

Hotel Information Management System (HIMS)
Specification Document

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1. Introduction

1.1. Purpose

The purpose of this document is to provide the requirement analysis and specification for the Hotel Management System software. This document is intended for software engineers.

1.2. Scope

This document describes the high level and detailed design of the Hotel Management System (HMS) including the functional decomposition of the system, preliminary database design, I/O specifications, hardware requirements and various diagrams. In addition, business rules and constraints of the software package are included in this section of the document.

1.3. Definitions, Acronyms

1.3.1. Entity Relation Diagram (ER Diagram)

A data-oriented technique for specifying a product, most often used for specifying databases. The emphasis of an ER Diagram is on the data itself, the actions performed are of secondary concern.

1.3.2. Data Flow Diagram (DFD)

A diagram that determines the logical data flow as opposed to the physical data flow (what happens rather than how it happens).

1.3.3. Record

A field of data usually pertaining to a data base system.

1.3.4. Data Base Management System (DBMS)

A database management system (DBMS), sometimes just called a database manager, is a program that lets one or more computer users create and access data in a database.

A DBMS can be thought of as a file manager that manages data in databases rather than files in file systems.

1.3.5. Entity

An entity, in relation to a database, is a single person, place, or thing about which data can be stored. In data modeling, a first step in the creation of a database, and entity is some unit of data that can be classified and have stated relationships to other entities.

1.3.6. Relationship

The relationship is the interaction between entities. A relationship may be represented by a diamond shape, or more simply, by the line connecting the entities. In either case, verbs are used to label the relationships.

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1.4. 1.4. Acronyms

1.4.1.1. HIMS

Hotel Information Management System. This is the software that controls the functions of the hotel.

1.4.1.2. SSN

Social Security Number

1.4.1.3. DFD

Data Flow Diagram

1.4.1.4. ER

Entity-Relationship

1.4.1.5. DBMS

Database Management System

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2. Functional Decomposition

Below is a list of the basic functions of the HMS software. Each function is then subdivided into separate categories of what the function does.

2.1. Reservation

2.1.1. Reservation Identification

A unique identification number that is given to each reservation. These can be used to pull up reservations from the system for easy access.

2.1.1.1 System will automatically produce reservation identification number.

2.1.2. Enter Customer Information

The fields that are required for each reservation including name (business or personal), address, telephone etc.

2.1.3. Enter Assigned Room Number

The room number assigned to the specific reservation. This can be set ahead of time or given at the time of the reservation (walk-in).

2.1.4. Enter Date of Reservation

The date the room will begin to be utilized by individual(s).

2.1.5. Enter Date of Check-Out

The length of time that a person/company will be using the room for.

2.1.6. Type of payment

Types of payment include check, cash and credit card. Businesses have the option of leaving a credit card on file to allow easier transaction processing including, but not limited to, paying balance at the end of the month as an accounts payable.

2.1.7. Enter Deposit Information

Credit Cards are the only acceptable form of deposit.

2.1.7.1 Determine Credit Card type.

2.1.7.2 Enter in amount for deposit.

2.1.7.3 Validate credit card information

2.1.7.4 Enter authorization code

2.2. Services

2.2.1. Service Identification

A unique identification number that is given to each service request. These can be used to pull up service requests from the system for easy access.

2.2.1.1 System will automatically produce unique identification number to go along with each service request.

2.2.2. Enter Room Number

System will cross reference room number with customer information currently staying in that room

2.2.2.1 Enter date of service request

The specific date that the particular service is being requested.

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- 2.2.3 **Enter service details**
 - 2.2.3.1 Enter service description.
 - 2.2.3.2 Retrieve rate of service.
 - 2.2.3.3 Bill service to room number entered.

2.3. Account Services

- 2.3.1. **Account Identification**

A unique identification number that is given to each account. These can be used to pull up accounts from the system for easy access.

 - 2.3.1.1. System will automatically create Account Identification number as each new account is entered.
- 2.3.2. **Account Management**
 - 2.3.2.1. **Edit Information**

This allows a user to edit account information such as address, telephone, name and credit card numbers.
 - 2.3.2.2. **Charge Account**

Allows a user to run a transaction for a specified account based upon the account information.
- 2.3.3. **Customer History**
 - 2.3.3.1. **Retrieve History**

The user inputs the account identification number and is able to retrieve the customer history. This includes all previous times the customer or business has rented rooms, requested services, or generally conducted business at the hotel.
- 2.3.4. **Retrieve Billing Information**

A form will display all pertinent information regarding billing statement; name, address, and balance for upcoming bill.

2.4. Employee Management

- 2.4.1. **Enter Employee Identification Number**

Employees will login into the system using their SSN as their login. Upon their first login to the system, they will be prompted to supply a password.
- 2.4.2. **Select Security Access**

Allows the setting of an employee to one of two levels of security: *manager* or *clerk*.

 - 2.4.2.1 **Validate Access**

SSN will be cross-referenced with employee record to determine if access is granted for security setting selected. If not, employee will be asked to select security level again until validated.
- 2.4.3. **Time Cards**

Upon logging into the system, the employee's time card will be punched. The employee must then log off the system prior to leaving work. The system will then calculate the number of hours worked and send the information to payroll.

2.5. Management Services

- 2.5.1. **Access Employee Records**

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Here a user with *manager* security level can access and edit employee records. Contained within these records are fields such as address, name, telephone etc.

2.5.1.1 Create New Employee Record

Manager can input the information for a newly hired employee.

2.5.1.2 Edit Employee Information

Manager has the ability to change the current information of an employee when necessary.

2.5.1.3 Set Employee to Inactive

After employee is terminated or otherwise discontinues working for the hotel, managers can set their username (SSN) to inactive thus they will no longer be able to login to the HIMS.

2.5.2. Hotel Rates

Allows a user with *manager* security level to edit hotel rates.

2.5.2.1 Edit Room Rates

Selecting this field allows the manager to change the rates of any given room and for any selected amount of time.

2.5.2.1.1 Enter Start Date for Change of Rates

2.5.2.1.2 Enter Ending Date for Change of Rates

2.5.2.1.3 Select Continuous Change of Rates

Continuous Change of Rates allows manager to change the rates of rooms for duration of hotel existence.

2.5.2.2 Edit Service Rates

Selecting this field allows the manager the change the rates of any given service for any selected amount of time.

2.5.2.2.1 Enter Start Date for Change of Rates

2.5.2.2.2 Enter Ending Date for Change of Rates

2.5.2.2.3 Select Continuous Change of Rates

Continuous Change of Rates allows the manager the change the rates of service for duration of hotel existence.

2.5.3. Pay Rate

A user with *manager* level of security can edit an employee's pay rate and type.

2.5.3.1 Edit Employee Payment Type (Hourly/Salary)

2.5.3.2 Edit Employee Salary

2.5.3.3 Edit Employee Hourly Wage

2.6. Cancellation

2.5.4. Enter Customer Information

2.5.5. Get Room Requested

2.5.6. Get Check-In Date

2.5.7. Cancel Reservation

2.5.8. Determine Refund of Deposit

2.7. Check-In

2.7.1 Enter Customer Information

2.7.2 Retrieve Room Requested (for reservation clients)

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- 2.7.3 Enter Room Number (for walk-in clients)
- 2.7.4 Enter Check-In Date
- 2.7.5 Enter Check-Out Date

2.8. Check-Out

- 2.8.1 Enter Customer Information
- 2.8.2 Retrieve Room Requested (for reservation clients)
- 2.8.3 Enter Room Number (for walk-in clients)
- 2.8.4 Enter Check-In Date
- 2.8.5 Enter Check-Out Date
- 2.8.6 Enter Customer Information
- 2.8.7 Retrieve Room Requested (for reservation clients)
- 2.8.8 Enter Room Number (for walk-in clients)
- 2.8.9 Enter Check-In Date
- 2.8.10 Enter Check-Out Date

Enter Customer Information

- 2.8.10.1 Retrieve Room Rented
- 2.8.10.2 Retrieve Check-In Date
- 2.8.10.3 Enter Check-Out Date
- 2.8.10.4 Retrieve Rate for Room
- 2.8.10.5 Retrieve Services Billed to Room
- 2.8.10.6 Retrieve Rate for Services Billed to Room

Send Rate Information to Billing

2.9. Billing

- 2.9.1 Enter Customer Information
- 2.9.2 Enter Room Number
- 2.9.3 Enter Check-Out Date
- 2.9.4 Verify Balance
- 2.9.5 Receive Payment

Bill Payment to Customer

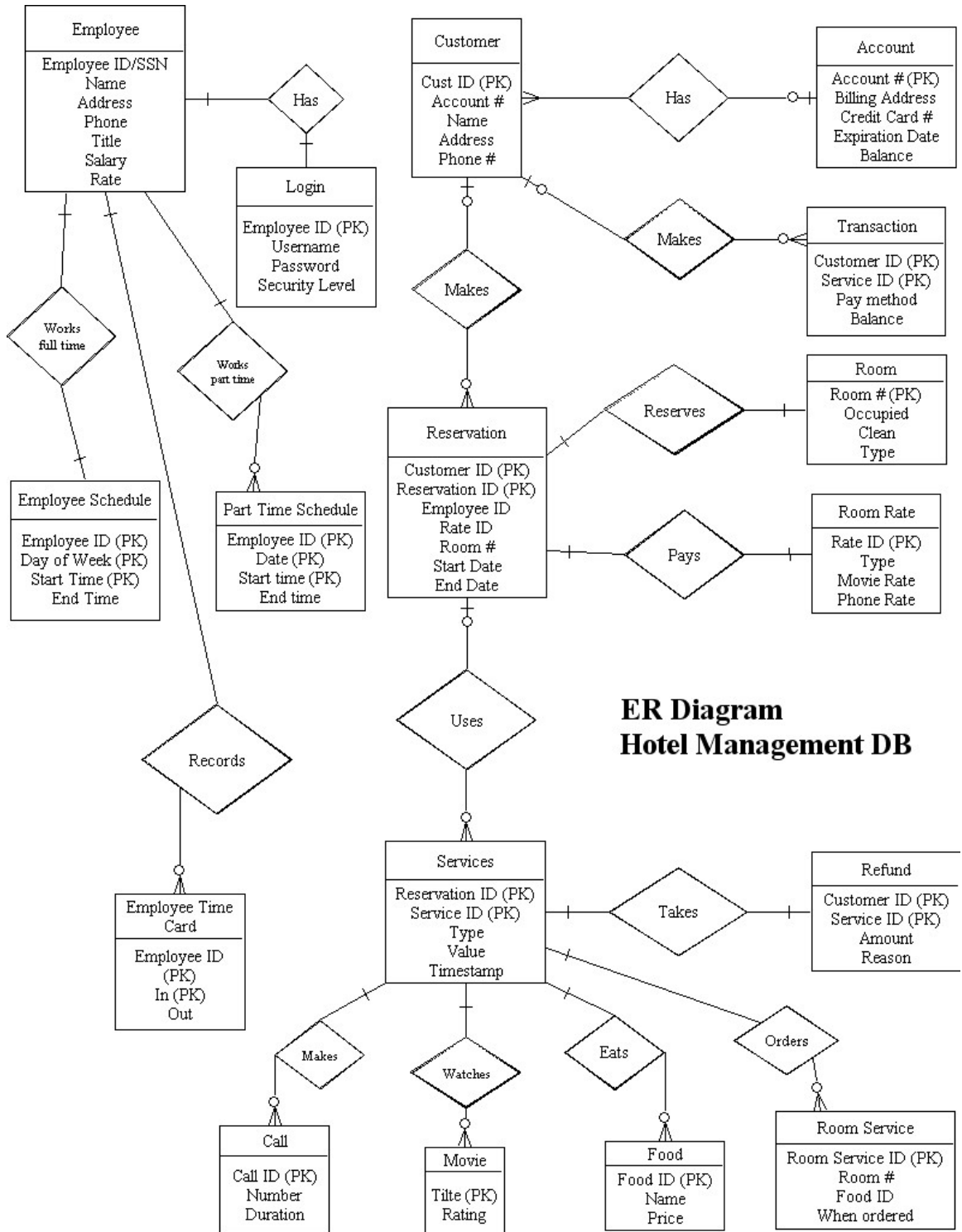
2.10. Maintenance

- 2.10.1 Search for dirty rooms
- 2.10.2 Enter request for services on dirty rooms
- 2.10.3 Enter request for repairs
- 2.10.4 Retrieve history of selected rooms

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3. DIAGRAMS

3.1. ER Diagram

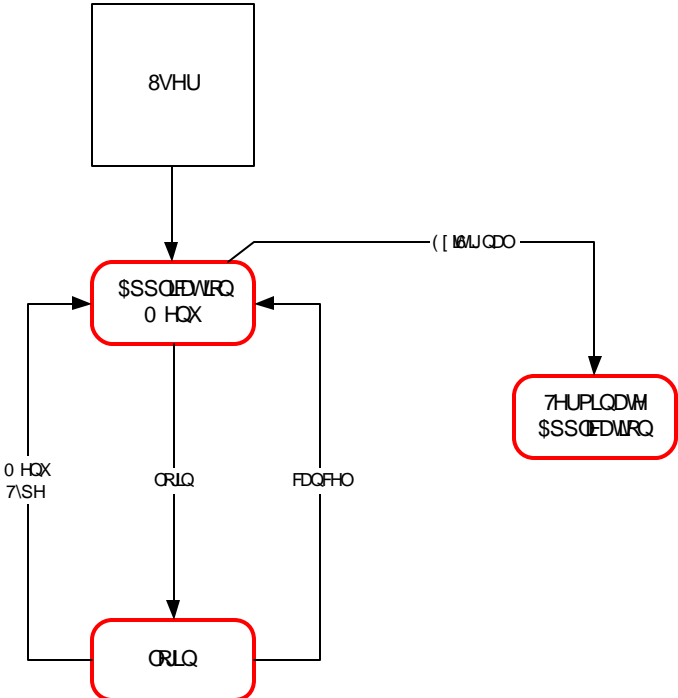


ER Diagram
Hotel Management DB

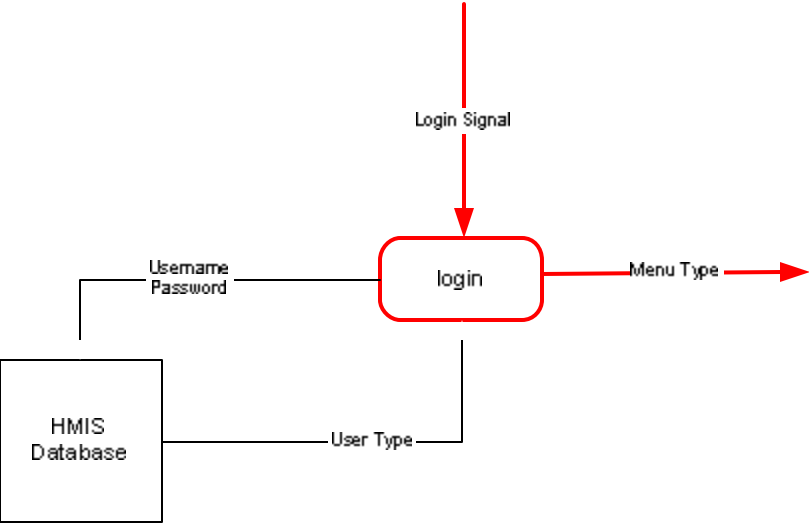
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3.2. Data Flow Diagram

3.2.1. User login and menu display DFD

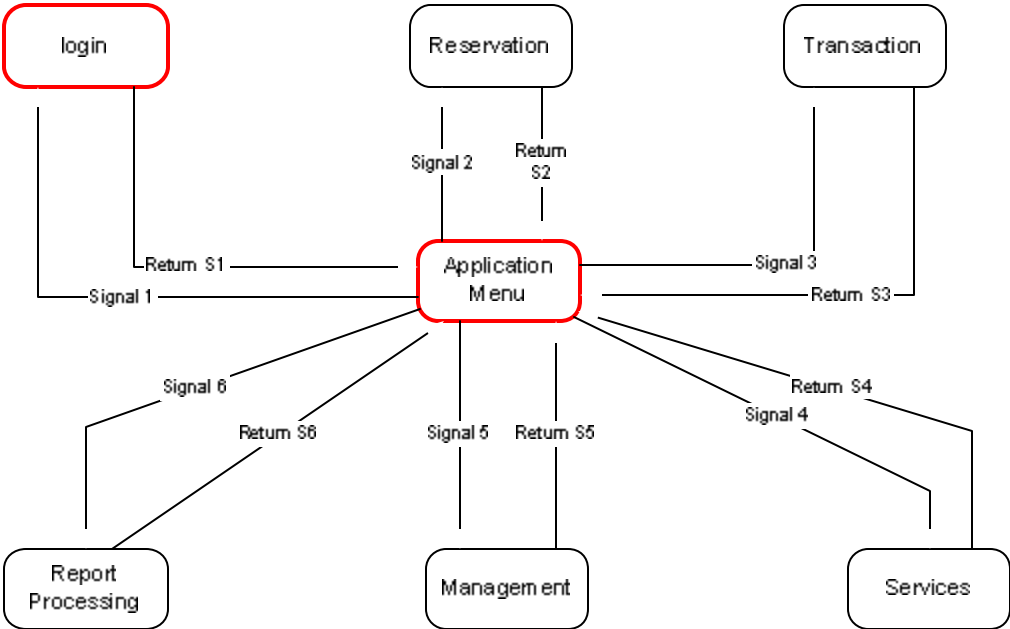


3.2.2. User login DFD



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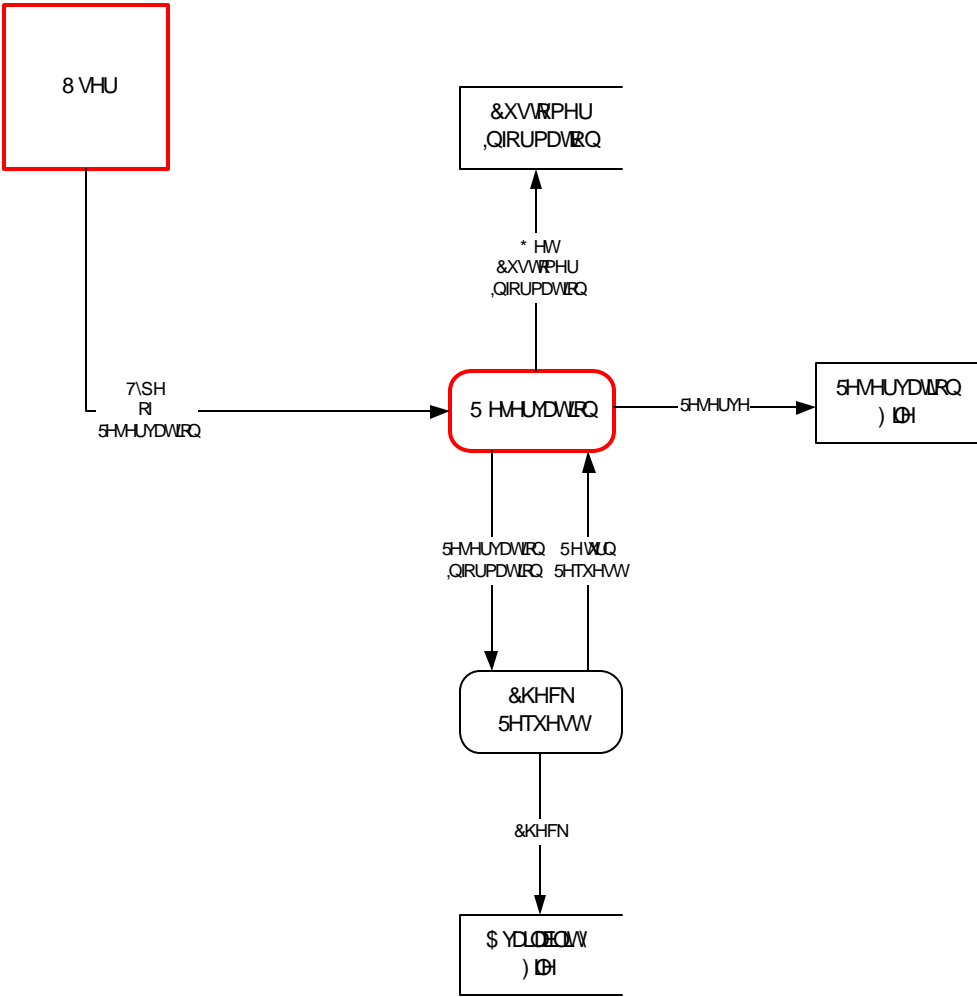
3.2.3. Application Menu DFD



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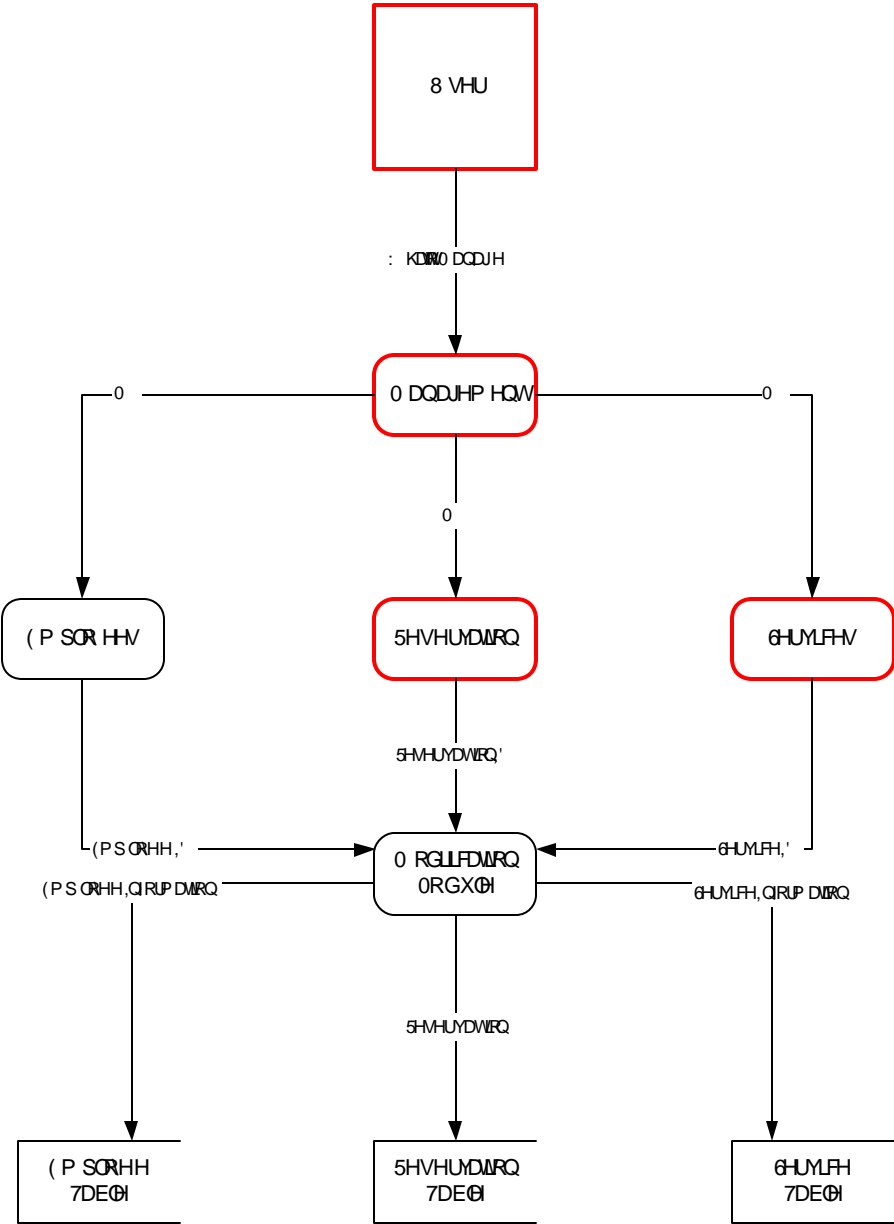
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3.2.4. Reservation DFD



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3.2.5. Management DFD



4. I/O Specification

4.1. Input Files

- ✍ Employee
- ✍ Login
- ✍ Employee schedule
- ✍ Part time schedule
- ✍ Employee time card
- ✍ Customer
- ✍ Reservation
- ✍ Services
- ✍ Account
- ✍ Transaction
- ✍ Room
- ✍ Reservation
- ✍ Services
- ✍ Refund
- ✍ Call
- ✍ Movie
- ✍ Food
- ✍ Room Service

4.2. Reports

- ✍ Customer info.
- ✍ Reservation info.
- ✍ Account info.
- ✍ Bill breakdown
- ✍ Employee info.
- ✍ Employee time card
- ✍ Open rooms
- ✍ Dirty rooms
- ✍ Refund info.
- ✍ Login Info.

4.3. Forms

- ✍ Login (new/delete)
- ✍ New reservation
- ✍ New customer
- ✍ New account
- ✍ Get room info
- ✍ Get customer info.
- ✍ Get employee info
- ✍ Get reservation info
- ✍ Do refund
- ✍ Order room cleaning
- ✍ New employee
- ✍ Schedule employee hours
- ✍ Employee info.

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5. Preliminary Database Design

There would be approximately seventeen tables in the Hotel Management System Database. The detail of each table will be listed in the following sub-sections.

5.1. Customer Table

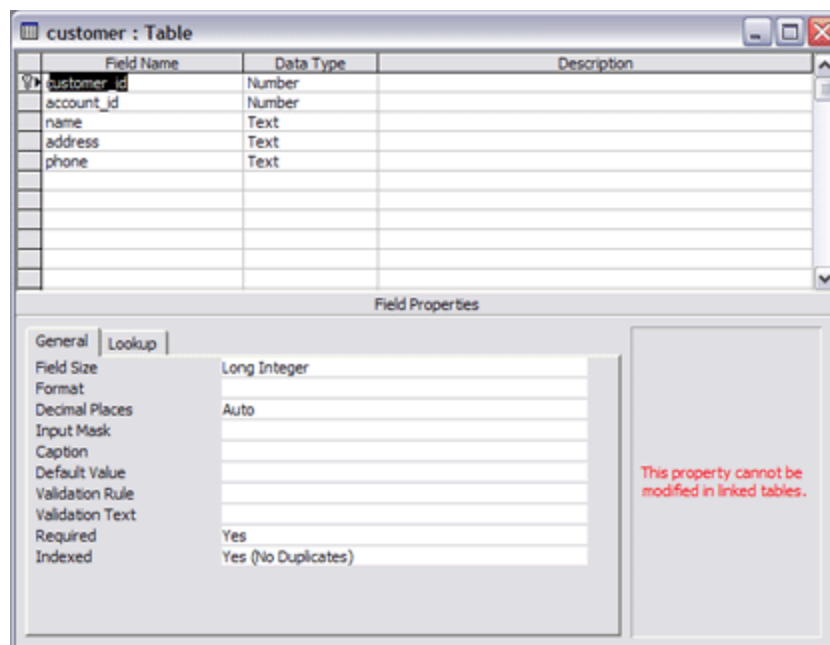
5.1.1. Table Description

Enter Table Information over here.

5.1.2. Table Detail

Customer	
Cust ID	PK
Account #	
Name	
Address	
Phone #	

5.1.3. File Design



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5.2. Account Table

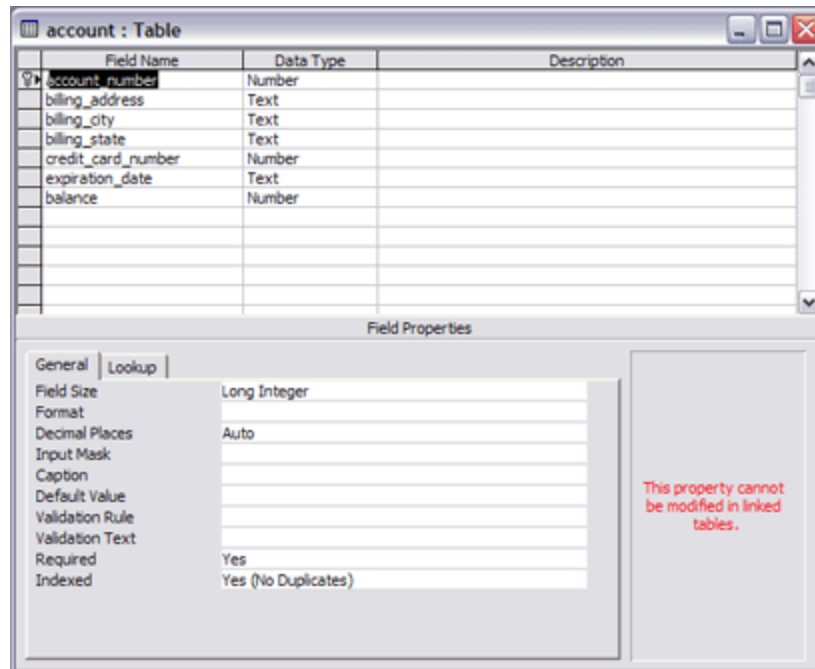
5.2.1. Table Description

Enter Table Information over here.

5.2.2. Table Detail

account	
Account #	PK
Billing Address	
Credit Card #	
Expiration Date	
Balance	

5.2.3. File Design



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5.3. Reservation Table

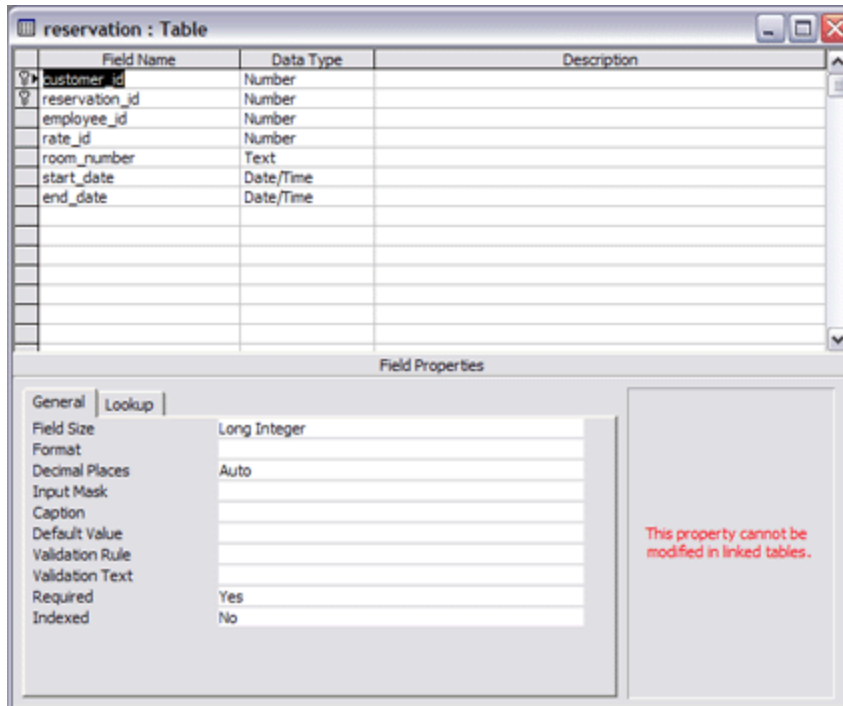
5.3.1. Table Description

Enter Table Information over here.

5.3.2. Table Detail

Reservation	
Cust ID	PK
Reservation ID	PK
Employee ID	
Rate ID	
Room #	
Start Date	
End Date	

5.3.3. File Design



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5.4. Room Rate Table

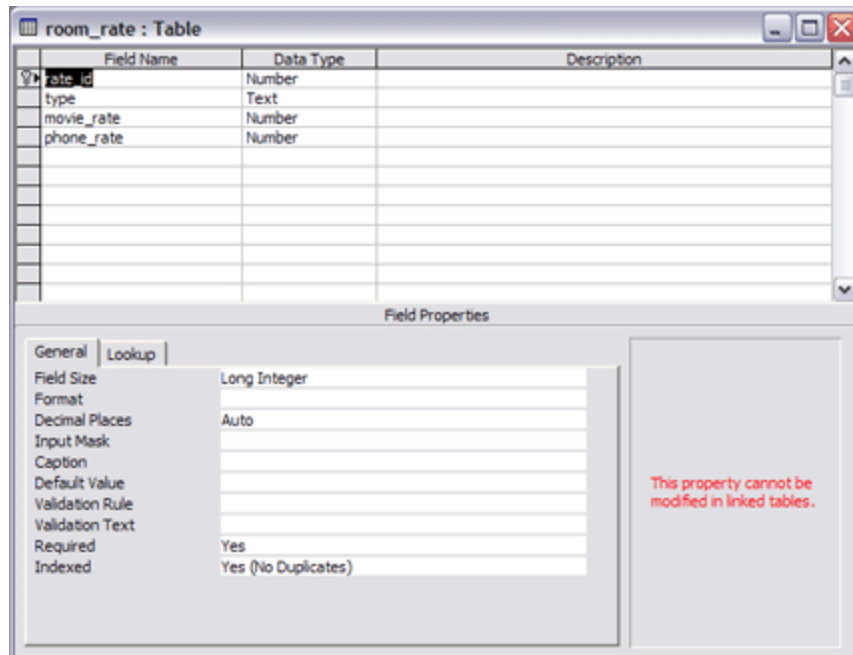
5.4.1. Table Description

Enter Table Information over here.

5.4.2. Table Detail

room_rate	
Rate ID	PK
Type	enum('Single','Double',etc)
Movie Rate	
Phone Rate	

5.4.3. File Design



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5.5. Transaction Table

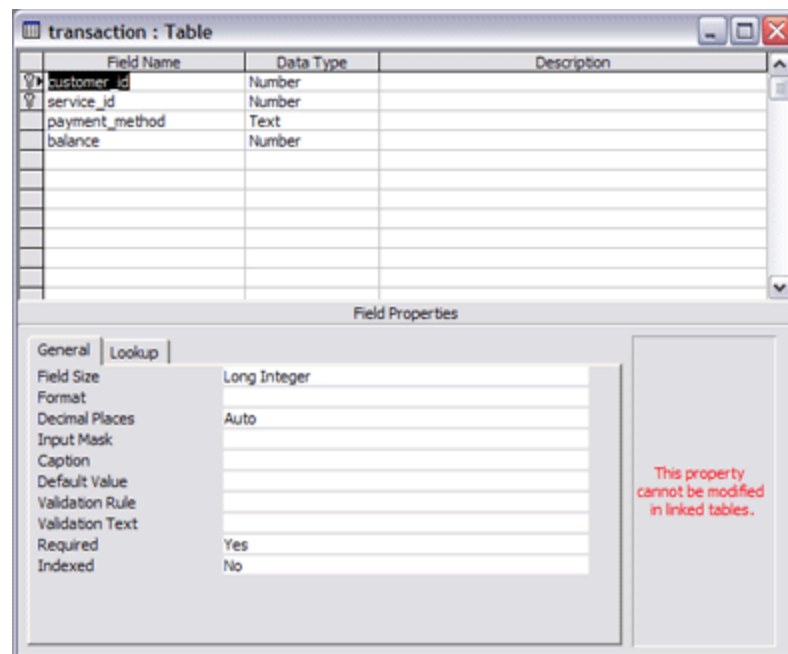
5.5.1. Table Description

Enter Table Information over here.

5.5.2. Table Detail

Transaction	
cust ID	PK
Service ID	PK
Payment Method	(Cash/Check, Credit, A/R)
balance	

5.5.3. File Design



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5.6. Services Table

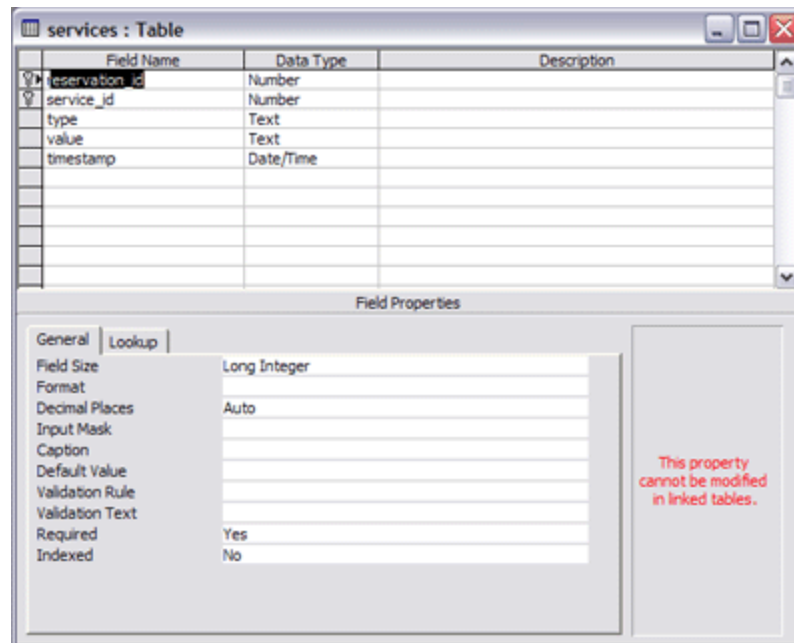
5.6.1. Table Description

Enter Table Information over here.

5.6.2. Table Detail

Services	
Reservation ID	PK
Service ID	PK
type	enum('food','movie','phone',etc)
value	food id, movie id, phone id...
timestamp	

5.6.3. File Design



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5.7. Food Table

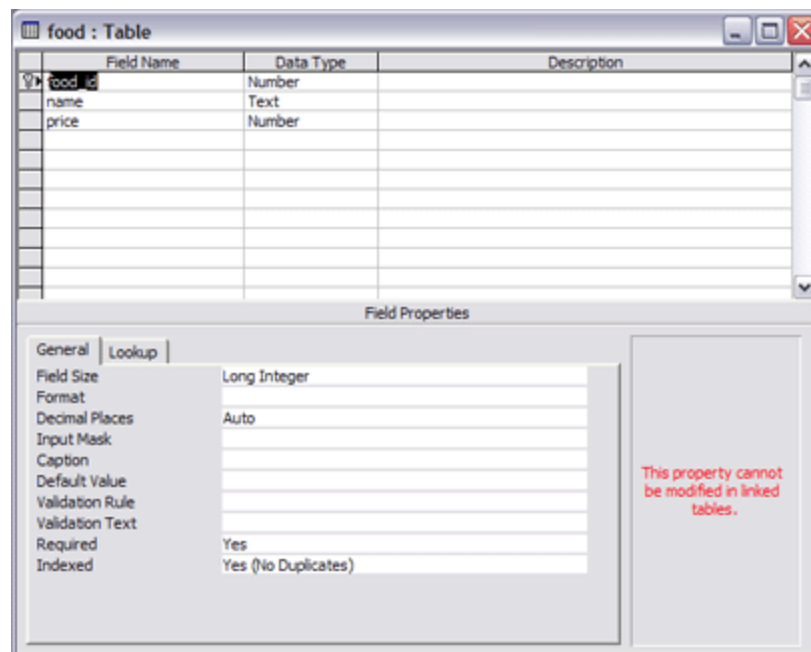
5.7.1. Table Description

Enter Table Information over here.

5.7.2. Table Detail

Food	
Food ID	PK
Name (of item)	
Price	

5.7.3. File Design



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5.8. Room Table

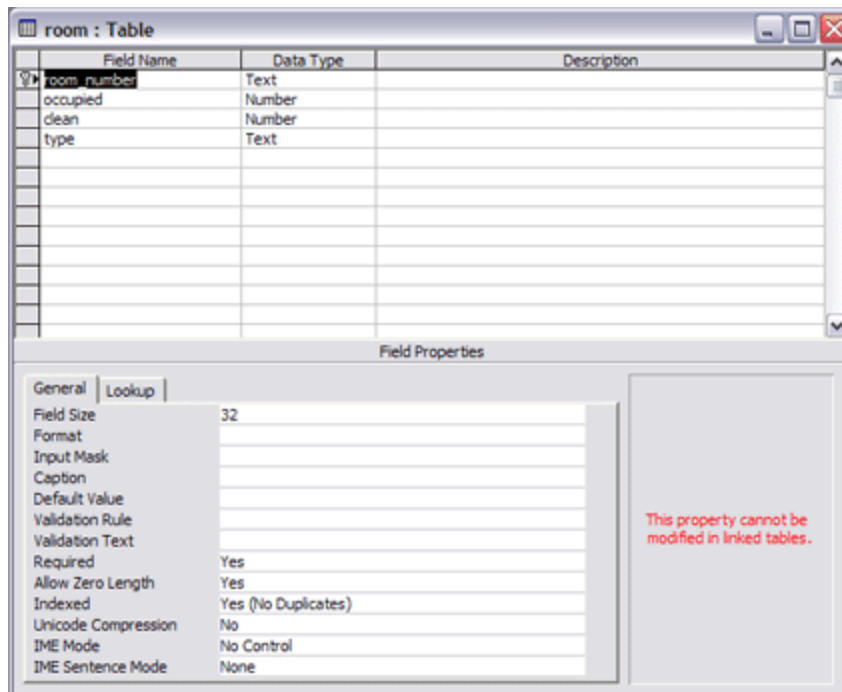
5.8.1. Table Description

Enter Table Information over here.

5.8.2. Table Detail

Room	
Room #	PK
Occupied	if occupied, this is the reservation ID
Clean	
Type	

5.8.3. File Design



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5.9. Login Table

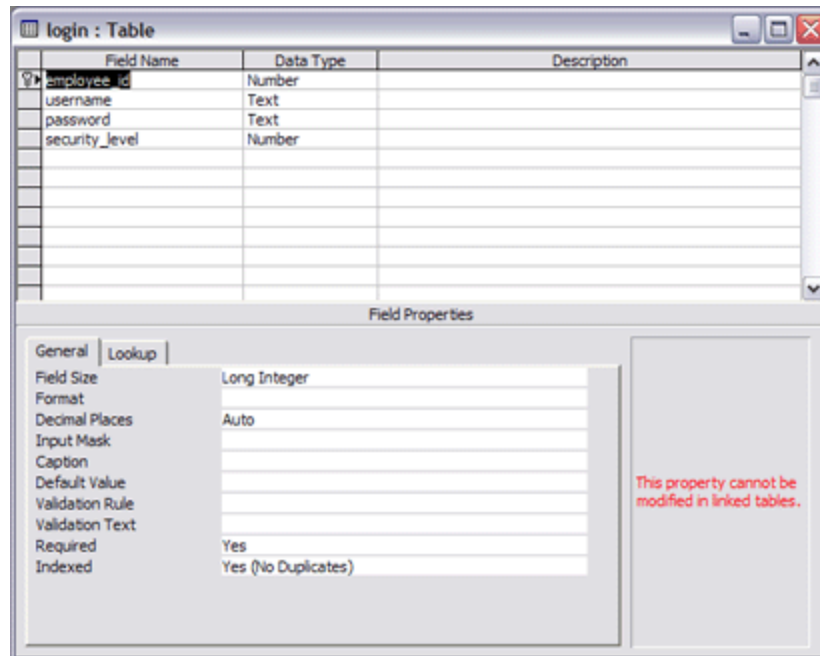
5.9.1. Table Description

Enter Table Information over here.

5.9.2. Table Detail

Login	
Employee ID	PK
Username	
Password	
Security Level (access)	

5.9.3. File Design



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5.10. Call Table

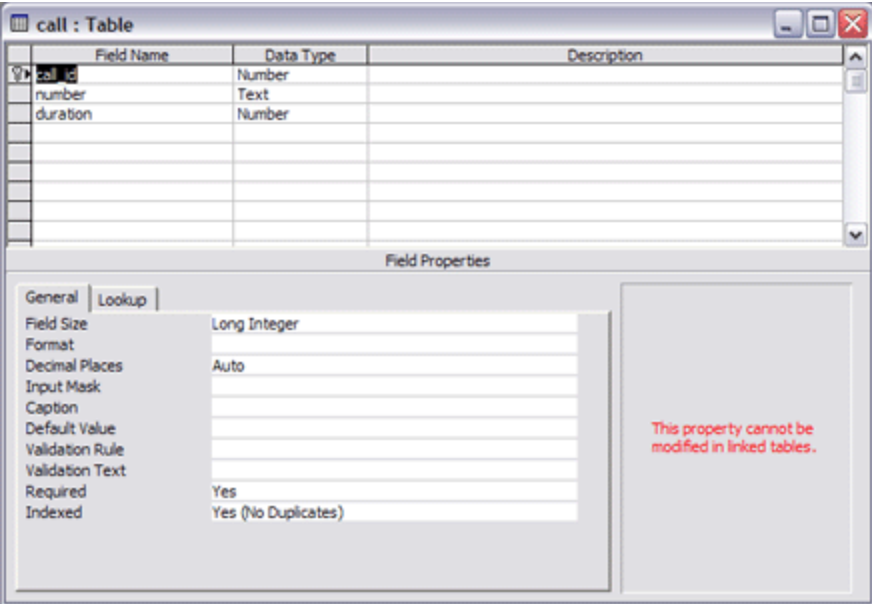
5.10.1. Table Description

Enter Table Information over here.

5.10.2. Table Detail

call	
call ID	PK
number	
duration	

5.10.3. File Design



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5.11. Employee Table

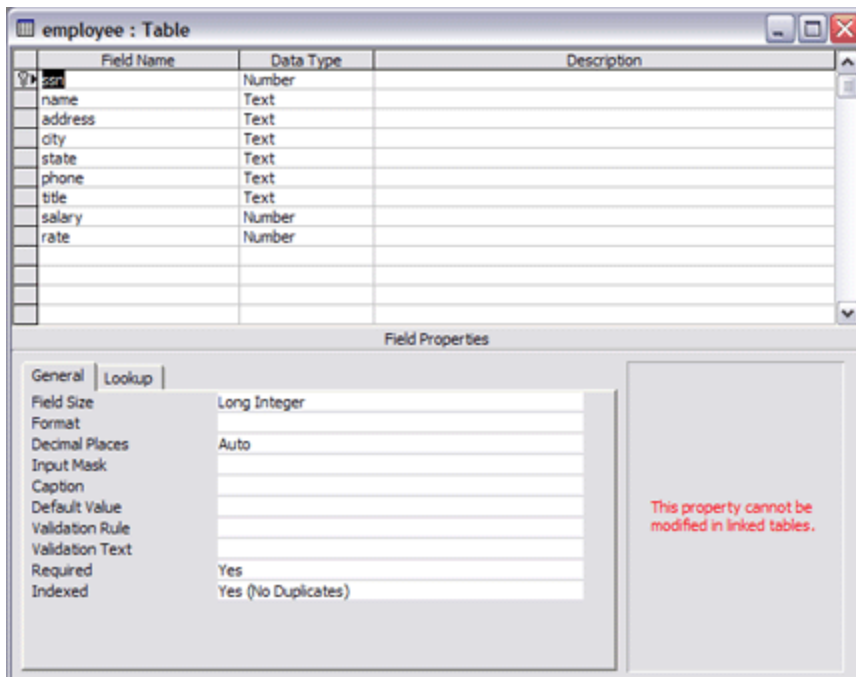
5.11.1. Table Description

Enter Table Information over here.

5.11.2. Table Detail

Employee	
Employee ID/SSN	PK
Name	
Address	
Phone	
Title	
Salary	If yes, rate is taken as yearly salary. If no, rate is hourly wage
rate	

5.11.3. File Design



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5.12. Movie Table

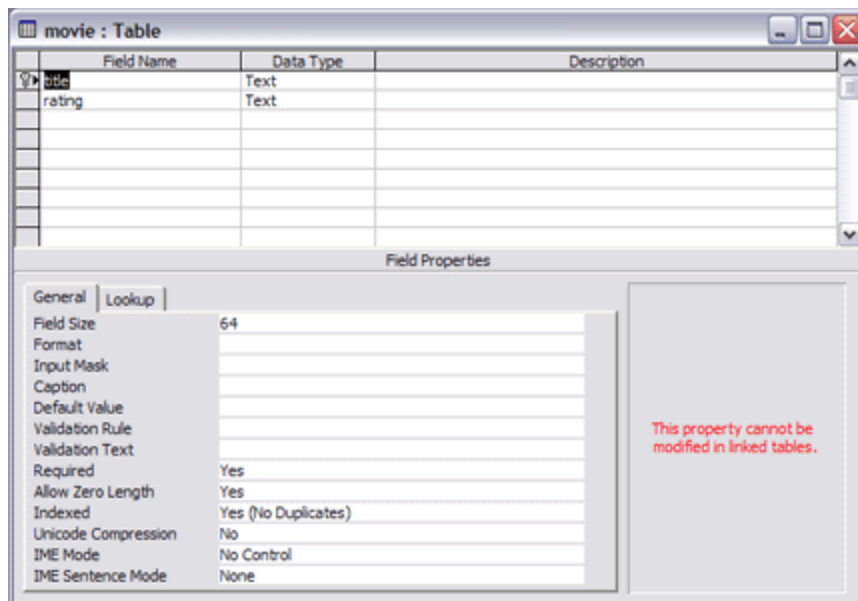
5.12.1. Table Description

Enter Table Information over here.

5.12.2. Table Detail

movie	
title	PK
rating	

5.12.3. File Design



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5.13. Room Service Table

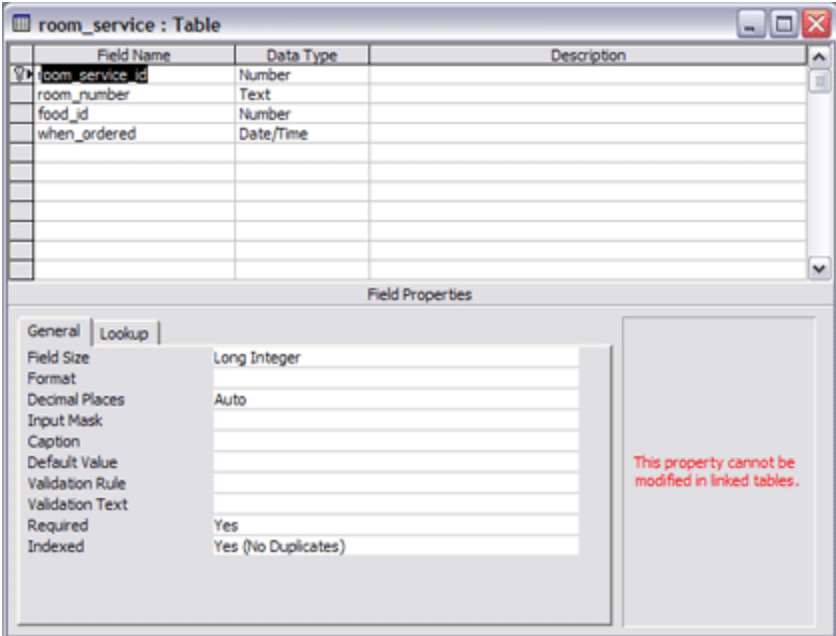
5.13.1. Table Description

Enter Table Information over here.

5.13.2. Table Detail

room_service	
room service ID	PK
room #	
food id	
when ordered	

5.13.3. File Design



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5.14. Employee Schedule Table

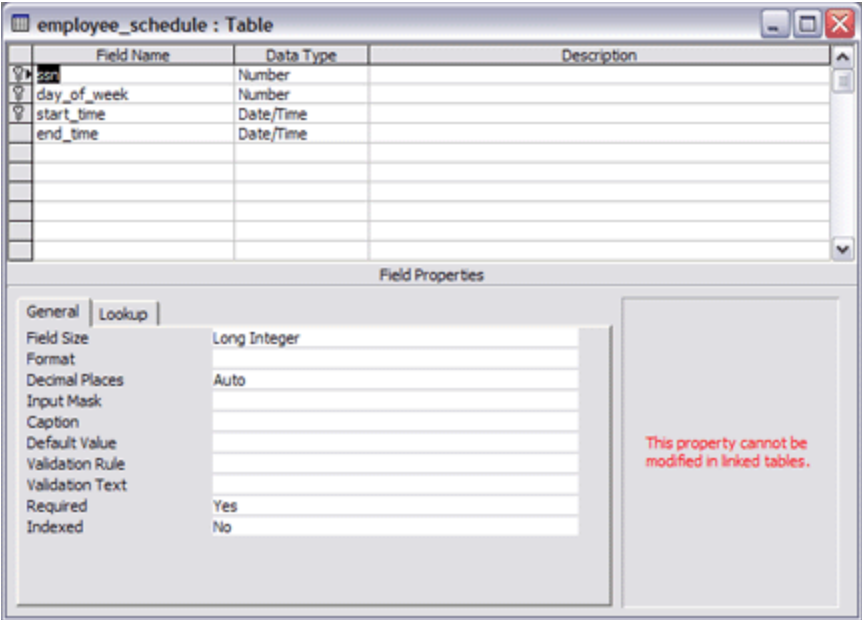
5.14.1. Table Description

Enter Table Information over here.

5.14.2. Table Detail

employee schedule	
Employee ID	PK
day of week	PK
start time	PK
end time	

5.14.3. File Design



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5.15. Employee Time Card Table

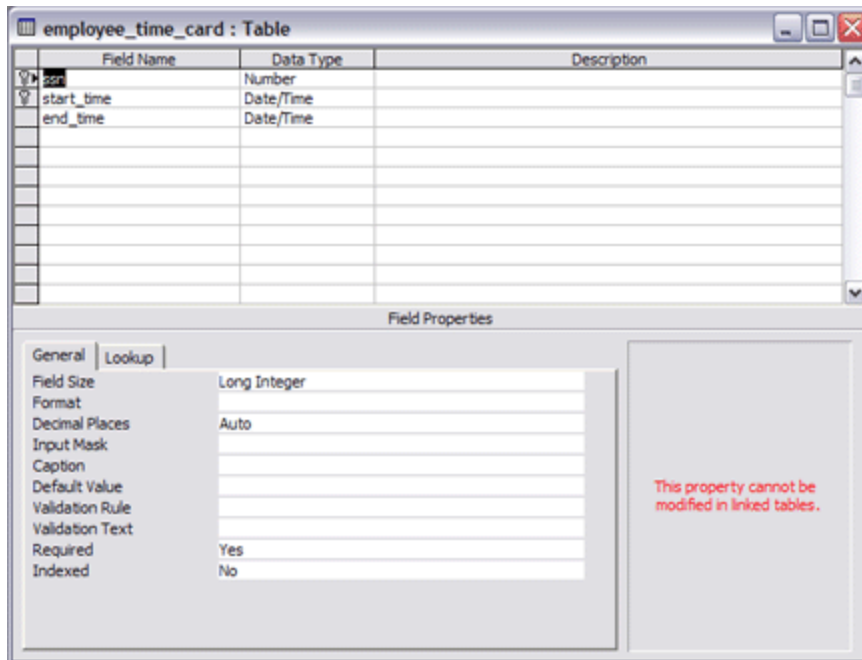
5.15.1. Table Description

Enter Table Information over here.

5.15.2. Table Detail

employee time card	
employee ID	PK
in	PK
out	

5.15.3. File Design



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5.16. Part Time Schedule Table

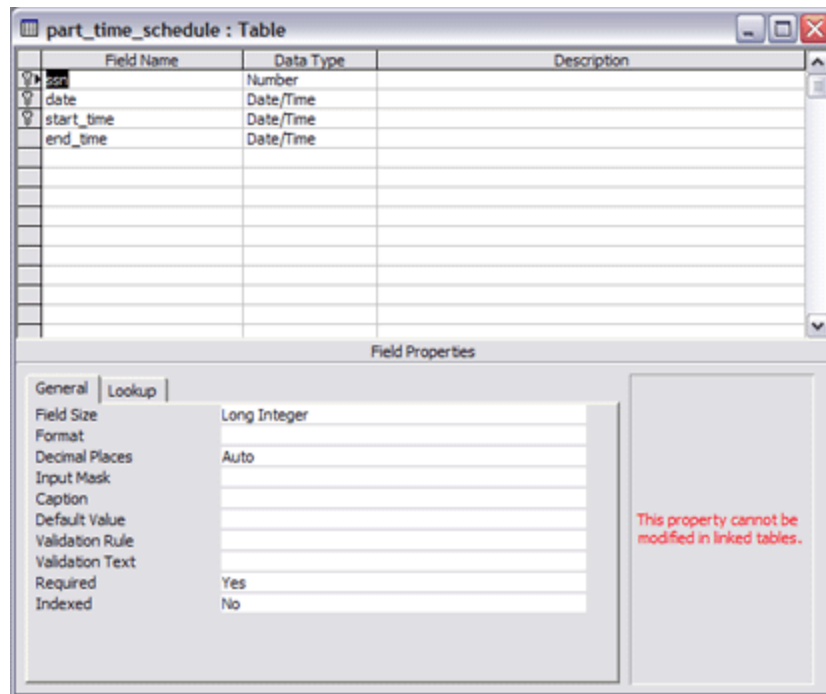
5.16.1. Table Description

Enter Table Information over here.

5.16.2. Table Detail

part time schedule	
employee ID	PK
date	PK
start time	PK
end time	

5.16.3. File Design



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5.17. Refund Table

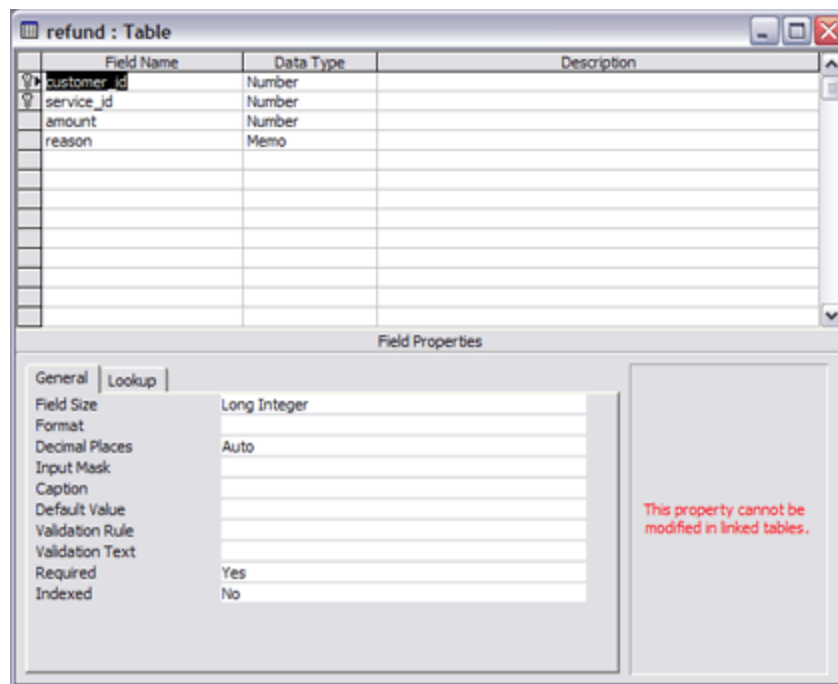
5.17.1. Table Description

Enter Table Information over here.

5.17.2. Table Detail

refund	
cust ID	PK
service id	PK
amount refunded	
reason	

5.17.3. File Design

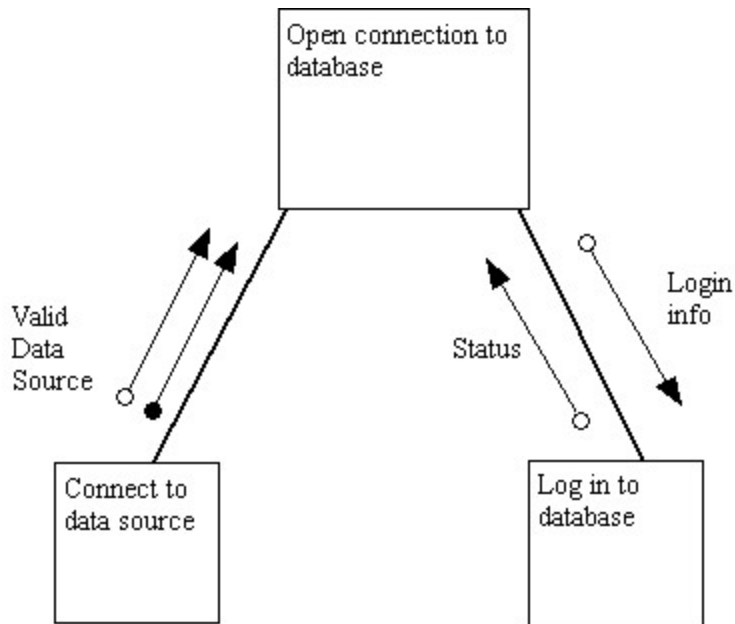


6. Structured Charts

In this section we will introduce the structured charts for the Hotel Information Management System. The structured charts will be for the GUI as well as the Database layer interaction.

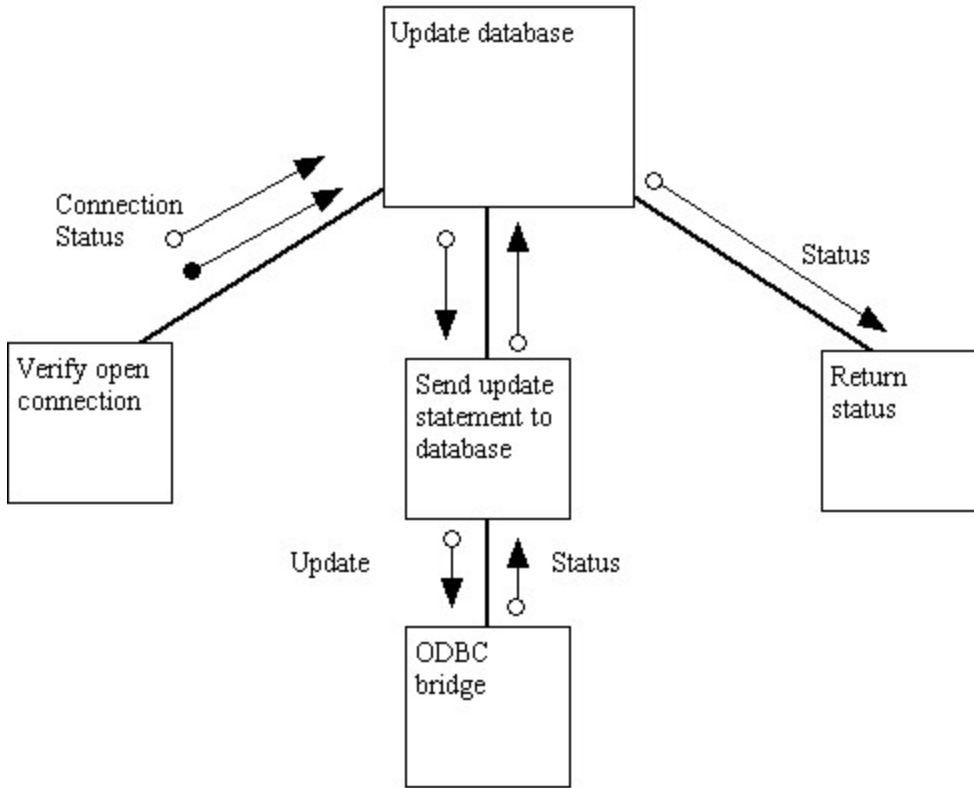
6.1. Structure Chart for the Database Layer

6.1.1. Open Connection to Database

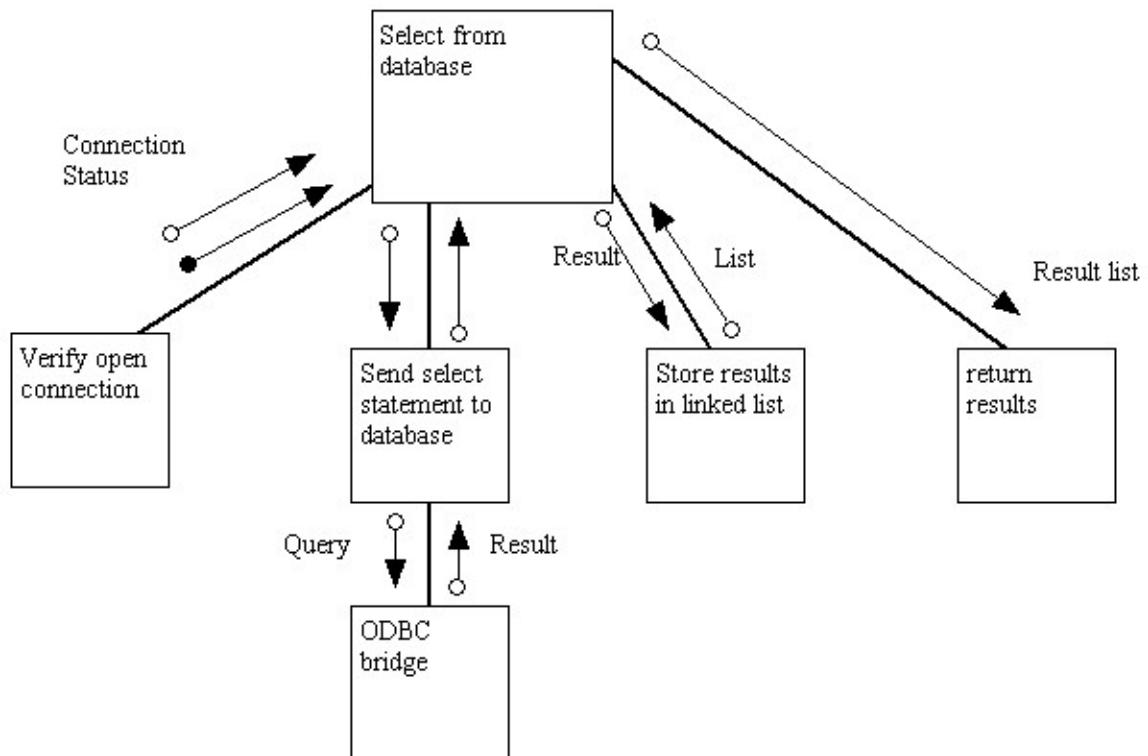


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6.1.2. Update Database

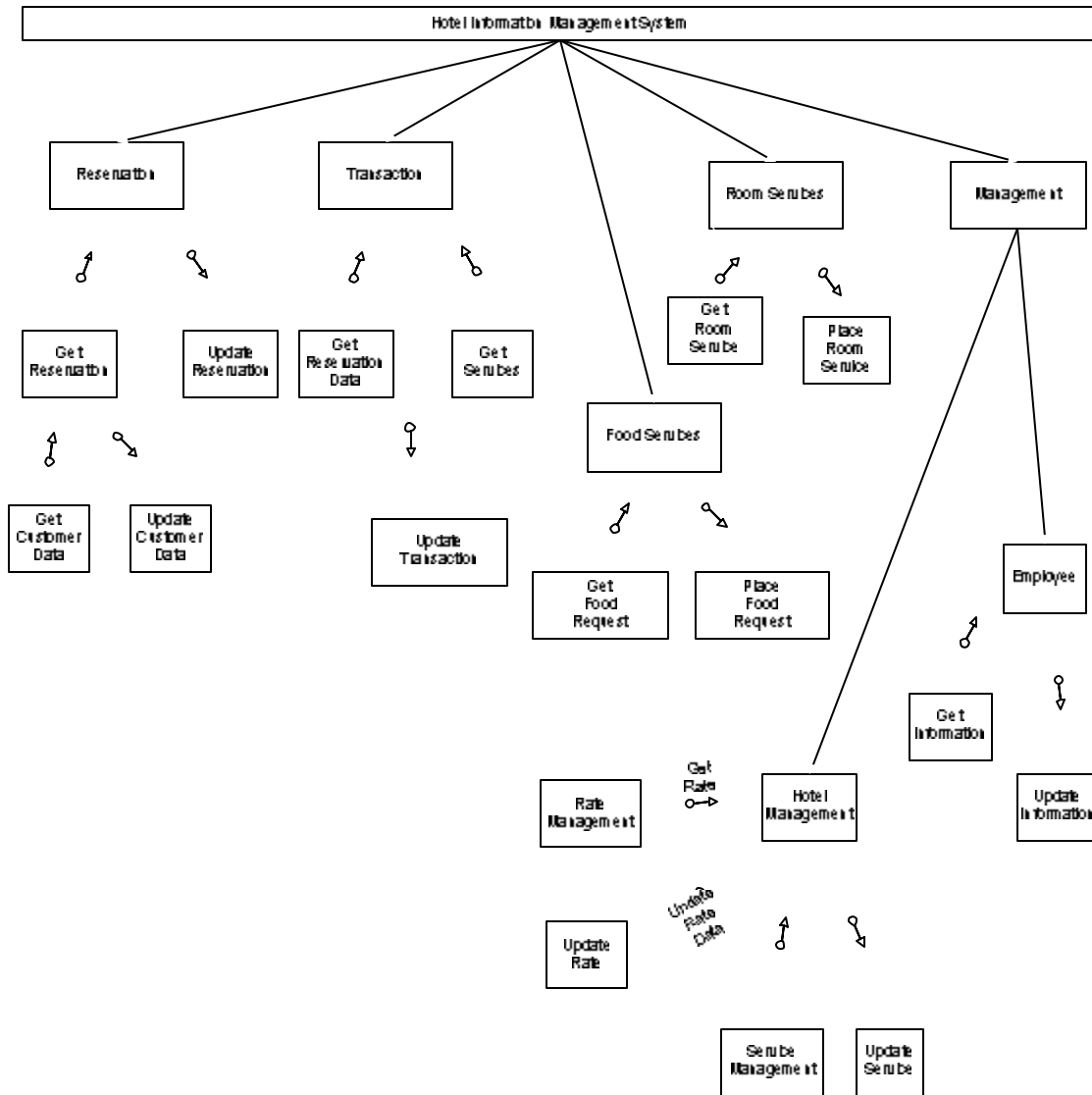


6.1.3. Get Data From Database



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6.2. Application Structured Chart



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6.3. Database Modules

6.3.1. Open Module

This is called to open a connection to the database. For the purposes of this project, the login username and password are hard coded. This returns true if the connection was successfully opened.

Module Name	Open
Module Type	function
Return Type	bool
Input parameters	none
Output parameters	none
Error messages	“Could not connect to data source” “Could not login”
Files accessed	none
Files changed	none
Modules called	none

6.3.2. Select Module

This is used to execute a select query from the db. The result is returned as a linked list of linked lists. Each sub list is the list of values for each column in the result.

Module Name	Select
Module Type	function
Return Type	list
Input parameters select statement	string
Output parameters	none
Error messages	“Syntax error”
Files accessed	Dependent on statement
Files changed	none
Modules called	none

6.3.3. Update Module

This is used to execute an update statement. This function returns true if the statement executes successfully.

Module Name	Update
Module Type	function
Return Type	bool
Input parameters update statement	string
Output parameters	none
Error messages	“Syntax error”

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Files accessed	Dependent on statement
Files changed	Dependent on statement
Modules called	none

6.3.4. Close Module

This function is used to close the connection to the database. It is not entirely necessary however, as the connection will automatically be closed upon program completion by the ODBC bridge. It can be useful for refreshing a connection.

Module Name	Close
Module Type	function
Return Type	none
Input parameters	none
Output parameters	none
Error messages	none
Files accessed	none
Files changed	none
Modules called	none

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7. Application Graphical User Interface

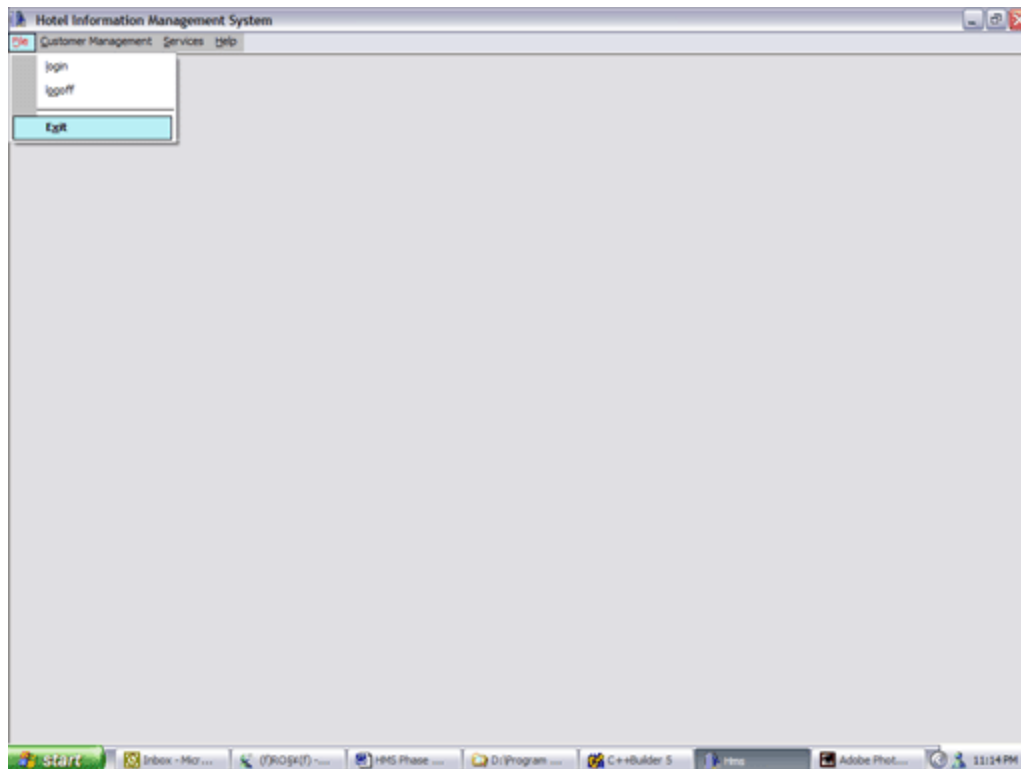
This section of the design document will provide the design of the GUI of the Hotel Information Management System.

7.1. Application Menu System

This section will illustrate the Menu System of the Hotel Information Management System.

7.1.1. File Menu

From the File Menu, the user can login and logoff of the system, as well as exit the whole application. When the application first starts, the application menu will be disabled, the only option the user would have is the LOGIN and the EXIT operations. If the user selects the LOGIN option from the File menu, he/she will be given a login window to enter their username and password. Based on the user type, the system will display the appropriate application menu.

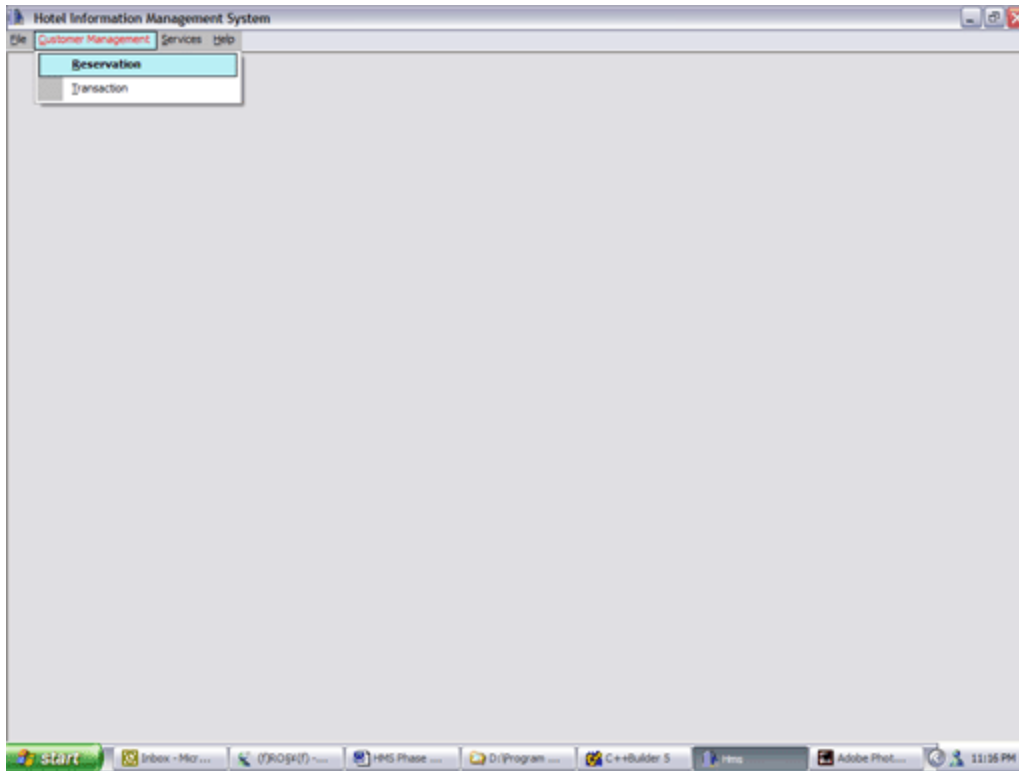


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7.1.2. Customer Management Menu

From the Customer Management Menu the user can perform two operations, RESERVATION and TRANSACTION. From the Reservation window the user can request a new reservation from the system; he/she can query an already existing reservation from the system, and can do data manipulation from the present window. From the Transaction window, the user can finalize the whole process of the reservation and the payment.

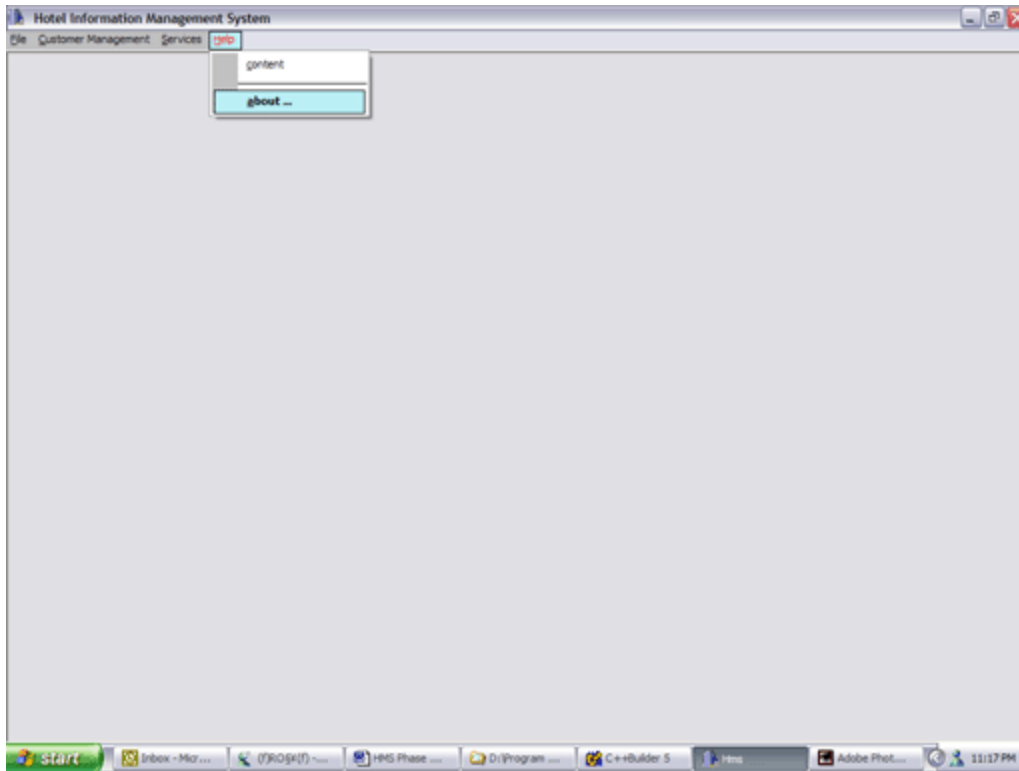


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7.1.3. Help Menu

From the Help menu the user can access information about how to use the Hotel Information Management System. This function will depend on the timeline and the budget of HMS project.



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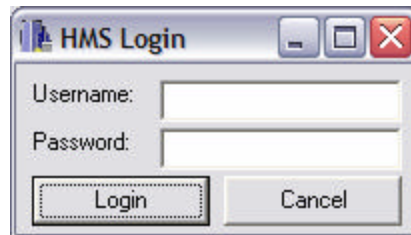
Specification Document

7.2. Application Window System

This section will display the design and explain the Hotel Information Management System's windowing system.

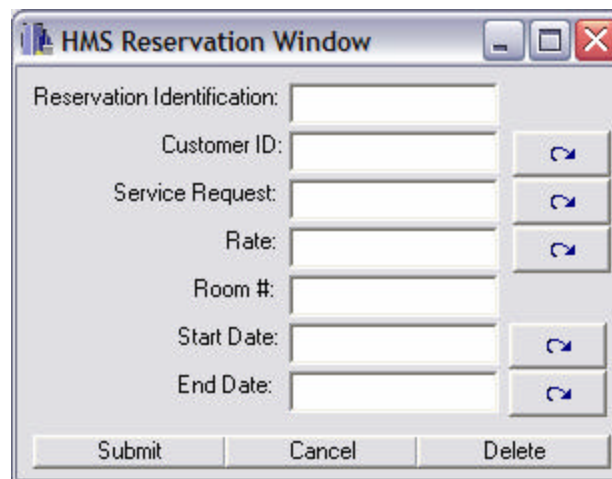
7.2.1. Login Window

This is the login window of the HIMS application. As you can see there are two data entries, the username and the password. The application will check the database once the login button has been clicked and the system will either accept the user account or deny it. If accepted it will display the appropriate Application Menu based on the user type. Otherwise, it will stay idle.



7.2.2. Reservation Window

This is the Reservation Window. It can be used in two different modes. Entering new reservation information, or quarrying information on existing reservation. If the user is entering a new reservation, the system will generate a reservation identification number automatically, and it will update the database based on the user input. On the other hand if the user wants to retrieve information on a reservation then he/she must supply the reservation identification number to the system for data retrieval.

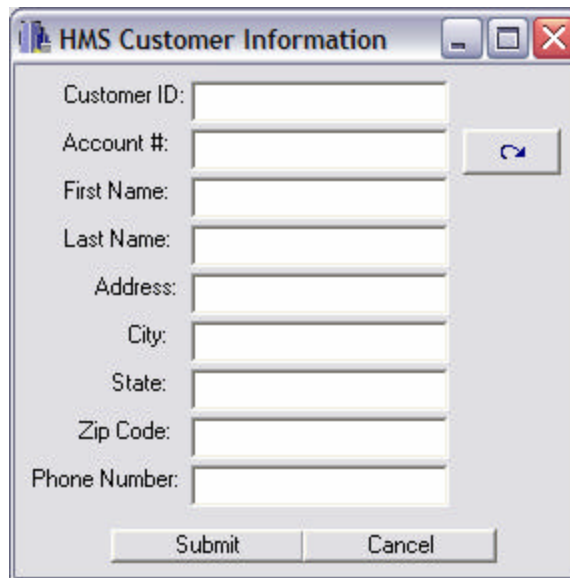


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7.2.3. Customer Information Window

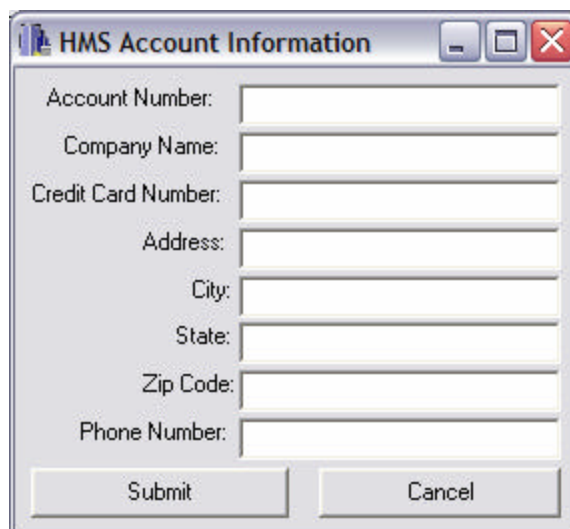
The Customer Information Window will display detailed information on the customer. It has similar functionality as the Reservation Window. The user can enter new customer information or retrieve and already existing customer information. If it is a new customer, the system will automatically generate a unique Customer ID and update the database as required. The user can request customer information by submitting the Customer ID to the system.



The screenshot shows a standard Windows-style dialog box titled "HMS Customer Information". It features a title bar with minimize, maximize, and close buttons. The main area contains a vertical stack of text input fields for the following fields: Customer ID, Account #, First Name, Last Name, Address, City, State, Zip Code, and Phone Number. A search button with a magnifying glass icon is positioned to the right of the Account # field. At the bottom of the dialog, there are two buttons: "Submit" and "Cancel".

7.2.4. Account Information Window

The Account Information Window will be displaying detailed information about individual accounts businesses have with the hotel. This information will be used when an employee of that company makes a reservation. It will be a way of getting the clients information as well as keeping track of the amount of transactions done by each account.



The screenshot shows a standard Windows-style dialog box titled "HMS Account Information". It features a title bar with minimize, maximize, and close buttons. The main area contains a vertical stack of text input fields for the following fields: Account Number, Company Name, Credit Card Number, Address, City, State, Zip Code, and Phone Number. At the bottom of the dialog, there are two buttons: "Submit" and "Cancel".

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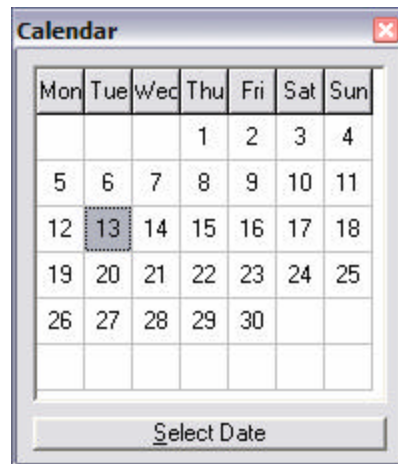
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7.2.5. Service Request Window

7.2.6. Rate Information Window

7.2.7. Start Date and End Date Window

The Start Date and End Date, as well as any other date fields are going to be using the Calendar widget which has been developed. This is done because we want to reduce the human error in entering date information and data format into the database.



8. Business Rules and Constraints

8.1. Basic Specifications

The software package must be able to handle multiple users accessing, updating, and editing the database at the same time. Queries should be answered promptly to ensure displayed data is current. Scenarios

8.1.1. Client requests reservation

8.1.1.1. The user must be able to access available rooms dependent on date of request from client.

8.1.1.2. From the selection of available rooms, the user must be able to give information regarding the room such as rate of room and amenities that are provided.

8.1.1.3. If the client agrees to reserve the room, the user must be able to enter in the customer information and deposit information while holding the room in an unavailable setting.

8.1.1.4. This makes certain that another user does not reserve the same room to another client at the same time.

8.1.2. Client requests room with no reservation

8.1.2.1. If a client requests a room with no prior reservation the user must be able to access available rooms for the duration of the client's stay.

8.1.2.2. From the selection of available rooms, the user must be able to give information regarding the room such as rate of room and amenities that are provided.

8.1.2.3. If the client agrees to rent the room, the user must be able to enter in the customer information while holding the room in an unavailable setting.

8.1.2.4. This makes certain that another user does not reserve the same room to another client at the same time.

8.1.3. Client requests room service

8.1.3.1. If a client requests room service, the user must be able to access the client's account one of two ways.

8.1.3.1.1. First, a client may only give their last name. This information will bring up their information regarding their room. In the

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case that multiple client's have the same last name, a display of all client's with the last name will be displayed and the user will have to then ask for a room number.

8.1.3.1.2. Secondly, a client may give their room number. This information will display the client's information and the user will ask for information from the client such as their last name to verify the client's request.

8.1.3.2. The room service display menu will then be displayed and their order will be taken by the user.

8.1.3.3. The room will be billed the proper amount and will be paid upon checking out of the hotel

8.1.4. Client requests to cancel reservation

8.1.4.1. User must request either confirmation code and/or client's information to retrieve reservation information

8.1.4.2. After confirming with client reservation information provided user cancels client's initial reservation.

8.1.4.3. Canceling client's reservation immediately returns the room number to the status of available allowing other users to reserve the room for other clients.

8.1.4.3.1. A fee may be assessed by the hotel if desired.

8.1.5. Managing Rates (Managers Only)

8.1.5.1. The software will allow managers to edit rates regarding hotel charges.

8.1.5.1.1. Selecting this area will prompt the user for information regarding the duration of time that the rates will be in effect.

8.1.5.1.2. Immediately after user updates rates, all users will be notified of price changes by displays on screen.

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8.1.6. Requesting Maintenance

- 8.1.6.1. Selecting this window will automatically start a query for rooms that have not been cleaned for three days. This may be due to unoccupied rooms or occupied rooms that have requested not to be cleaned.
- 8.1.6.2. A maintenance request can be filled from this window notifying maintenance that cleaning and/or repairs need to be completed on particular rooms.
- 8.1.6.3. A history of maintenance orders can also be conducted on particular rooms or the entire hotel.

8.1.7. Client Is Checking Out of the Hotel

- 8.1.7.1. As the client notifies the user that he/she wishes to check out of their room, the user enters the check-out window
- 8.1.7.2. The user enters in the room number and confirms the name of the client to verify balance of stay.
 - 8.1.7.2.1. The user will then go over any discrepancies with the bill that the client may have
- 8.1.7.3. The user then receives the payment and enters in the payment received.
 - 8.1.7.3.1. If the client is an account customer or wishes to be billed, the user must enter the account information number to be billed later.

9. Hardware Requirement

9.1. Server

- ✍ Dual Intel PIII 700 MHz
- ✍ 512 MB RAM
- ✍ Dual 100 base-t network cards
- ✍ 20GB boot drive
- ✍ Free BSD
- ✍ MySQL 3 DBMS

9.2. Filer

- ✍ Intel PIII 700 MHz head unit
- ✍ 2GB RAM
- ✍ 1TB RAID 4 2 shelf Array
- ✍ Proprietary Linux build with journaling file system (NetApp)
- ✍ NFS file sharing

9.3. Workstation

- ✍ Any Windows 9x+ compatible PC
- ✍ Persistent broadband internet connection
- ✍ Standard I/O devices (mouse, keyboard, monitor)