 MB

For NTFS file system:

Oracle home drive 336 MB

System drive 51 MB

Web browser (if manager web site is to be used)

Microsoft Internet Explorer 5.0 or higher

<u>.NET Framework:</u>

Operating System

       Windows 2000 Professional

       Windows 2000 Server

       Windows 2000 Advanced Server

       Windows XP Home Edition

       Windows XP Professional

       Windows NT 4.0

       Windows Millennium Edition (Me)

       Windows 98

<u>System requirements for the .NET Framework:</u>

Processor: Intel Pentium class, 90 megahertz (MHz) or greater

RAM: 32 megabytes (MB) (96 MB or greater recommended)

Hard disk space required for installation: 160 MB

Hard disk space required: 70 MB

Video: 800x600, 256 colors

Microsoft Internet Explorer 5.01 or later

Hence, for RA-I, the system requirements are:

       Processor: Intel Pentium class, Pentium I 266 or higher

       RAM: 128MB or higher

       Web browser (if manager web site is to be used): Microsoft Internet Explorer 5.01 or

higher

       Hard disk space required for installation: with FAT, 1 GB (higher would be better)

       Hard disk space required for system drive: 121 MB

Video: 800x600, 256 colors

In addition to the items above, 3 desktop computers and 4 printers are needed. Computers are; one for cashier (He will see the additions, take the payments, make the recipe); one for phone operator (By Caller ID, he will see the customer immediately on his screen when s/he calls. Then, he will take the order.); and one for the manager (He will do the monitoring of the whole restaurant. He will act as an administrator.)

Printers are; one for kitchen, to take orders from inside or outside the restaurant (online ordering); one for cashier (to print the additions); one for package/reservation facility (Here, addition might be printed out.); and one for the printing out the reports. Except the last printer all other printers are of a special type that they print out on a thin paper that suits well for additions. The one for printing reports is a generic printer.

Moreover, we need handhelds, which will be supplied by the department.

2   *Software:*   Functioning TCP/IP on the Windows machine where Oracle product will reside is a requirement. As the operating system, Microsoft Windows XP is counted.

3   *People:* To make the program much usable for especially waiters, cashier and the operator on the phone it is decided to provide not too many submenus, mouse controls and palm stick controls. Eventually, even if the manager is one of the users of RA-I, the importance is on the waiters, cashier and the operator on the phone.

3.2   Estimations

COCOMO estimation technique based on lines of code is used to get an accurate insight to project size, cost and effort. However, lines of code are estimated by means of function points using the historical baseline of information. That is, the average proportion of lines of code to function points (LOC / FP). Hence, finding out the FPs will help us to find out LOC which will then help us in estimating the cost and effort. Before we start let's learn about what some expressions we will use mean:

-NUMBER OF INPUTS
-NUMBER OF OUTPUTS

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The above count the distinct number of items that the user provides to the system and the system provides/presents to the user, respectively (note, if there is no person as user, then the user is another application/system).

When counting outputs, a group of things such as
-a screen (counts as one item - in other words we don't count individual output fields on the screen)
-a file (counts as one item - in other words we don't count the records in a file or fields of a record)
-a report (counts as one item)

-NUMBER OF USER INQUIRIES
It is the distinct interactive queries made by the user that require specific action/response by the system. These are not counted under NUMBER OF INPUTS.

-NUMBER OF FILES
It is number of the master files - those files that are maintained by the application on behalf of the user or for organizing the application. Since the focus of function point analysis is to measure the complexity of an application based on the function that the application delivers to the users, temporary files produced by the application are generally not counted - only those files that are visible or required by the user are counted.

-NUMBER OF EXTERNAL INTERFACES
It is the number of external interfaces to other systems, i.e. the number of files to be read or written to disk or transmitted or received from other systems. This is machine readable information.

FP Based Estimations

Inputs:

1-Customer Information (to describe customer, to define his/her profile)

2-Personnel Information (to define personnel)

3-Product Group Information (to define a product group)

4-Product Information (to define a product)

5-Stock Information (to trace outcome from cashier)

6-Other Company Information (from which raw material is bought)

7-Reservation Information (to make a reservation)

8-Kitchen messages (defined by the manager)

9-Addisyon messages (defined by the manager)

10-Product Cost Assessment (since it can be done separately, but after defining it)

Outputs:

Screen outputs: Approximately, we have 10 screen outputs considering the whole parts of the system (Some of the menus and submenus have screen outputs. For example, an addition view or a daily cashbox report)

Reports: Approximately, we have 10 outputs in the report format. (We will develop reports based on time intervals and other constraints such as product.)

Inquires:

1-Apply KDV rate to product costs

2-Perform operations to uncover *some specific customers* (that have enough bonuses to promote)

3-Apply special promotion to *some specific customers*

4-Perform alerts to the customers that wanted such a service by SMS

5-Perform alerts to the customers that wanted such a service by e-mail

6-Apply regular deletes from the restaurant database (customer up to now addition tables)

We can approximate the number of inquiries to 10. That wouldn't be an extreme assumption examining the data flow diagram.

Files:

We have the chance to determine the number of source files and since decomposition or modularization makes development easier it is decided to be 10.

External Interfaces:

-Since RA-1 will have no communication to any other system, there will be no external interfaces.

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Measurement Parameter	Count	Simple Weight Factor	Average Weight Factor	Complex Weight Factor	Count
Number of Inputs	10	3	_4_	6	40
Number of Outputs	20	4	_5_	7	100
Number of Inquires	10	3	_4_	6	40
Number of Files	10	7	_10_	15	100
Number of External Interfaces	0	_5_	7	10	0
Count Total					280

Now, the complexity adjustment values are:

1-Does the system require reliable back-up and recovery?

- It is an important aspect of the development, so 4 points.

2-Are data communications required?

-No, so 0 point.

3-Are there distributed processing functions?

- No, so 0 point.

4-Is performance critical?

-Not very much, so 2 point.

5-Will the system run in an existing heavy utilized operational environment?

-Since it is Windows XP, it might be heavily utilized, so 3 points.

6-Does the system require online data entry?

-Yes. Customer preferences, reservation, registration, so 4 points.

7-Does the online data entry require the input transition to be built over multiple screens or operations?

-Yes. For example promotions are to be applied for each customer, so 3 points.

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8-Are the master files updated online?

-No, so 0 point.

9-Are the inputs, outputs, or inquires complex?

-Not very much, so 1 point.

10-Is the internal processing complex?

-Arithmetic operations and the password encryption, so 3 points.

11-Is the code designed to be reusable?

-No. Just for that enterprise. But, it can be extended for some other restaurant, so 2 points.

12-Are conversion and installation included in the design?

-Yes. Developers will install the program after all, so 3 points.

13-Is the system designed for multiple installations?

-Yes. We have a 4 to 5 users, i.e. the manager, waiters, cashier, phone operator. But this is just once, so 3 point.

14-Is the application designed to facilitate change and ease of use by the user?

-No/Yes. No, because the project is so straightforward and yes, because it's required to be easily used. So, 3 points.

$\sum$Fpi = 4+0+0+2+3+4+3+0+1+3+2+3+3+3 = 31

FP = 280 * (0.65 + 0.01*31) 270

And, we have the historical data that informs us LOC / FP on the average is 32. Using this information, we have 270*32 8700 lines of *Visual Basic* code. Yes, assumed programming language that suits well enough for this project is Visual Basic. This language was chosen just for estimation calculations. It has palm interpreter, and also it has .NET version which won't make too much different in estimations. Hence, we estimate to write 8700 lines of code for this project, which is **8,7 KLOC**.

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Effort Estimation

- Waltson Felix Model:

$$E = 5.2 * (KLOC)^{0.91} \text{ pm}$$

- Boehm simple model

$$E = 3.2 * (KLOC)^{1.05} \text{ pm}$$

By Waltson Felix Model: $E = 5.2 * (8.7)^{0.91} \cong 37$ pm.
By Boehm Simple Model: $E = 3.2 * (8.7)^{1.05} \cong 31$ pm.

Using COCOMO:

Since our project is not so big, ie a couple of thousand lines fits the requirements of basic cocomo model. RA-I could be involved in organic projects.

$$E = 2.4 * (KLOC)^{1.05}$$

$$T = 2.5 * (E)^{0.38}$$

So,

$$E = 2.4 * (8.7)^{1.05} \cong 24 \text{ pm}$$

$$T = 2.5 * (23)^{0.38} \cong 8 \text{ m.}$$

Number of people = EFFORT / TIME

So, $24 / 8 = 3$ people.

Fortunately and gracefully, COCOMO gave us realistic estimates of 3 people in an 8-month time. This project will require 3 to 4 programmers to complete the development in

time. The number of team members is 4. The team should be somehow experienced on the programming language used to produce reliable product.

3.3 Functionalities

The functionalities our system provides changes from user to user. Below the requirements are categorized according to user groups:

- general user

General users can be categorized in two groups as waiters/waitresses using a hendheld and phone operators on the phone using a PC. Here is the rights of the general users:

1. general users take orders. Two different order option is available that are table orders and orders by phone.
2. Waiters/waitresses using hendhelds have the right either to open a new addition for a specific table or to add new orders to an existing addition.
3. Phone operators using PCs have the right either to open a new addition belong to the caller or to add new orders to the additions not sent yet.
4. Phone operators record the reservation calls with the requested time interval in the specified day for an appropriate table.
5. After the reservation is taken by the operator s/he prints out the reservation information to be illustrated on the table reserved.
6. The user sends the orders to the required printers. If it is a table order addition information is sent to the kitchen printers and then cashbox printer, otherwise it is send to the kitchen printer and the package-order printer.
7. Waiter/waitress closes the addition by sending it to the cashbox printer.
8. The users can update their user names and passwords.

- Cashier

1. Cashier takes the payment of the bills.These bills are either of table customers or of phone customers.If the customers have their customer ids, the authority adds the payment together with the order to their accounts.Otherwise orders are collected in a general consumed product part with their payment amounts.
2. S/he also records all of the inventory related payments as outcome.

3. S/he compares the amount of money in the cashbox with the calculated one by the computer and prepares a daily or user related report for the use of the manager.After this report the cashbox is closed for the current day or user.

4. The users can update their user names and passwords.

- Manager

1. The manager adds all of the restaurant related information. These can be listed as follows:
    - Define employees and open their user accounts
    - Create the inventory list with additional information related to them
    - Create the product list with related information such as cost, profit etc.
    - Add existing tables
    - Create a list of all firms being in connection with.
    - Define auto SMS types and contents.

2. S/he can also update any information in the previously defined lists.

3. Deletion of the selected items from any of the lists created by the administrator is also possible.

4. The manager has the right of viewing all kinds of reports about stock, accounting, ordering, customers, etc.

5. S/he can see the reports graphically and type of the graphical chart is chosen by her/him.

6. The manager closes the user accounts when necessary.

7. S/he can change personal information such as user id and password.

- Customer

1. First of all, in order to use functionalities the system presents to customers, the customer must register to the system to have an account and a customer id related to this account.

2. If customer doesn't have an account yet, s/he can eat in the restaurant, order by phone and make reservation by phone. But for benefitting from the capabilities of the system, customer must register to the system online.

3. Customer can go to the restaurant and order by means of the waiters. This is logically same with the online ordering. The only difference is the transferring mechanism of the

order to the system; one is via wireless network(by handhelds), the other is via cabled network(Internet). The rest of the functionalities are written by thinking the online customer.

4. The customer can choose any product (meal,drink,etc.) to order from the list displayed on the screen according to their groups.
   S/he specify the meal s/he selected by choosing the ingredients preferred from the ingredient list of the meal.

5. S/he can add her/his current order to the favorites menu list to order again later easily.

6. Payment can be performed either cash or by credit card.

7. If the payment is performed by credit card, s/he can use either previously introduced cards by selecting from the list or a new one.

8. The customer can also make online reservation by using the table schema of the restaurant.

9. After selecting the table, the user state the time and desired meals and drinks in order the meals to be ready till the reservation time.

10. The customer evaluates the meals.Evaluation can be made base on the levels defined on by the system.(very bad, not good, notr,good,excellent)

11. The customer can also write special comments on any subject related to the restaurant or the system and s/he can mail it to the administrator.

12. The customer can also record all customer related information such as birthdays,anniversaries and other things that should be reminded to the customer.

13. S/he can activate the send sms option not to forget his/her special dates.

14. S/he can activate/deactivate the auto SMS sending option.

15. The customer can see the bonuses s/he gains according to the points collected by online or table ordering.

3.4 Constraints

Time Constraints

We only have about seven months to finish all documentation, bug fixings and development. We have a lot of ideas but cannot implement them due to time constraint. Actually, we have seen that the context of restaurant automation is really huge. There are so many features that are possible to be included in the system, but we aim delivering not huge

but useful system with some attracting features like Caller ID, SMS posting, Icon Enlarging, considering limited time.

Funding Constraints

To develop and implement the handheld computer integration, we will need funding to buy at least one handheld. However, this need will be met by the department. There is no any funding constraint for this project.

3.5 Database Requirements

These are general requirements about program database of our system.

- o The database is initialized by the manager according to the restaurant's specifications and data.
- o The database is composed of two separate sub-databases: current database and storage database. This separation is needed for the efficient use of the database system. System crashes and slowness can be minimized by this separation. Current database will store the daily information of additions, out coming and in coming money. At the end of the day, system automatically transferees the related data to the storage database.
- o Database cleaning up is controlled by 2 different processes:
    1. Periodic deletion: Every month addition details and stock details will be deleted by the system. But only 'details' are deleted, the parts related with customer management and accounting will be stored in the system. User accounts which haven't been used for 3 months will be deleted from database. If users try to login to the system after 3 months, system will inform the user about the deactivation of his account, and offers to activate the account. Activation can be done since user names and passwords will be store in the system 1 year even if the account became inactive. But if the account hasn't been activated in a 1 year period, it will be completely deleted from the system.
    2. Manual deletion: When needed, employee, product, table and firm data information can be deleted by the manager.
    3. Daily deletion: While current database is transferring to storage database, some of the data which is not proper for storage purposes will be deleted. Actually, won't be transferred to the storage database that means deletion.

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This watermark does not appear in the registered version - http://www.clicktoconvert.com

Reservation information is the most understandable one in this category. No need to store reservations that has been timed out and that is for the previous day. And also customer information (if zero customer) that is taken while ordering on the phone, is not needed to be stored at the end of the day.

Data to be stored in the database

- customer data

name,two phone,2 adresses, customer id, addition information, special dates, credit card information, preference list, customer bonus, receipt information (tax office name, tax number, appellation for receipt)

- inventory data

Id, name, current amount, measurement, cost, vat ratio, vat excluded/included, firm to buy

- product data

Id, name, group, ingrediant related information (names, amount, cost, profit amount, profit percentage, sale)

- employee data

Id, name, personal information (address, phone, bank account number, ssn), appellation, user information (user status and password, salary amount)

- table data

Table no, capacity, available/full

- firm data

Name, account numbers for payments of inventories, telephone, addresses, loan, installment

4.   LITERATURE SURVEY

We examined four restaurant automation programs deeply, which were: Restoran Otomasyon Sistemi (ROS) [Ref. 1], Restoran Otomasyon Programi (ROP) [Ref. 2], RESTO [Ref. 3], and RESTOMATION [Ref. 4]. And also 4 other program components were examined for the parts which weren't covered by the programs we listed above. These parts are the customer management part, online reservation& ordering, and stock management& accounting parts. Although we have given a detailed report on our research, we want to make a brief summary on the literature survey we had done. Please see Appendix-L for the screen shots.

4.1   Restoran Otomasyon Programi (ROP)

Before the online investigation on the net, we, as TusubasaSoft, tried to itemize some features that should exist on this kind of automation to meet the general needs. And as a result, we got many of the followings in common, which are the main properties of ROP:

- *Track of Addition*
   - ✓ *For table:* An addition is started by two ways. You can start it by pressing the keyboard buttons typing the waiter number, table number, and the number of people that will use the table as customers. Else, you can start it by just touching the monitor.
   - ✓ *For package:* ROP requires the phone number as a search index. If it cannot find the customer whose phone number was given, it displays the customer registration form
   - ✓ *For customer:* This addition is generally used in places like clubs. The customer is not dependent on one table

      The main menu can be seen from App L.1.

- *Account:* ROP presents four ways to pay the bill: Cash, with credit card, current or with foreign nation money. Also, you can acquire the reports about these operations immediately. By this way, documentation of credit card account or foreign money will not be a laborious issue anymore.

- *Receipt:* There are mainly 2 kinds of receipts: detailed one includes each product the customer paid, while the total one includes just the total debt of the customer. For the receipt form, please look at App. L.2.

- *Kitchen Control:* The orders are forwarded to the kitchen by means of the specified printers or monitors.

- ***Reservation:*** ROP gives chance to the customers to reserve table before they come. Customer name, address, phone number, table number and date are the necessary information to book the table.

- ***Customer Tracking:*** By using ROP you can track your customers` consumptions, special dates, addresses, also receipt data, subscriber data and current account processes. A sample customer registration form can be seen from App. L.3

- ***Daily sale lists:*** All the details of a day about the enterprise can be seen via ROP. For example: Orders, Packages, Sales, Rate of vacancy of tables, pay balance, waiter performance, etc.

- ***Cashier Notebook:*** You can see all money input and expenditure of the enterprise. Waiter salary, current accounts of the other firms that you commerce with them for raw materials. By looking at the "Kasa Raporu" GUI on the App. L.4, you can obtain more information.

- ***Reports of Past:*** These are mainly: Addition reports, waiter sales reports, product sale reports, cashier/sale reports, endorsement (giro) reports.

- ***Graphical Reports:*** Some graphical reports can be generated by the system such as; product sale, monthly distribution, group sales, waiter/endorsement graphics, product sale graphics, yearly distribution, addition distribution

- ***Security:*** By the authorization, jobs to be done by every personal can be assigned and designated. If wanted, magnetic cards can be delivered to personal to make the processes more secure.

The hardware used for this automation: Desktop Computer, Mouse + Keyboard, Color Printer, Receipt Printer (App. L.5), Handheld.

4.2   Restoran Otomasyon Sistemi (ROS)

As you may notice while examining Appendix L. 6, there are 5 main modules in the system. These are:

- *Handheld computers:* Opening a table, taking orders, controlling reservations are the processes done by the handhelds. After the order is taken, waiter sends the order to the kitchen only by one touch or one click.

- *Kitchen monitors:* The given orders will be distributed to the appropriate printers in the kitchen according to the types of the orders.

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- *Cashbox module:* Users of this module can see the open tables and the order lists of these tables. Some other operations that can be done by this module are: dealing with packet & table orders, reservation operations, expense entering, end-date operations.
- *Management module:* This module is for the management of all the other modules. System's all kinds of settings are defined by using the module and 5 main things can be done: menu, user, table, product type, and payment type operations.
- *Reporting module:* By the help of the module, monitoring the firm will be easier for the managers. This module mainly provides reports like: daily activity reports, reports for date intervals, user reports, product reports, table reports, cashbox reports.

4.3 RESTO

Mainly the menu operations in this system are below:

- The user can define a new product or a group of products. The prices of the products can be defined and changed easily.
- By the help of handwriting module, any note to the kitchen can be transferred.
- The portion of the meal can be defined, such as 1, 1.5, ½.
- The user can see the status of the tables, reserved or empty, on the monitor. To see the details about the open tables, the user can click to the related table on the monitor.

We can examine the other options that the system has into some parts;

- *Customer management:* Customer management aims to make the things easier for the customers.
- *Stock management:* After the integration of the stock management module, the user can monitor the condition of the stocks. It can be on the basis of product and its sold quantity, the name of the meal and how many portion it is sold or the remaining quantity of the products. Please see App. L.7.
- *Reporting (executive information system):* The user can see the daily, monthly and yearly collection reports. Resto provides a daily report on the number of sold products and their prices. The user can see the past reports and make comparison also. Resto also shows the condition of the stock in a report format. The user can see total sale, the way of collection, cancelled operations reports on the basis of branch, personnel and the cashbox.
- *Other system modules:*

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- ✓ *"Packet Service Management" module:* The restaurant can take orders by telephone and by using this module telephone orders can be managed. The information about the telephone customers can be kept. This can be done by writing by hand the info on the touch panel monitor.
- ✓ *"Caller ID" module:* When a customer rings the phone all the information- name, address, past orders- about him appears on the monitor before answering the phone.
- ✓ *"SMS" module:* The program sends the daily reports to the cellular phones.
- ✓ *"On line Access" module:* This module is for the companies with too many branches. It provides central management by accessing all the branches.

4.4   RESTOMATION

Like most of the other restaurant automation software, 'restomation' has the functions such as ordering, handling inventory, informing about recipe and cost of meals, reporting and displaying profit, etc. We don't want to analyze each functionality in detail, because very similar ones were examined in the other three programs. Here are some points we want to emphasize:

- The main advantage of the program is that it has very well designed user interfaces. On each button there are some figures that explain the function of the button. Also information display design is well.

- By analyzing the profit & lost part of the program we gained some idea about the accounting system of the program and what information is kept related to this system. This program keeps the total sales, cost and profit in TL, $ and % for each group in the restaurant like drinks and desserts.

- We think that maybe the most important function that we are planning our project to have and this one does not is that there is no specific account for the customers. For example the orders are taken according to the table and order numbers but not according to the customer names or any information related to them. So this program cannot have any customer specific information and functionality.

4.5   ALI SATI STOK TAK P PROGRAMI

We analyzed this software to have deeper information about how the things are going on in the stock and accounting systems. You can access the program via [Ref 5.]We will

explain the related parts of this software below:

1) *Inventory related data:* In this part, the basic actions performed are inventory definition, update, deletion and the display of the inventory flow. For 'inventory definition' please look at App. D.8.

2) *Customer related information:* For 'the user interface' please look at appendix D.9. This is a very detailed and proper interface to have the required information of the customer.

3) *Firms inventories to be sold and related data:* This part is very much similar to the customer related information.

4) *Cashbox related process:* In this part, possible processes to be performed are money entry, money exit and flow list.

In conclusion, every detail related to stock management and accounting system was considered and requirements have such good solutions in terms of usability and quality of user interfaces. For more detailed information and more GUI's for this software you can visit the web sites of the software companies which are available through internet.

4.6   Amazon.com

This site [Ref. 6] is examined for the detailed customer management facilities it provides to its users. Users can do lots of things within their accounts. By looking at these things, we can say that in our customer management system, the main options which can be used by the users are:

- Order status control (statuses: didn't sent yet, will be received in [predicted delivery time] minutes)
- Users can see orders they have given in a specific month, year, etc. And can follow-up the points (it is like bonuses) they gained from their orders in monthly or yearly basis.
- Change, modify the address information. Also users can have a right to store more than one addresses in the system and just before the ordering process has completed, system can ask to the user which address he wants to use in that order.
- The same thing can be performed for the credit card information, users can have a right to store more than one credit car number in the system and just before the

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ordering process has completed, system can ask to the user which credit card he wants to use in that order.

- Let the user develop preference lists and store them in the system. These lists may be used by the user when ordering. By the help of this feature, users can save a lot of time.

- Users must have a right of blocking or accepting the notifications, alerts, promotion news, etc. sending from the web site.

- Users can modify their personal settings like e-mail address, special dates, address books, etc.

4.7 OpenTable.com

This web site [Ref. 7] is used by restaurants for online reservation. Actually, OpenTable.com is defining itself as "the premier restaurant reservation network". Users can sign in to the system and start gaining "OpenTable dining points", which is actually something like bonus. The more users use this site for reservation, the more they gain dining points. When users want to make a reservation, first of all, they choose the restaurant they prefer from a main menu, then a reservation form like in App. L. 10, is displayed. System sends a confirmation mail to the addresses users have given, when reservation is done successfully. When users reserve something, their dining points will increase and after it reaches a limit, they can use them as dining cheques.

4.8 PapaJohnsOnline.com

Papa John's Online is the web site [Ref. 8] of a pizza restaurant. Using this site, users can do online ordering. When users sign in, the system asks them what they would do; change account settings or order. If users choose ordering, then asks for delivery or carryout. Whatever is chosen, a screen with full of options of pizza kinds, drinks, sides and extras is displayed. If user decides to order something, he puts them into shopping cart and then follows the "View my order and checkout" link. The form displayed after that action can be seen from App. L. 11. If payment method is chosen as cash, the confirmation screen comes after that. Else, if payment method is chosen as credit card, some additional information about credit card will be asked to user.

As it can be noticed, customer management part is weak in this site. After registering, user mustn't rewrite his credit card number settings every time he orders something; this is time consuming for users and also for the system.

We also did some research about handhelds for restaurant automation program. Since its detailed report has been submitted before; here, we don't want to refine them again. Please look at the "The Software Observations from the Market" titled report for detailed information on the systems explained above, our comments on these systems and a detailed investigation report on the handhelds.

4.9   Interview

Interview with Hocam Piknik:

Q: Are you trained by the company to use the program as a master, or to cope with some problems that occur during lifetime of program?

-          Even a minor problem finds its solution with the program. Every detail is thought by the developers of the program.

Q: Is there any feature that you find it really useful and practical? What about the one that you find it as not friendly, complex?

-          Mustafa: Yes, for your first question. For example, taking special notes for each order is possible such as a "salad without salt". Also, yes for your second question. I am bored with this screen of pale colors of interface and I want shiny colors which are more enjoyable.

-          Sadık: Taking special notes for each order is not an efficient activity. Because, I find it boring to press on each character individually on the palm.

Q: Can you think a solution for this annoyance?

-          We want to convey the answer on behalf of the waiter. Even he uses the handheld everyday and even he is the nearest man to the problem he could not suggest a solution. It seems to be an important point, then. We suggested making it optional on a combo box. He again rejected that solution. He said that it would again be something inefficient. He found that combo box as a complicated interface.

Q: Do you have any accordance problem with handheld and the main computer?

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\-   Coincidentally, we have asked a crucial problem. They sometimes have to make some changes even manually, because handheld update is slow. The changes on main computer can not be reflected immediately to the handheld.

Interview with Black&White:

Q: Do you wish some other features exist on the system?

\-   Their answer was straight forward, it was no. They even do not use some parts of the automation program.

***This question was deliberately asked to prove that the programs on the market are so big even huge sometimes that some parts of it are not used.

Q: Is there any feature that you find it really useful and practical? What about the one that you find it as not friendly, complex?

\-   Yes. He, the cashier, has the chance to see how much money he will earn at the current time. That is, the revenue of the additions, which were not paid yet, can be calculated and informed the cashier by the system.

Q: As experienced personnel, what do you prefer us to keep track of the stock materials by our automation program?

\-   It is really very hard to keep track of stock products. Actually, it may not be the case for fixed-size products; i.e. cola, schnitzel, water, chicken, etc. However, it is difficult for tomatoes, potatoes, other vegetables, spaghetti, mayonnaise, etc. Customers have various orders: some wants less sauce while some wants much. In the same mentality, some wants his/her schnitzel with an excess of spaghetti, while some wants it an excess of salad. Even in more detail; some wants his salad with no tomatoes, some wants potatoes as an extra with his/her meal. As you can see, it is hard to keep track of some kind of raw material by the automation program. You have to do a little "bakkal hesabi" or you have to ignore some money that will be an outcome of the restaurant.

Q: When you need 20 kg of tomatoes, what do you do, how do you record this information?

\-   We buy it giving money from hand and keep record of it on our notebook. So, we perform "bakkal hesabı" for some kind of raw materials.

Q: There is a reporting facility of reporting the sales of a specific table between given dates. What benefits do you attain by learning such kind of information?

- For example, we learned that many of our customers prefer to choose the tables which are next to the wall. Many of the customers prefer not to be in open area of the saloon of the restaurant. Hence, we design our tables in such a way that no table is left in open area. Most of our tables are lying down the walls of the café.

5. GANTT CHART

Please see Appendix-6 for the Gantt Chart.

6. DATA REQUIREMENTS

6.1 Accessibility

This subsection specifies the following requirements associated with the degree to which the system must be accessible to people with authorization rights:

- ✓ ACC-1) any graphical user interfaces of RA-1 to display graphical reports of the restaurant, to hire a new employee or to fire an employee and also to add products to menu of the restaurant shall be usable by only the manager

- ✓ ACC-2) any graphical user interfaces of RA-1 to display daily income report, addition information of a table, or of a customer shall be usable by the cashier

- ✓ ACC-3) any graphical user interfaces of RA-1 to display the products in the menu, to open an addition for both a table and a customer, to close addition, to send the addition to be paid to the cashier shall be usable by the waiters

- ✓ ACC-4) any graphical user interfaces of RA-1 to view/update the customer preferences, to make an online ordering/reservation shall be used by the people who has customer ids

6.2 Correctness

This subsection specifies the following requirements concerning the degree to which the system can contain defects and still be acceptable to the customer.

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Accuracy:

This subsection specifies the following requirements concerning the degree of correctness of the system's outputs:

- ✓ COR-1) Values of money shall be correct to the nearest YTL by two digits after decimal point, which will point kurush.

- ✓ COR-2) Values of time shall be correct to the nearest second.

Precision:

This subsection specifies the following requirements concerning the resolution of the system's numerical outputs:

- ✓ COR-3) Values of money shall be precise to the nearest kurush.

- ✓ COR-4) Values of time shall be precise to the nearest second.

Timeliness:

This subsection specifies the following requirements concerning the degree to which the system must ensure that its persistent information is current (i.e., up-to-date):

- ✓ COR-5) when one user (an online customer) updates some data, the system shall ensure that the user shall see the update in his/her next login, which can be quantized as 10 seconds.

- ✓ COR-6) the system shall synchronize data with the handhelds, which shouldn't take so many time that waiters have to update the computers manually, so the moderate maximum time for this is 30 seconds

- ✓ COR-7) the system shall permanently delete "obsolete" information from all storage after every 1-month time.

6.3   Maintainability

This subsection specifies the following requirements associated with the ease with which the system can be maintained:

- ✓ M-1) The RA-1 shall permit the swapping and upgrade of hardware without down time.

- ✓ M-2) The RA-1 shall permit the upgrade of software without down time.

- ✓ M-3) The Mean Time to Fix (MTTF) shall not exceed two person days.

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6.4   Performance

This subsection specifies the following requirements associated with the speed with which the system shall function.

Latency:

This subsection specifies the following requirements concerning the maximum time that is permitted for the system to execute specific tasks (i.e., system operations) or use case paths end to end:

- ✓ PER-1) a customer shall be able to sign in the system from the internet for within 10 seconds

- ✓ PER-2) a customer shall be able to sign in the system and make an online ordering from the internet for within 1 minute (assuming that the customer knows what to order)

- ✓ PER-3) a customer shall be able to sign in the system and make an online reservation from the internet for within 1 minute (assuming that the customer knows what to do)

Response Time:

This subsection specifies the following requirements concerning the maximum time that is permitted for the system to respond to requests:

- ✓ PER-4) No system responses shall occur exceeding 1 minute

6.5   Portability

This subsection specifies the following requirements associated with the ease with which the system can be moved from one environment (e.g., hardware, operating system) to another.

- ✓ RA-1 shall enable users to use the following environments (e.g., platform and operating system) to interact with it:

  - • User Personal Computer:

    POR-1) PC with minimum of Pentium I 266, 128 MB RAM

  - • Operating Systems:

    POR-2) Microsoft Windows 95/98/200/NT/XP

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6.6   Reliability

On this project an important aspect is reliability of the delivered software. Possible defects may cause great amount of time and money loss. To prevent defects as possible as we can, software quality assurance should be taken into account much considerably. In case of any information loss back-ups should be taken often and support should be provided quickly.

This subsection specifies the following requirements associated with the reliability of the system.

- ✓ REL-1) the mean time between failures (MTBF), summation of mean time to failure and mean time to repair shall exceed 3 months.

6.7   Reusability

This subsection specifies the following requirements associated with the degree to which the system can be used for purposes other than originally intended (e.g., as part of other applications).

- ✓ REU-1) RA-1 shall incorporate a database continuous availability layer.
- ✓ REU-2) RA-1 shall reuse common classes such as name, address, telephone number, and currency
- ✓ REU-3) RA-1 shall reuse software for sending SMS
- ✓ REU-4) RA-1 shall reuse software application program interface (API) for voice recognition (system will be suitable for voice recognition capability)
- ✓ REU-5) RA-1 shall reuse software for Caller ID feature

6.8   Safety

This subsection specifies the following requirements associated with the degree to which the system does not directly or indirectly (e.g., via inactivity) cause accidental harm to life or property (e.g., loss of money or data).

- ✓ SAF-1) RA-1 shall not accidentally lose user account information.
- ✓ SAF-2) RA-1 shall accurately calculate customer promotions.
- ✓ SAF-3) RA-1 shall not accidentally lose product information, including their cost.

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7. APPENDIX

7.1 Data Dictionary

Name	Alias	Where / How Used	Description
Customer Data& Commands	None	Online Application/ Forms the customer preferences and performs online ordering& reservation	customer preferences and online ordering& reservation data
User Data& Commands	None	Interaction with the system	user operation
Phone Number	None	Phone Order/ Providing the index for the related customer in the database	customer phone number
Order Report Data	None	Printing/ Providing resource for printing addition and reports	addition and reports
Customer& Restaurant Data	None	Display Output/ Providing resource for displaying the screens	User interface screens showing the related info
System Reports	None	Display Output/ Providing resource for displaying the reports to the manager	Reports to trace the restaurant progress
Promotion& Alert Data	None	Sending SMS/ Providing SMS data	Special dates, promotions
Employee Info	None	Employee Profile Management	Includes personal info, ssn number, salary and bank account
Table Order Info	None	Open& Close Table	Includes customer id, table no, addition content& addition number
Phone order& reservation request	None	Package Ordering	Includes customer id, package& reservation info
Income& Outcome	None	Cashbox Application/Providing data for money transactions	Includes money amount and stock info

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System initialization data	None	System Administration/Initialize the database	Includes product info, employee and stock info

7.2 ER Diagrams

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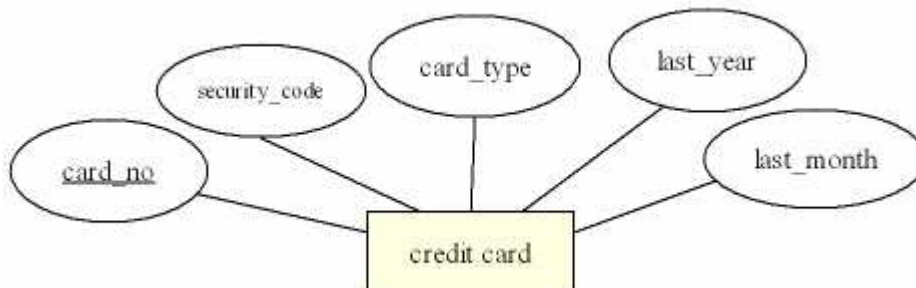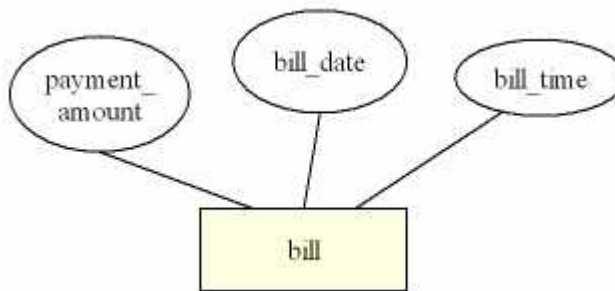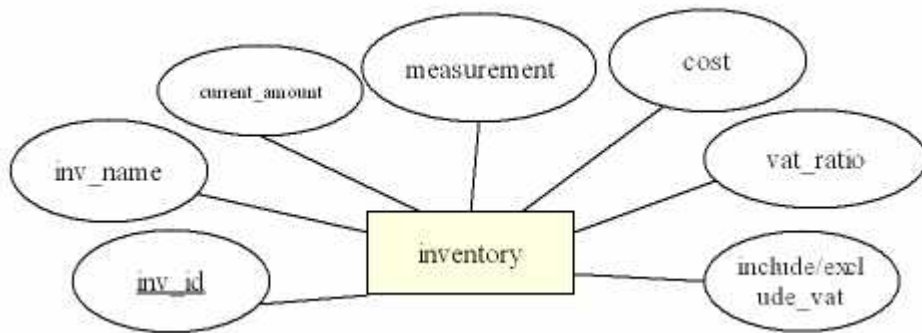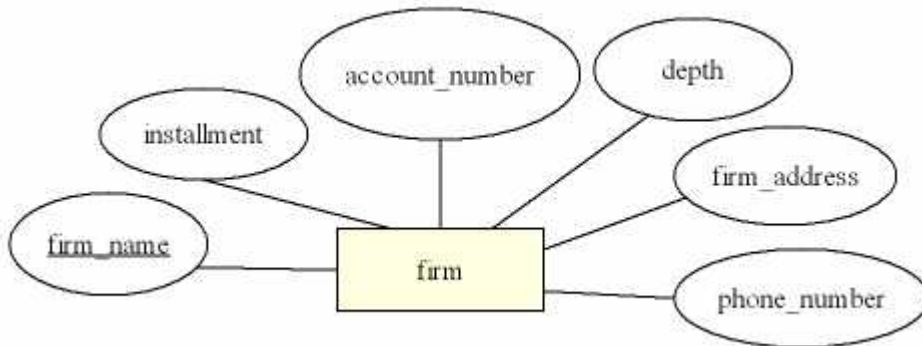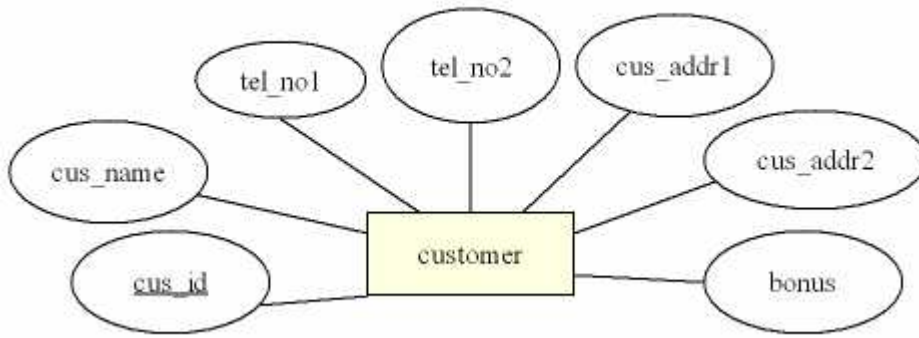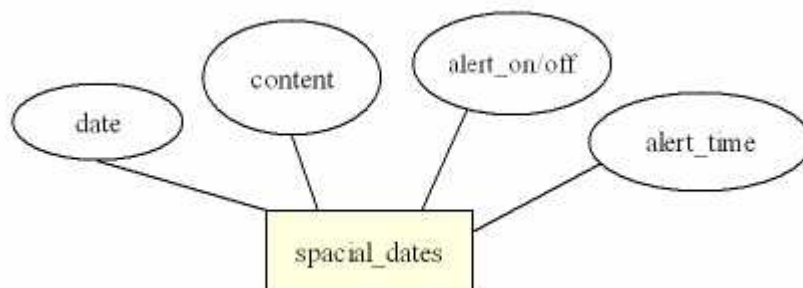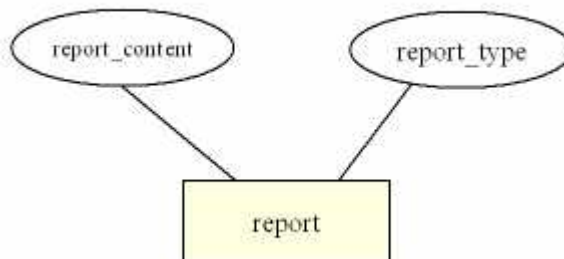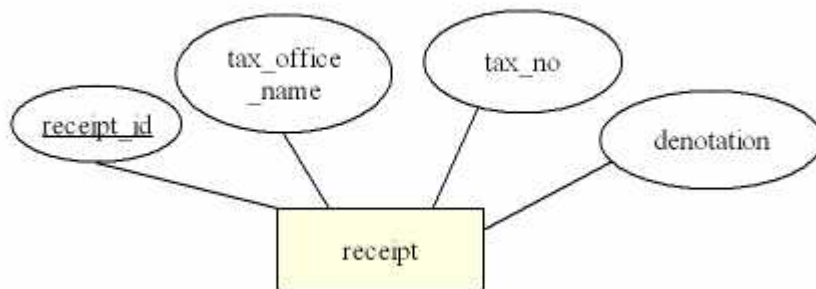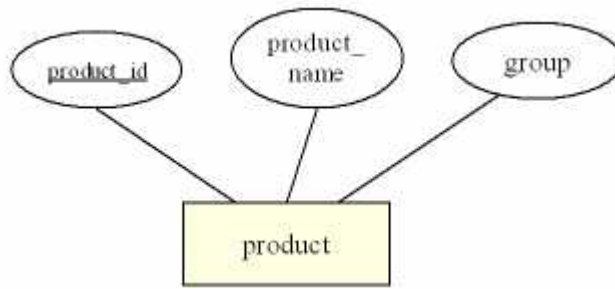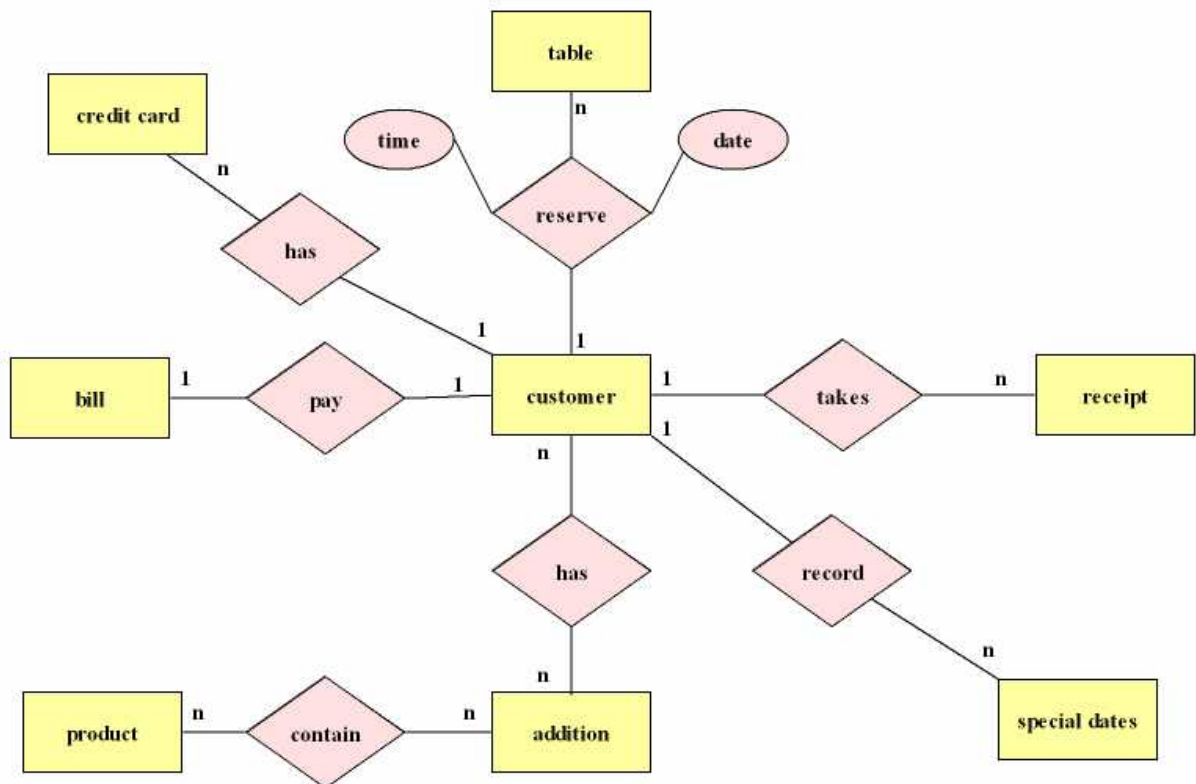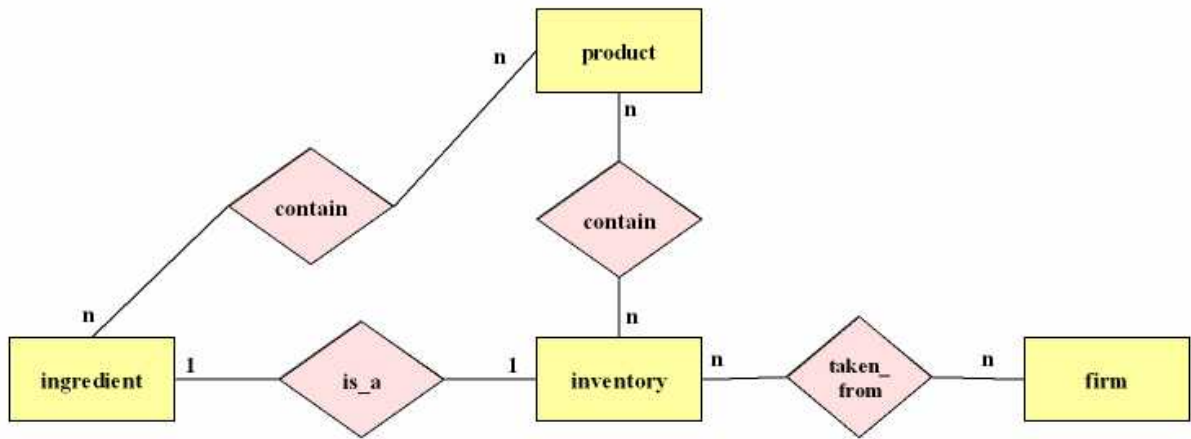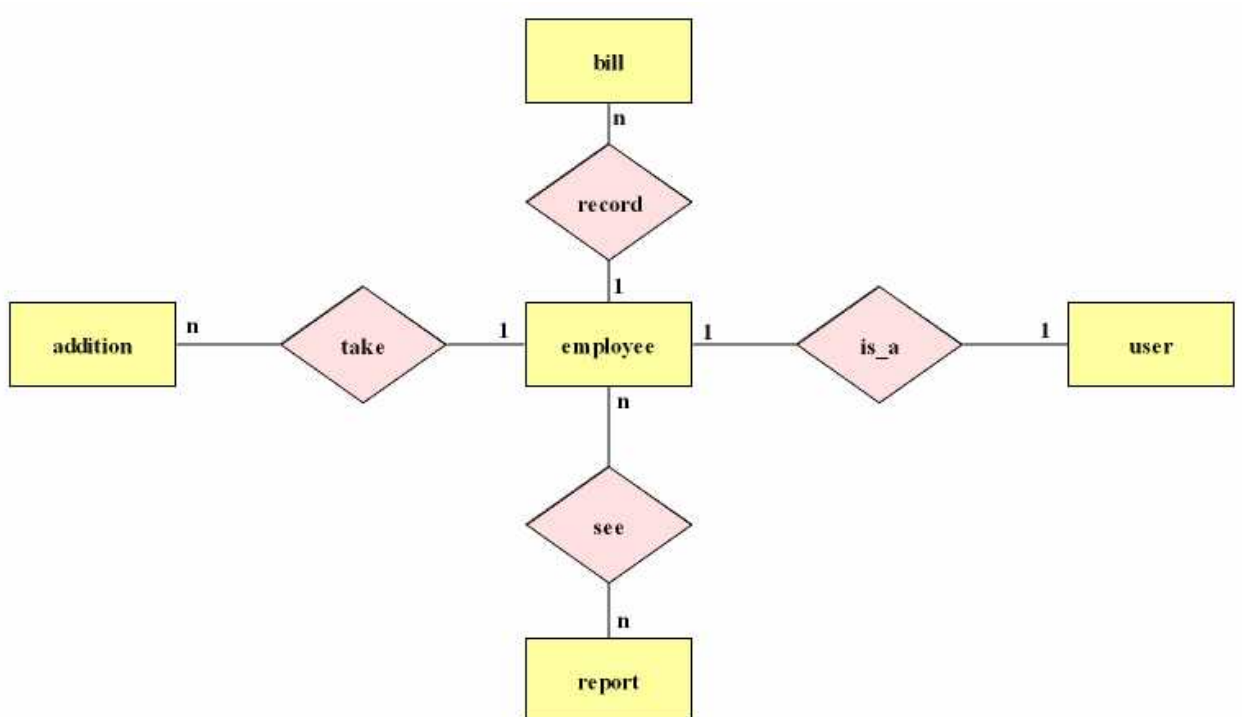
7.3   Data Flow Diagrams

DFD-Level 0 for RA-1

DFD-Level 1 for RA-1

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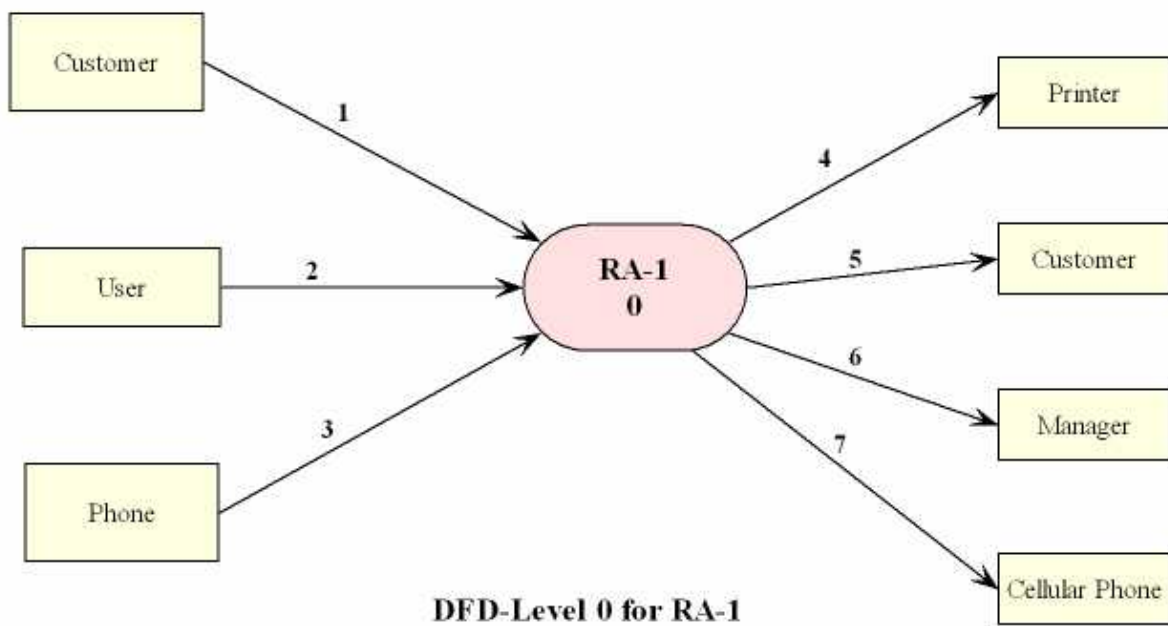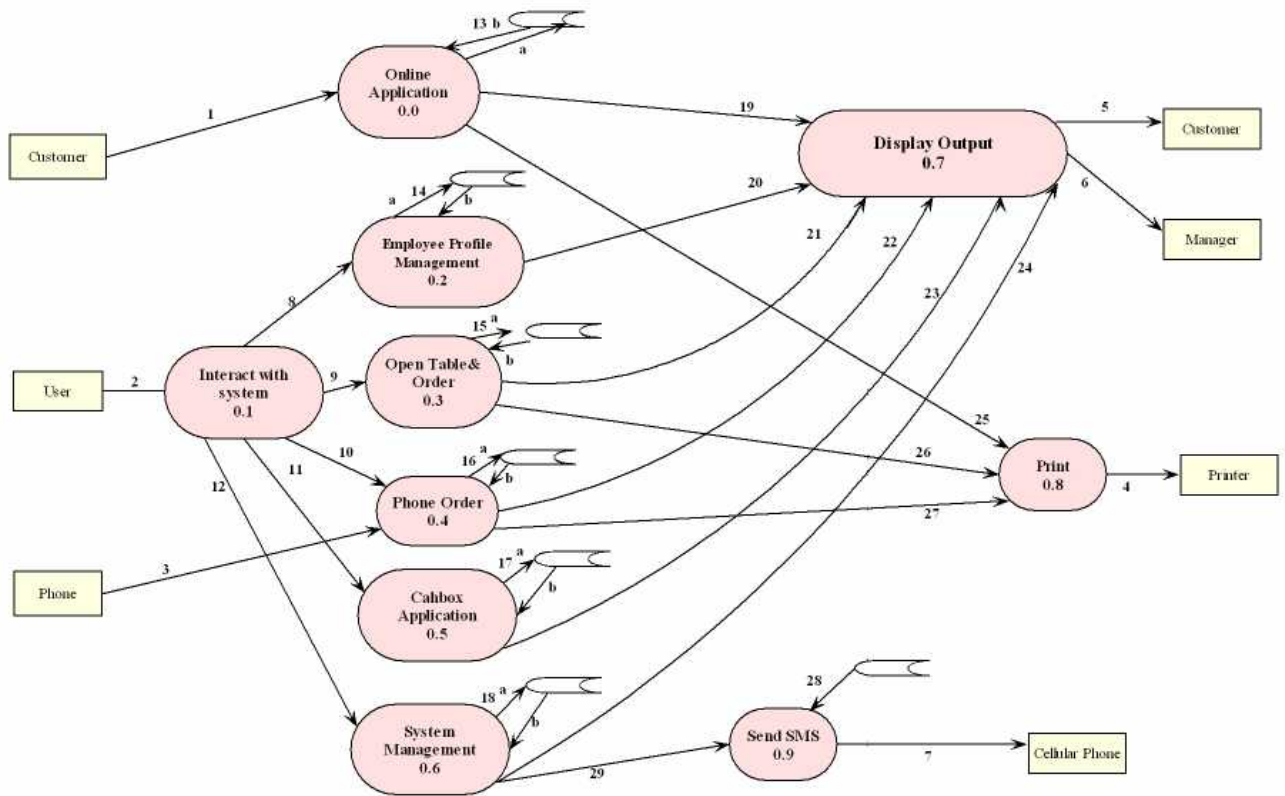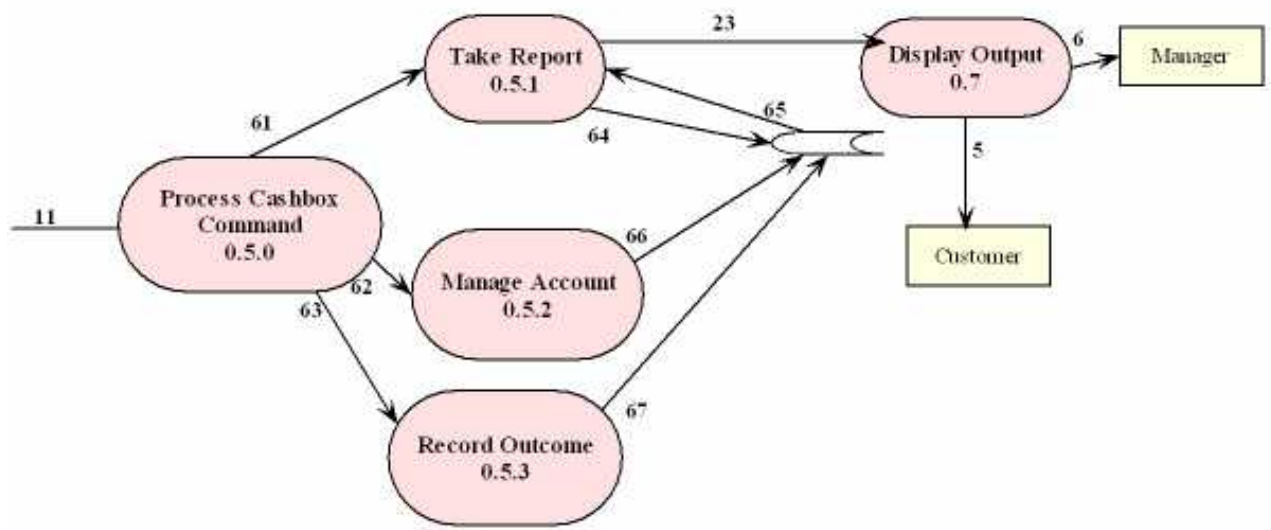
DFD-Level 2 for RA-1 (Cashbox Application Process)
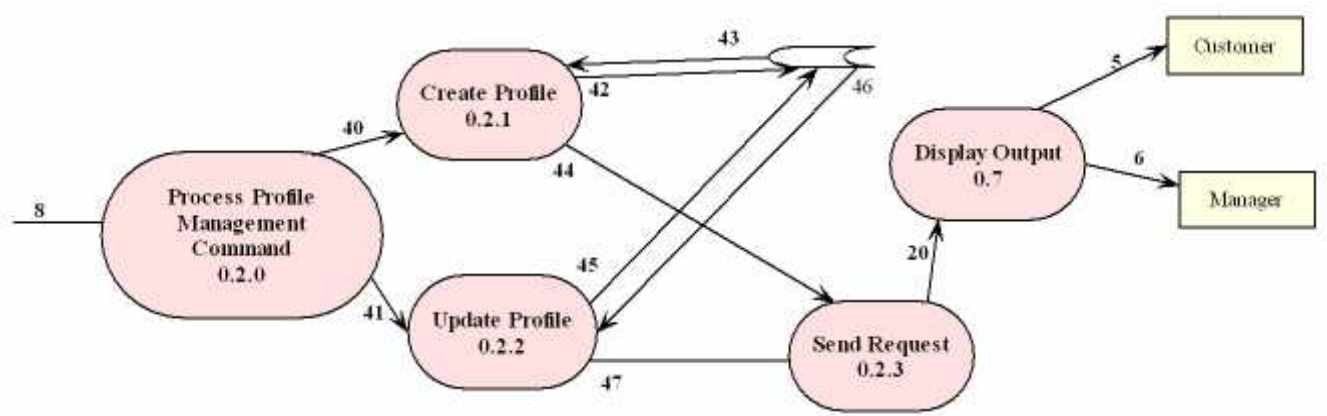
DFD-Level 2 for RA-1 (Employee Profile Management Process)

45
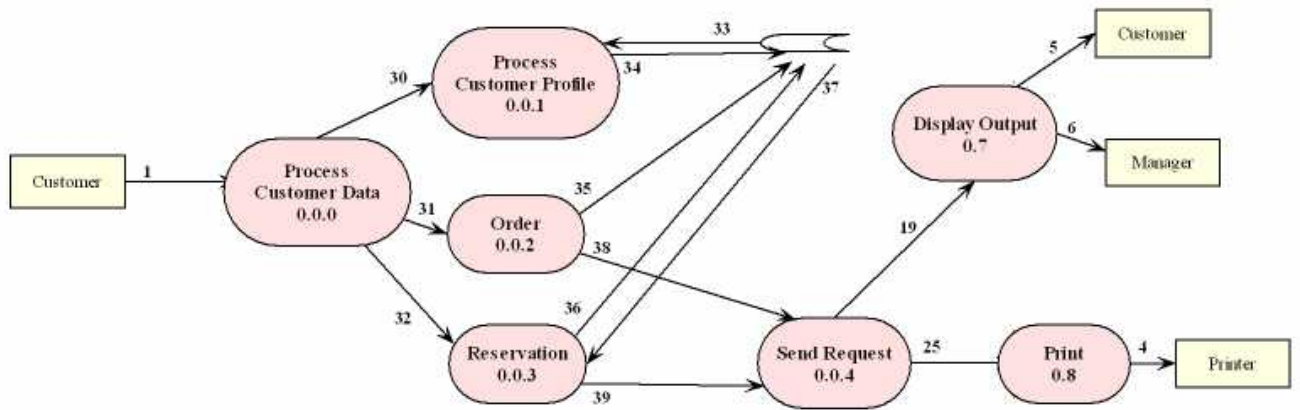
DFD-Level 2 for RA-1 (Online Application Process)
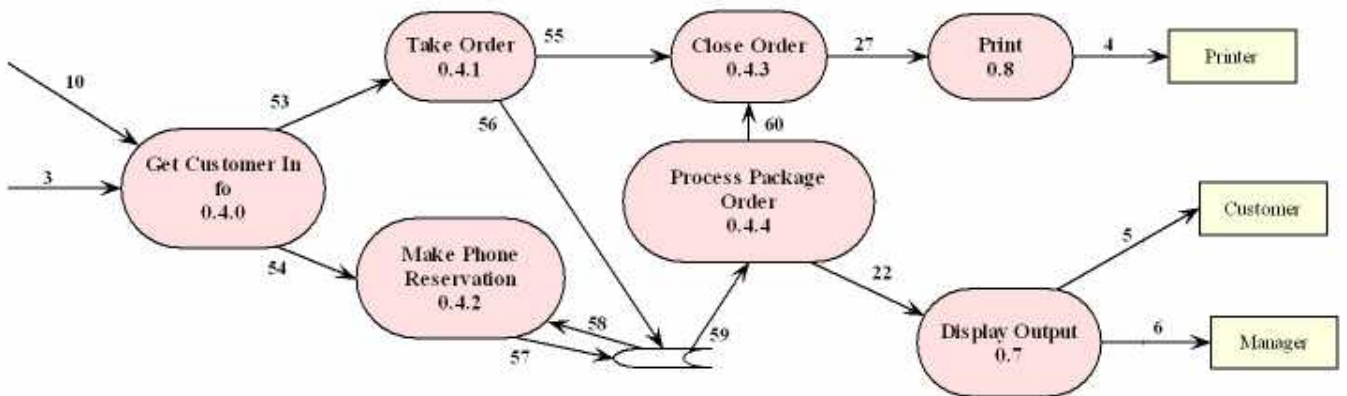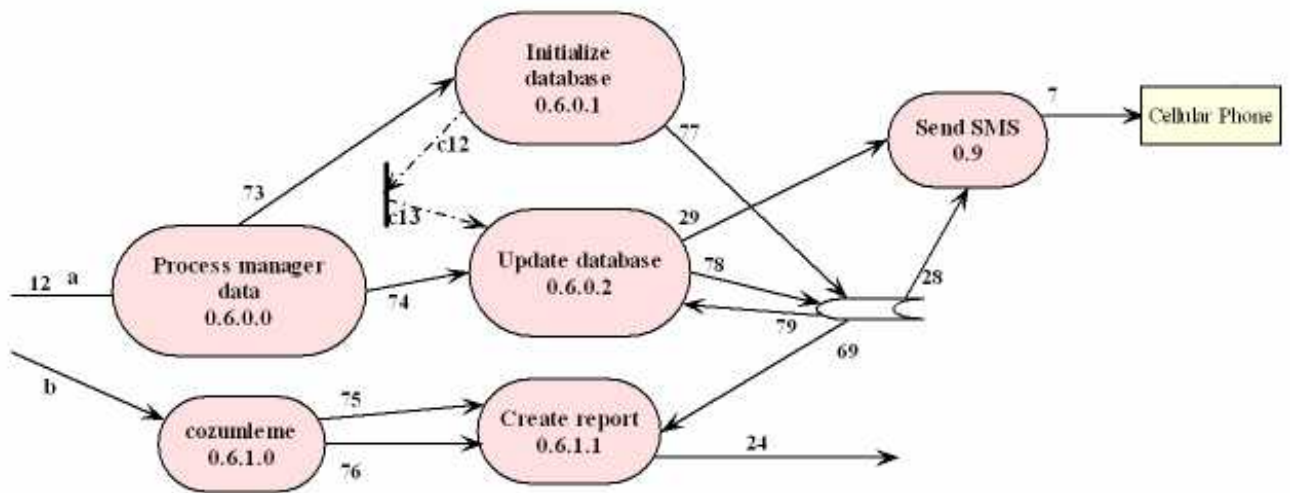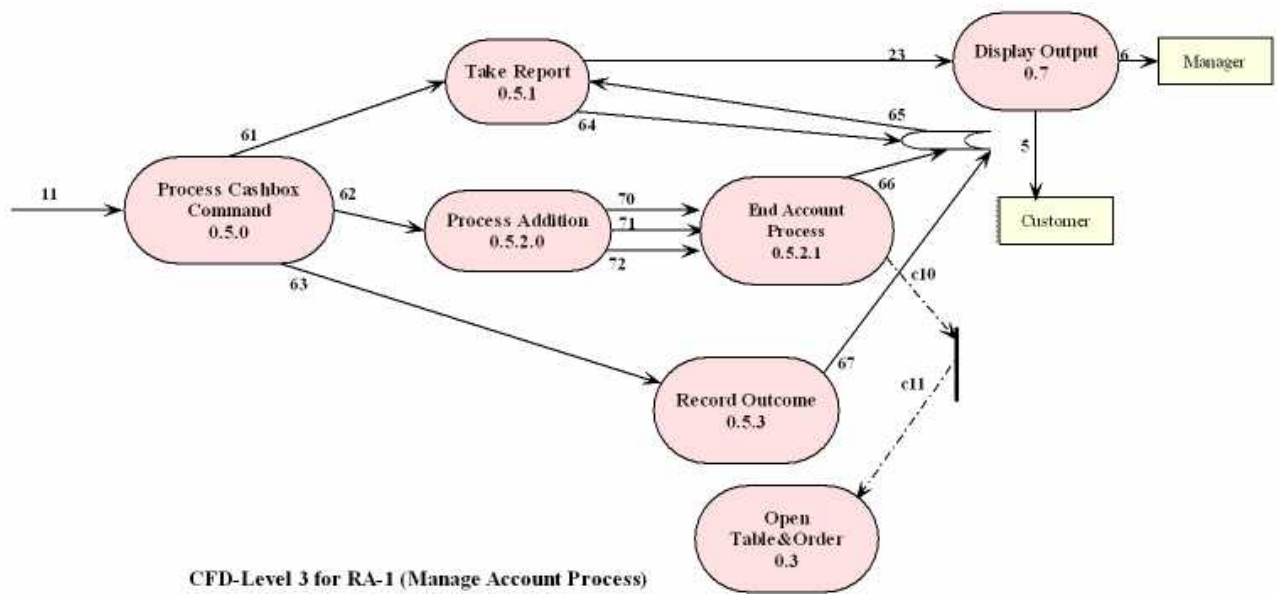

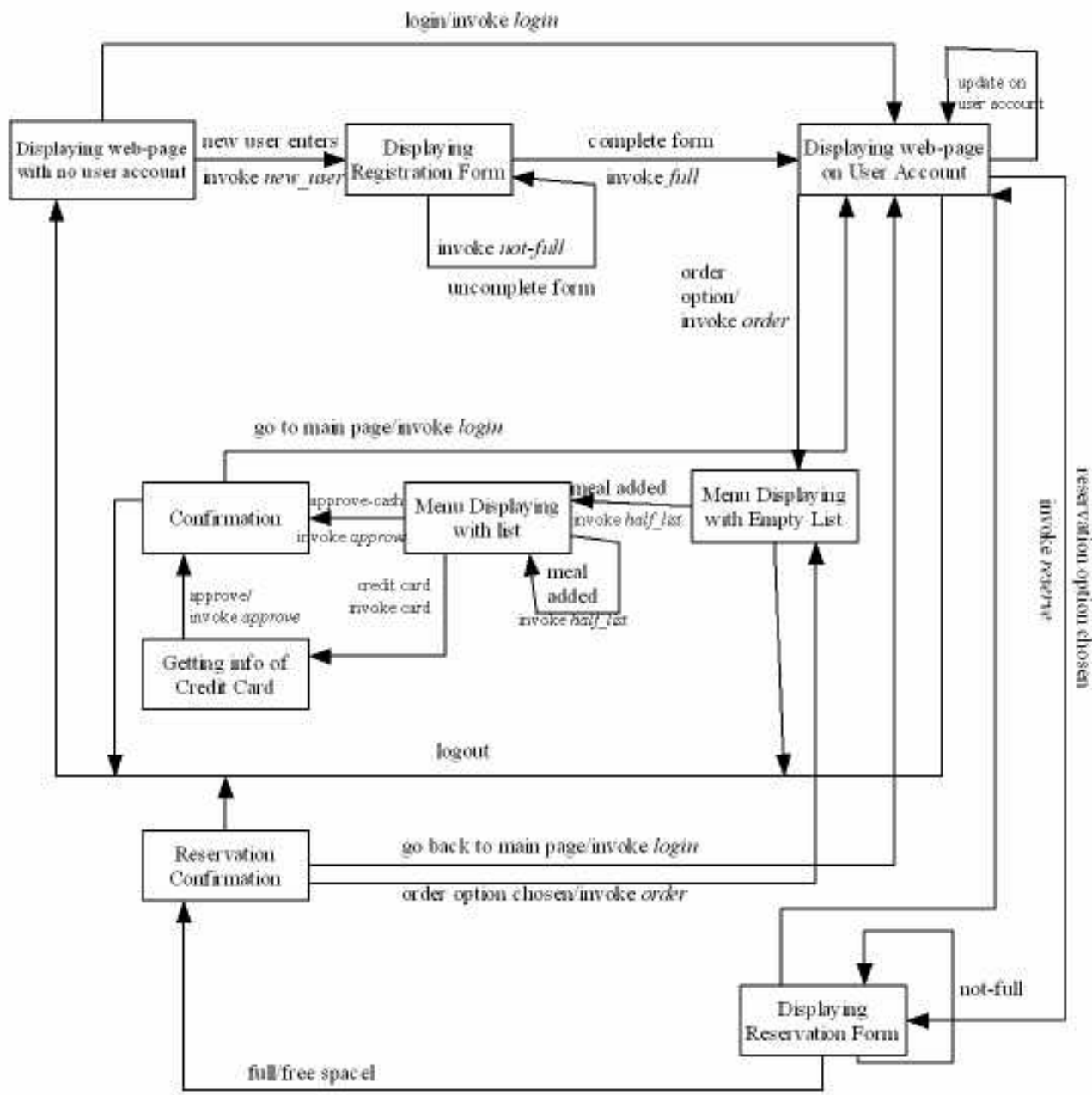DFD-Level 2 for RA-1 (Phone Order Process)

46
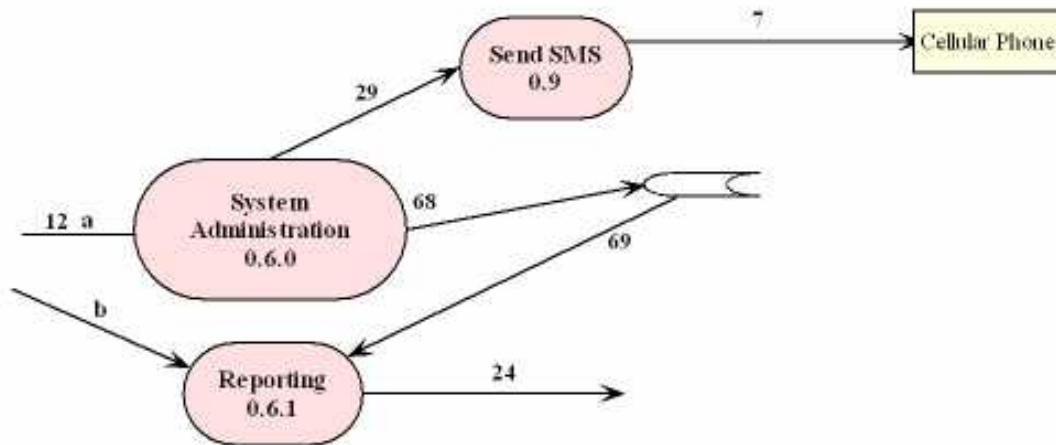
DFD-Level 2 for RA-1 (System Management Process)
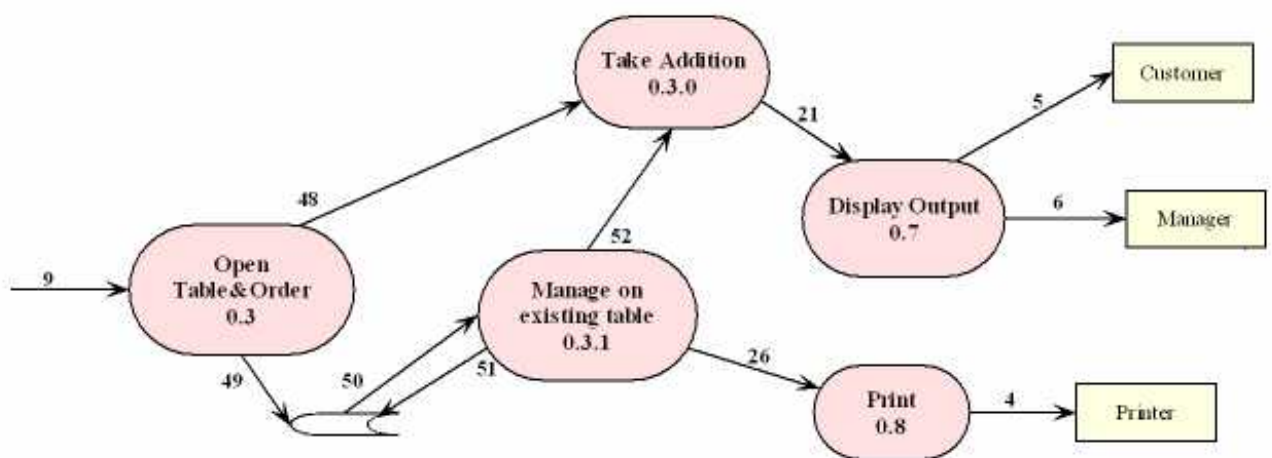
DFD-Level 2 for RA-1 (Table Order Process)

47
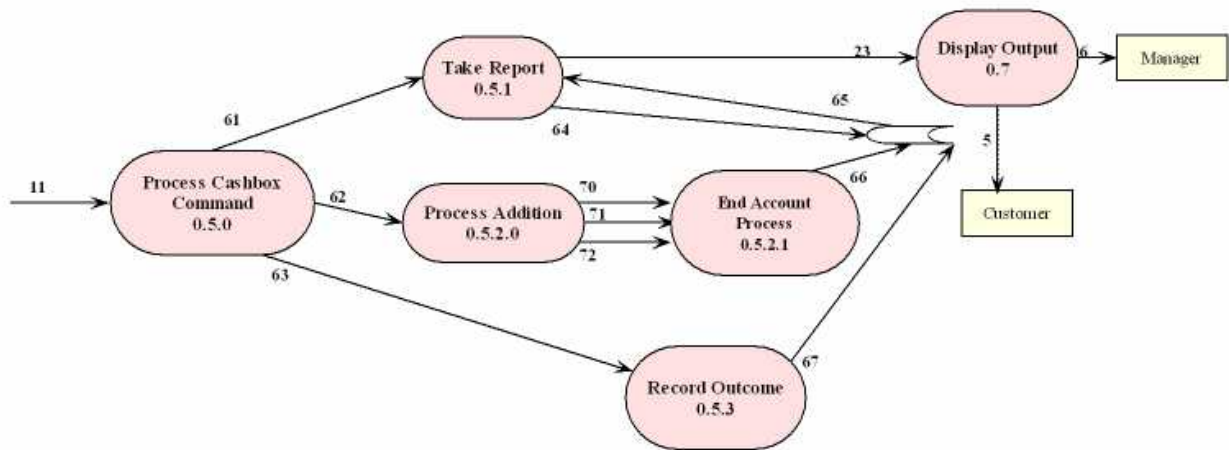
DFD-Level 3 for RA-1 (Manage Account Process)
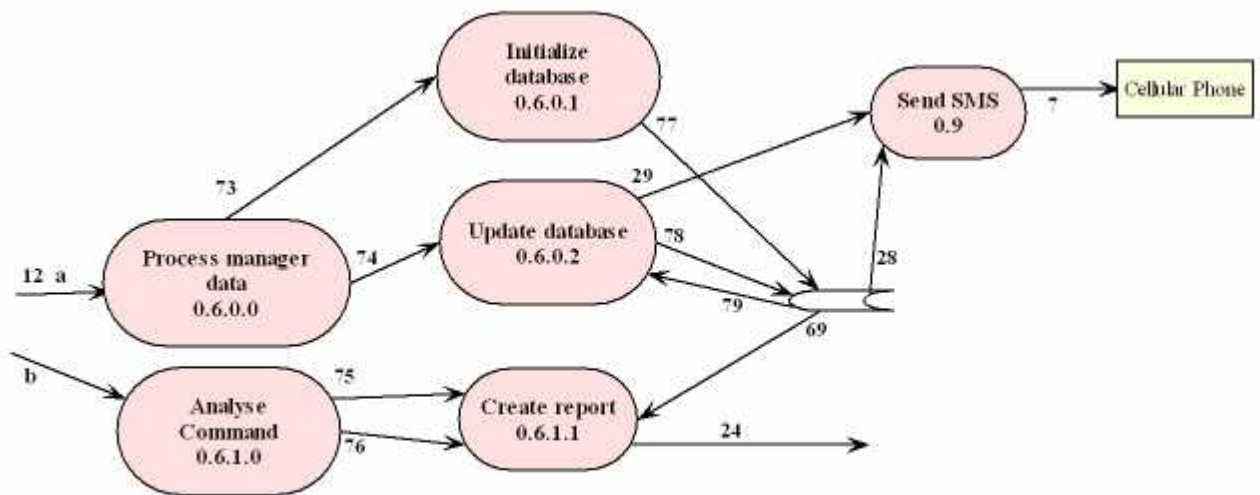
DFD-Level 3 for RA-1(System Administration & Reporting)

48

Representative numbers:

DFD

1. customer data& commands
2. user data& commands
3. phone number
4. order report data
5. customer& restaurant related data
6. system reports
7. promotion& alert data
8. employee info
9. table order info
10. phone order& reservation request
11. income& outcome
12. a) system initiallization data   b) report command
13. a) customer info to be stored   b) requested customer info
14. a) employee info to be stored   b) requested employee info
15. a) addition info to be stored   b) requested addition info
16. a) order, reservation& profile info to be stored
    b) requested order, reservation& profile info
17. a) incoming& outgoing money info to be stored
    b) requested incoming& outgoing money info
18. a) system initialization data
    b) reports characteristics info
19. customer properties to be displayed
20. employee profile properties to be displayed
21. table order properties to be displayed
22. phone order& reservation properties to be displayed
23. income& outcome properties to be displayed
24. management properties to be displayed
25. customer addition information
26. table addition information
27. package addition information

28. SMS content

29. SMS control request

30. customer profile data

31. customer order data

32. reservation data

33. requested customer profile data

34. customer profile data to be stored

35. customer order data to be stored

36. reservation data to be stored

37. requested reservation data

38. order request

39. reserved status

40. initial employee profile info

41. emploee profile info to be updated

42. employee profile info to be stored

43. requested employee profile info

44. display profile request

45. updated profile info to be stored

46. requested profile info for update

47. display updated profile request

48. addition data

49. addition data to be stored

50. request for existing table data

51. updated table data to be stored

52. updated addition

53. phone order data

54. phone reservation data

55. delivered request

56. package addition content

57. phone reservation info to be stored

58. requested customer id

59. requested addition content

60. close order request

61. desired income& outcome report properties

62. table no

63. outcome amount, firm & properties

64. request for income& outcome report

65. income& outcome report content

66. addition close request

67. outcome amount& properties to be stored

68. defined restaurant properties to be stored

69. report content

70. table no

71. customer id

72. payment type

73. product, inventory, employee, table info

74. update request

75. report type

76. report content

77. restaurant data to be stored

78. updated restaurant data

79. requested restaurant data

Cfd

1. registered flag

2. registered signal

3. registered signal

4. profile_created signal

5. update_approved signal

6. table_opened signal

7. table_exist signal

8. package_opened signal

9. process_open signal

10. table_closed flag

11. table_empty flag

12. database_initialized signal

13. update_approved signal

7.4 Control Flow Diagrams

CFD-Level 2 for RA-1 (Employee Profile Management Process)

CFD-Level 2 for RA-1 (Online Application Process)
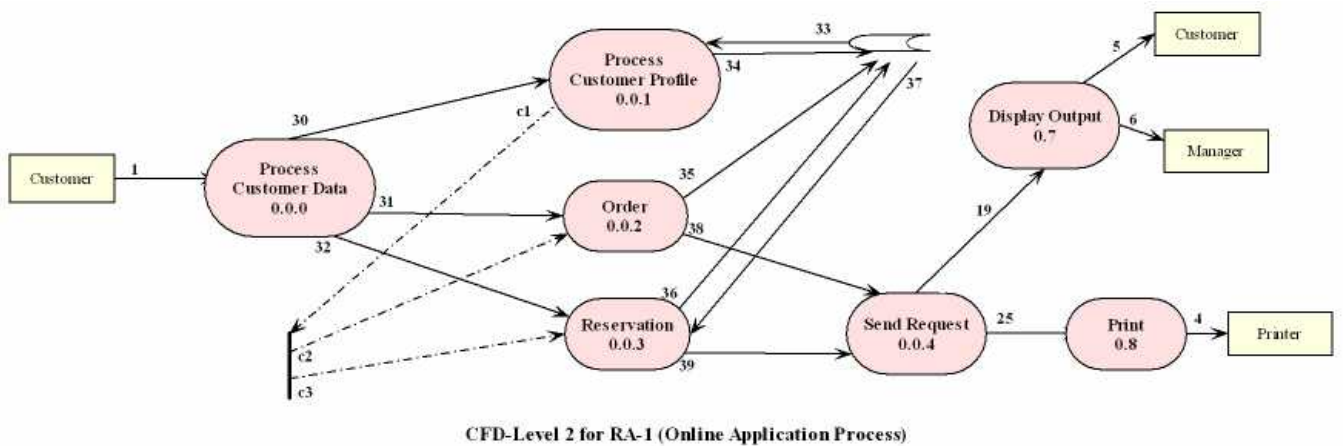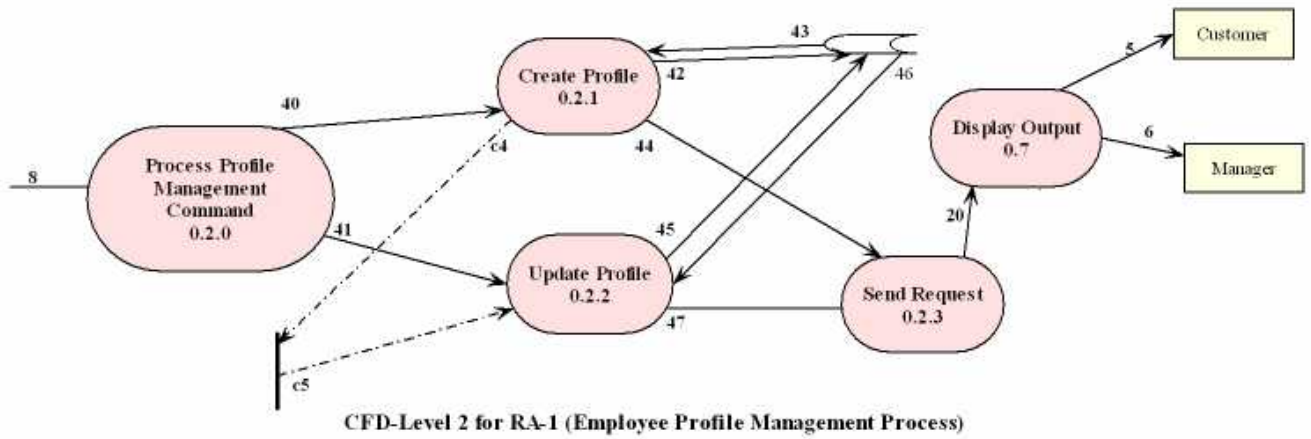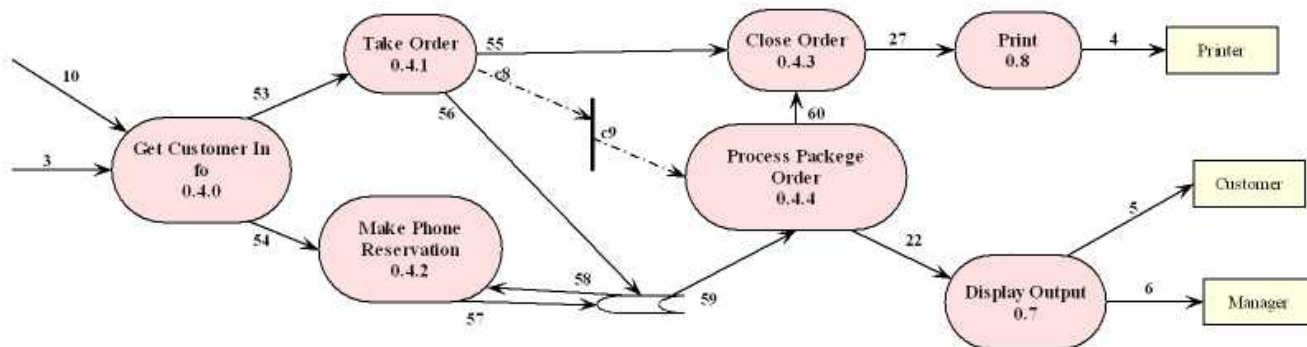
CFD-Level 2 for RA-1 (Phone Order Process)

CFD-Level 2 for RA-1 (Table Order Process)

53

CFD-Level 3 for RA-1 (Manage Account Process)

CFD-Level 3 for RA-1(System Administration & Reporting)
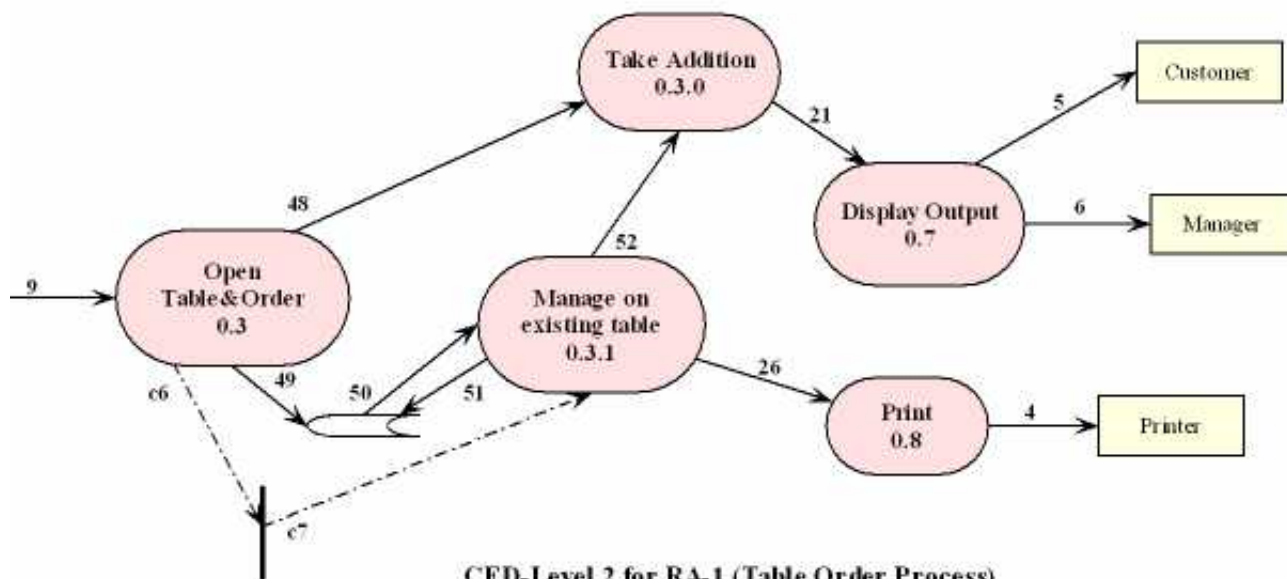
7.5   State Transition Diagram

55

7.6   GANTT CHART

56
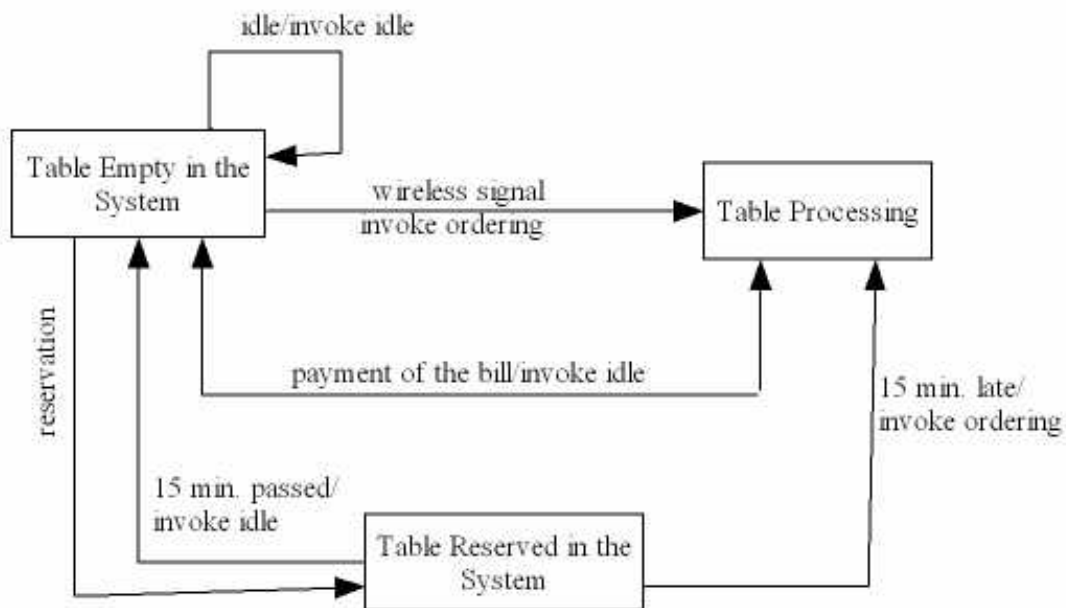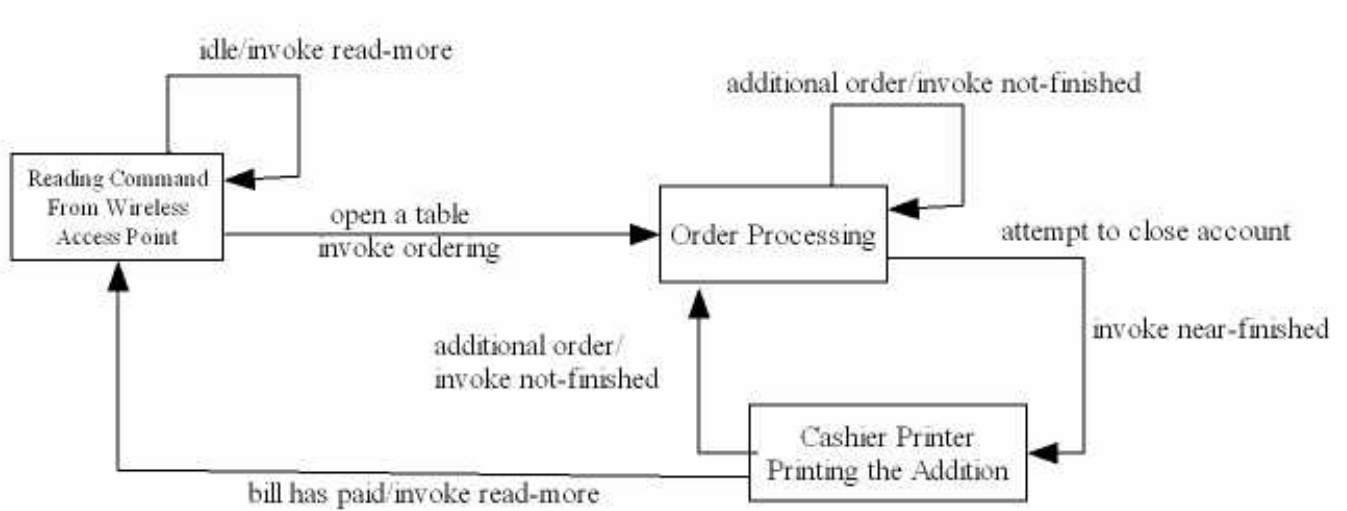
ID		Task Name	Duration	Start	Finish
1	→	first researches and preparation of the proposal	2 days	Thu 07.10.04	Sun 10.10.04
2	→	first meeting & division of the research topics among members	1 day	Thu 07.10.04	Thu 07.10.04
3	→	project scope & definition (written by hatice&gokce)	2 days	Thu 07.10.04	Sat 09.10.04
4	→	submition of the project proposal&first meeting report	0 days	Sun 10.10.04	Sun 09.10.04
5	→	deeper research on exmples and requirements(every member performed)	8 days	Wed 13.10.04	Sun 24.10.04
6	→	second meeting	1 day	Wed 13.10.04	Wed 13.10.04
7	→	research on ROS &programs related customer management, online reservation&ordering by Gokce	5 days	Thu 14.10.04	Wed 20.10.04
8	→	research on Restoration and a program related to stokmanagement by Hatice	5 days	Thu 14.10.04	Wed 20.10.04
9	→	research on ROP by Ahmet	5 days	Thu 14.10.04	Wed 20.10.04
10	→	research on Resto by Nazmiye	7 days	Thu 14.10.04	Fri 22.10.04
11	→	every member reports his/her research	2 days	Thu 21.10.04	Fri 22.10.04
12	→	combining the reports	1 day	Fri 22.10.04	Sun 24.10.04
13	→	submition of the software observation report	0 days	Sun 24.10.04	Sun 24.10.04
14	→	meetings with the restaurants using an automation	5 days	Mon 25.10.04	Sun 31.10.04
15	→	meeting with Hocam Pinar (Hatice,Gokce,Nazmiye)	1 day	Mon 25.10.04	Mon 25.10.04
16	→	meeting with Black&White (Ahmet)	1 day	Wed 27.10.04	Wed 27.10.04
17	→	writing the restaurants meeting report (Ahmet&Gokce,Hatice)	2 days	Thu 28.10.04	Sun 31.10.04
18	→	restaurant meetings report	0 days	Sun 31.10.04	Sun 31.10.04
19		analysis of RA-1	11 days	Mon 01.11.04	Fri 12.11.04
20	→	system scope and definitions (Gokce)	1 day	Mon 01.11.04	Mon 01.11.04
21	→	submition of the second&third meeting report	0 days	Tue 02.11.04	Tue 02.11.04
22	→	Scenarios (Hatice)	3 days	Tue 02.11.04	Thu 04.11.04
23	→	system capabilities & constraints, conditions (Ahmet)	3 days	Wed 03.11.04	Fri 05.11.04
24	→	functionalities of the users (Hatice)	2 days	Thu 04.11.04	Fri 05.11.04
25	→	creation of dfd-ctd (all members)	2 days	Mon 08.11.04	Tue 09.11.04
26	→	drawing dfd-ctd (Nazmiye)	1 day	Tue 09.11.04	Tue 09.11.04
27	→	creation of ER diagram (Hatice)	1 day	Tue 09.11.04	Tue 09.11.04
28	▣	creation of the state transition diagram (Gokce)	1 day	Tue 09.11.04	Tue 09.11.04
29	→	submition of the forth meeting report	0 days	Tue 09.11.04	Tue 09.11.04
30	→	drawing of ER (Nazmiye)	1 day	Wed 10.11.04	Wed 10.11.04

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ID		Task Name	Duration	Start	Finish
31	↘	combining the reports (all members)	1 day	Thu 11.11.04	Thu 11.11.04
32	↘	submittion of the analysis report	0 days	Fri 12.11.04	Fri 12.11.04
33		initial design of RA-1	17 days	Sat 13.11.04	Tue 30.11.04
41		detailed design of RA-1	29 days	Wed 01.12.04	Mon 10.01.05
46		construction of the system database	5 days	Mon 06.12.04	Sun 12.12.04
47		implementation of the web module using .NET	9 days	Mon 13.12.04	Thu 23.12.04
48		implementation of the the managers and the cashiers modules	9 days	Fri 24.12.04	Wed 05.01.05
49		last works and modifications on the prototype of RA-1	10 days	Wed 05.01.05	Tue 18.01.05
50		presenting the prototype of RA-1	0 days	Wed 19.01.05	Wed 19.01.05

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7.L

L.1   "Gunluk Islemler"

L.2   Account ("Hesap" from Order Form)

L.3   Customer Registration Form

L.4 "Kasa Raporu"

L.5 Printers

65
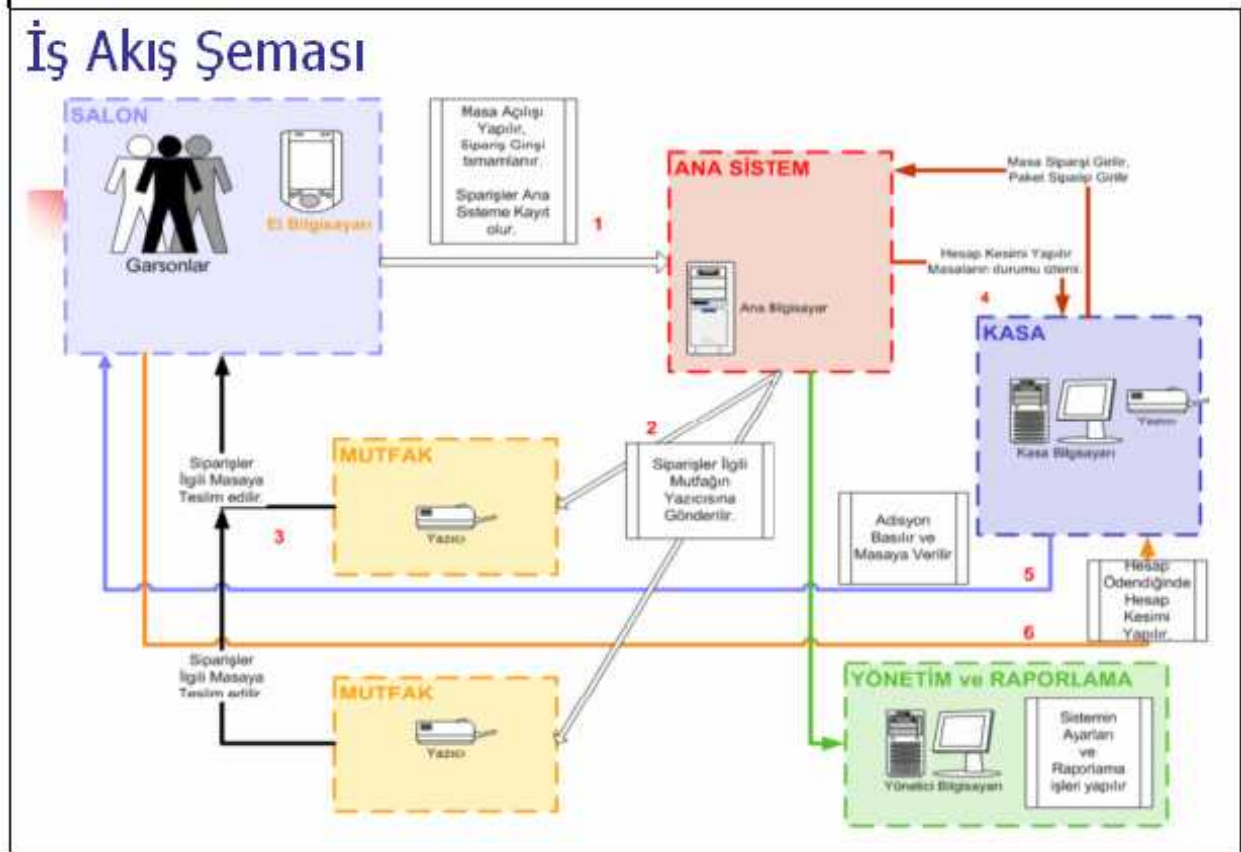
L.6   Schema of the main components of the system

L.7 Stock Management

L.8 Inventory Definition

L.9 User Interface

L.10 Reservation Form

L.11 Order Confirmation Form