Software Requirements Specification

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CMIS 330 – Section 7980

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1. Introduction

1.1. Purpose

The purpose of this document is to describe the design of a reservation system for a bed and breakfast and an accounting system for tracking profits and expenses. This document is intended for the software engineering team designing the program, the customers who requested its creation, and any other stakeholders involved in program development.

1.2. Scope

The program will provide authorized hotel staff with a quick and efficient way to check the availability of rooms in the bed and breakfast on a given date and to monitor the expenses and profits of the bed and breakfast. The system will use a database to store room availability, customer information, and accounting data.

1.3. Definitions, acronyms

DBMS – Database Management Software

SRS - Software Requirements Specification

Completed reservation - a reservation where payment has been received for the days that a customer has stayed in the bed and breakfast

Reservation guarantee – a fee paid by a customer in order to reserve a room in the bed and breakfast. The fee is equal to the cost of one day at the current daily rate.

RSRV users – End-users authorized to access the Reservation System only.

ACCT users – End-users authorized to access both the Reservation System and the Accounting System.

Authorization number – Each staff member who is authorized to make expense payments on behalf of the bed and breakfast will receive an unique authorization number. This number will keep a record of which staff member is authorizing payments.

1.4 References

The following resources were used in creating this Software Requirements Specification document.

- IEEE Std 830-1998: IEEE Recommended Practice for Software Requirements Specifications
- Bandakkanavar, Ravi (2017). Software Requirements Specification document with example. Retrieved from https://krazytech.com/projects/sample-software-requirements-specificationsrs-report-airline-database
- IBM. Database Authorization. *IBM Knowledge Center*. Retrieved from https://www.ibm.com/support/knowledgecenter/en/SSPT3X_4.1.0/com.ibm.swg.im.infosphere.biginsights.analyze.doc/doc/bi_admin_biga_dbauth.html

- Module 1: Introduction to Software Engineering. Document posted in University of Maryland University College CMIS 330 7980 online classroom, archived at http://campus.umuc.edu

- Module 2: Requirements Engineering and Modeling. Document posted in University of Maryland University College CMIS 330 7980 online classroom, archived at http://campus.umuc.edu

- Module 3: Methodologies and Application Domain Issues. Document posted in University of Maryland University College CMIS 330 7980 online classroom, archived at http://campus.umuc.edu

2. Overall Description

2.1. Product perspective

2.1.1. System Interface

The system for the bed and breakfast is comprised of end-user software, two databases, a card reader and key pad, a keyboard and mouse, and a printer.

a) *End-user software.* The end-user software will send and receive information via a networked connection to a database. It will accept inputs from end-users via a keyboard and mouse and from customers via a card reader and keypad. It will send output to the printer.

b) *Database to End-user Software.* There are two databases: one for storing reservation and customer data and one for storing financial data. The databases will receive and send data over the network connection via DBMS. The end-user software will request, receive, and send information over the network to both databases.

c) *Database to database.* The reservation database will send reservation guarantee and completed reservation payment information to the financial database. The financial database will never send financial data to the reservation database.

d) *Credit card reader and key pad.* The card reader and key pad will connect to the internet for verification of funds. The card reader and key pad will also interface with the end-user software to send the credit card number of a validated credit card.

e) *Keyboard and Mouse.* The keyboard and mouse provide input to the end-user software. It is the primary form of interaction between the end-user and the end-user software and controls when other subsystems interact with each other.

f) *Printer.* The printer receives output from the end-user software.

2.1.2. User Interfaces

The software component of the system consists of two subcomponents: one for reservations and one for accounting.

2.1.3 Software interfaces

a) *DBMS. The Microsoft SQL Server 2016 relational DBMS with interface with the end-user software and the database.*

b) *Computer Operating System*. The end-user system will be designed for Windows Operating System 10 Professional, Version 1709.

2.2. Product functions

The system provides hotel management and staff with a reservation system and an accounting system to aid in day-to-day operations of the bed and breakfast. All authorized users can search the system for vacancies by date or by hotel room. Staff can create new reservations or edit existing ones, store payment information, and process payments.

Management or any authorized users can access and record the financials of the bed and breakfast. These users can search the financial database by entering a specific date or date range. The financial database will return the expenses, income, and net profit for the designated time period. The user has the option to print the report, if desired. Additional financial data, such as expenses or other income, can be added to the financial database as well.

2.3 User Characteristics

The primary users of the system are bed and breakfast staff, managers, and owners. They will have an understanding of the basic operations needed to operate a computer, keyboard, mouse, and printer. They will have to know how to process a payment using a credit card reader or by entering the card number into the system.

2.4 Constraints

In addition to the typical user of the system who will desire a system that is efficient and easy to use, additional requirements may be expected from stakeholders. The stakeholders are listed below.

- The financier(s) of the software may require that the system remain below certain budget limits.
- The accounting manager for the bed and breakfast may require certain features for the Accounting System be modified to ensure accurate accounting of hotel financial data.
- Individuals responsible for the maintenance of the software will desire a system that is easy to maintain and keep up-to-date.

3. Specific requirements

3.1. External Interfaces

The system consists of the following external interfaces.

- ***Keyboard and Mouse***.
  Control end-user software

- ***Card Reader***
  Initiate in-person credit card payment
- ***Key Pad***
  Provide pin number for debit card
- ***Printer***
  Print reservation receipts, credit card receipts, and financial reports
- ***Reservation Database***
  Store customer, reservation, and payment information.
- ***Accounting Database***
  Store reservation income, expenses, and other income.

An overview of all external interfaces with the end-user software is shown in the context-level Data Flow Diagram in Figure 1.

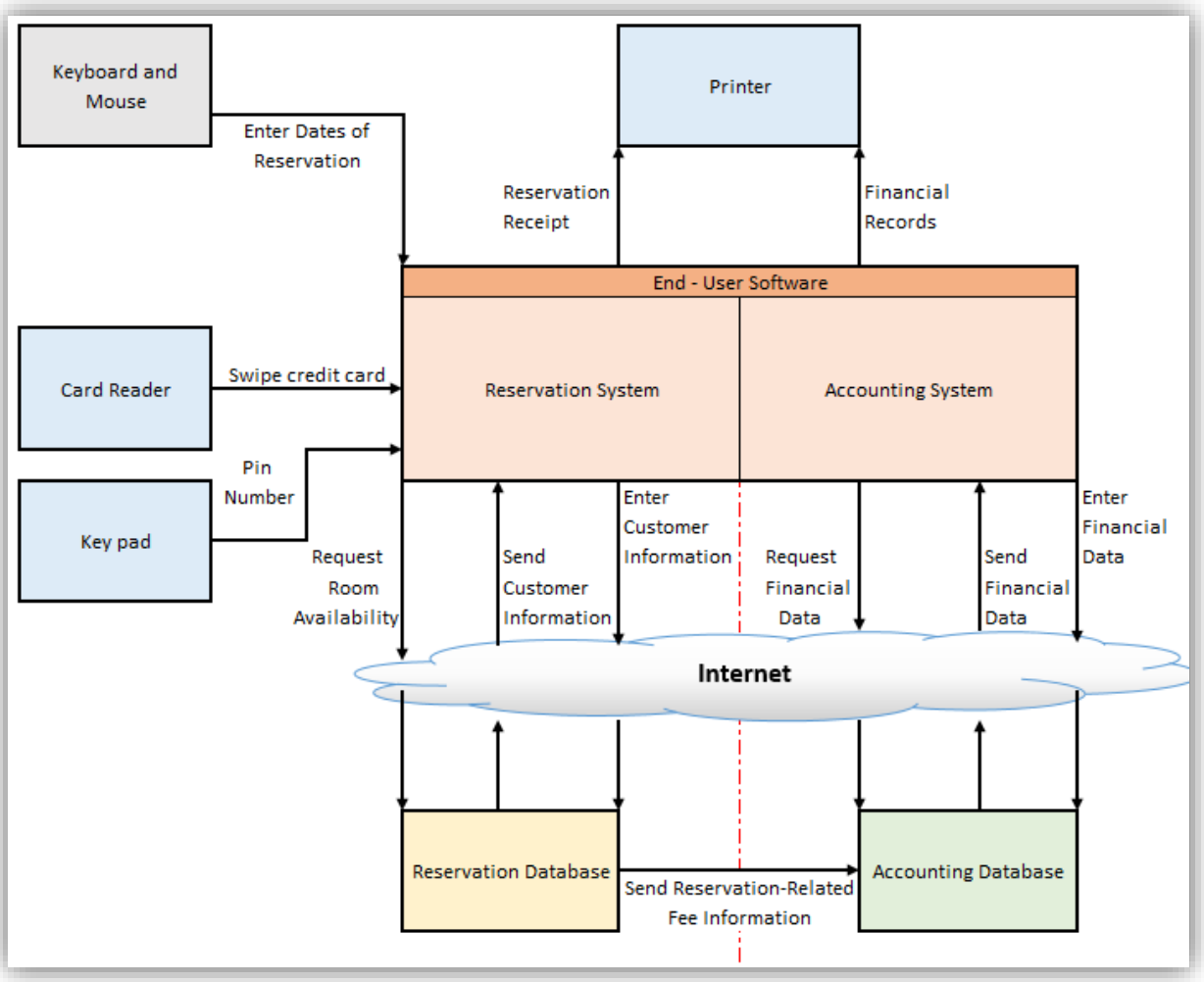


Figure 1. Level 0 Data Flow Diagram

3.2. Functional Requirements

3.2.1. User Class 1: All users

3.2.1.1. Functional Requirement 1.1 – Logging into system

Use Case 1.0 Logging into the System

Pre-condition: The system is active and has access to a network connection to confirm authorization. The system is ready to accept a username and password.

Post-condition: The system will provide access to the software that the end-user is authorized to use. The end-user will have access to the reservation system or to both the reservation system and the financial system.

Actor Profile: The end-user is a bed and breakfast staff member, manager, or owner. The end-user has a username and password to enter into the system.

Sequence of Events

1. The end-user approaches a computer installed with the end-user software.
2. The end-user types their username and password into the system
3. The end-user selects the option to log in.
4. The end-user is able to access the system or receives an error message

User scenario for Logging into the System

User scenario 1: Log Into System

1. End-user enters user name and password into system.
2. End-user selects “Enter site” button.

User scenario 2: System Verifies Authentication

1. System will confirm that the username and password belongs to an authorized account.
2. System will determine if user is authorized to access the Reservation System only or both the Reservation and Accounting System.
3. The system will display the Reservation System to users to all authorized users.
4. The system will display the Accounting System to users who are authorized to view the Accounting System.

Requirement 1.1: Logging into the System

1.1 The system shall display a message to log into the system

1.1.1 The system shall display a textbox with the label “Username” for the end-user to enter his username.

1.1.2 The system shall display a textbox with the label “Password” for the end-user to enter their password.

1.1.3 The system shall display a button with the label “Reset” for the end-user to erase the text entered by the user into the Username and Password textboxes.

1.1.4 The system shall display a button with the label “Enter Site” for the end-user to log into the system.

1.1.5 The system shall detect that the “Enter Site” button was selected.

1.1.6 The system will authenticate the end-user’s username and password.

1.1.7 The system shall display an error message in red above the username textbox to an unauthorized user.

1.1.7.1 The error message shall tell the unauthorized user to ensure that the correct username and password is entered.

1.1.7.2 The error message shall tell the unauthorized user the amount of incorrect log-in attempts that are allowed by the system administrator before the unauthorized user is locked out of the system.

1.1.7.3 The error message shall tell the unauthorized user to contact the system administrator when the user’s account is locked out of the system.

1.1.8 The system shall provide access to the Reservation System to a RSRV or an ACCT user.

1.1.9 The system shall provide access to the Accounting System to an ACCT user.

1.2 The system shall display a button labeled “Begin Reservation” to RSRV and ACCT users.

1.3 The system shall display a button labeled “Financial Data” to ACCT users.

3.2.2 User Class 2: RSRV users

3.2.2.1 Functional Requirement 2.1 : Search for Room Vacancy

Use Case 2.0 Search for a Room Vacancy

Pre-condition: The user has been verified as an authorized user of the reservation system. The end-user software has access to a network connection in order to access the reservation database. The system is ready to accept dates of reservation

Post-condition: The system will display available rooms for the requested dates and allow the end-user to select which rooms to reserve.

Actor Profile: The end-user is a bed and breakfast staff member with authorization to use the reservation system.

Sequence of Events

1. A customer calls the bed and breakfast or visits in-person.
2. A staff member answers the phone call or greets the customer at the front desk.

3. Customer provides the staff member with the date(s) of reservation.
4. Staff member logs into the system and selects the “Reservation” button on the screen.
5. Staff member enters date(s) of reservations and clicks the “Search” button.

User Scenario for Search for a Room Vacancy Use Case

User scenario 1: Initiate Reservation

1. System displays “Begin Reservation” button to authorized user.
2. End-user selects “Begin Reservation” button.
3. System displays options to select a start date and an end date for the reservation.

User scenario 2: Search for Vacancy

1. Customer gives end-user desired date(s) of reservation.
2. Authorized user enters date(s) of reservation.
3. Authorized user selects “Search” button
4. System displays vacant rooms.

Requirement 2.1: Search for a Room Vacancy

2.1 The system shall display a button with the label “Begin Reservation” to an authorized user.

2.1.1 The system shall detect that the “Begin Reservation” button is selected.

2.1.2 The system shall respond by creating two Date objects for the start date and the end date of the reservation.

2.2 The system shall display menus for selecting the start date and the end date for the reservation.

2.2.1 The start date for the reservation shall be labelled “Start Date.”

2.2.1.1 The system shall display a drop-down menu containing each of the 12 months of the year.

2.2.1.2 The system shall display a drop-down menu containing the numbers 1 through 31 for the days of the month.

2.2.1.3 The system shall display a drop-down menu containing the current year and the next year.

2.2.2 The end date for the reservation shall be labelled “End Date.”

2.2.2.1 The system shall display the drop-down menu containing each of the 12 months of the year.

2.2.2.2 The system shall display a drop-down menu containing the numbers 1 through 31 for the days of the month.

2.2.2.3 The system shall display a drop-down menu containing the current year and the next year.

2.3 The system shall display a button labeled “Search.”

2.4 The system shall detect when the “Search” button is selected.

2.4.1 The system shall detect an incorrect number for the day of the month.

2.4.1.1 The system shall display an error message to tell the user to select the correct date for the month.

2.4.2 The system shall create a Date object for the start date.

2.4.3 The system shall create a Date object for the end date.

2.5 The system will process the Date objects to query the database.

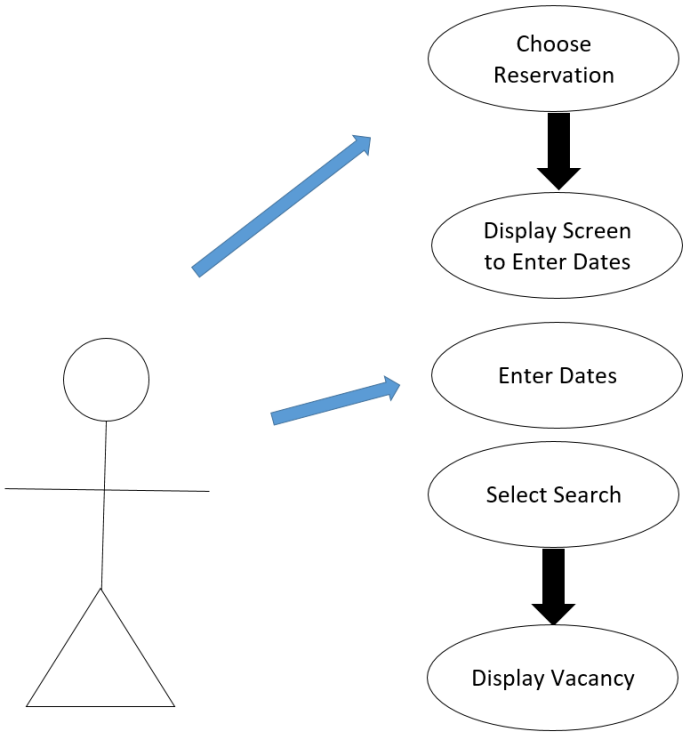
2.6 The database will provide the system with vacant rooms.

2.7 The system shall display room availability.

2.7.1 The system shall display a “No Vacancy” message in red when all rooms are reserved.

2.7.2 The system shall display each available room.

2.8 The system shall display a checkbox next to each available room for customer selection.



Data Flow Diagram for Search for a Room Vacancy

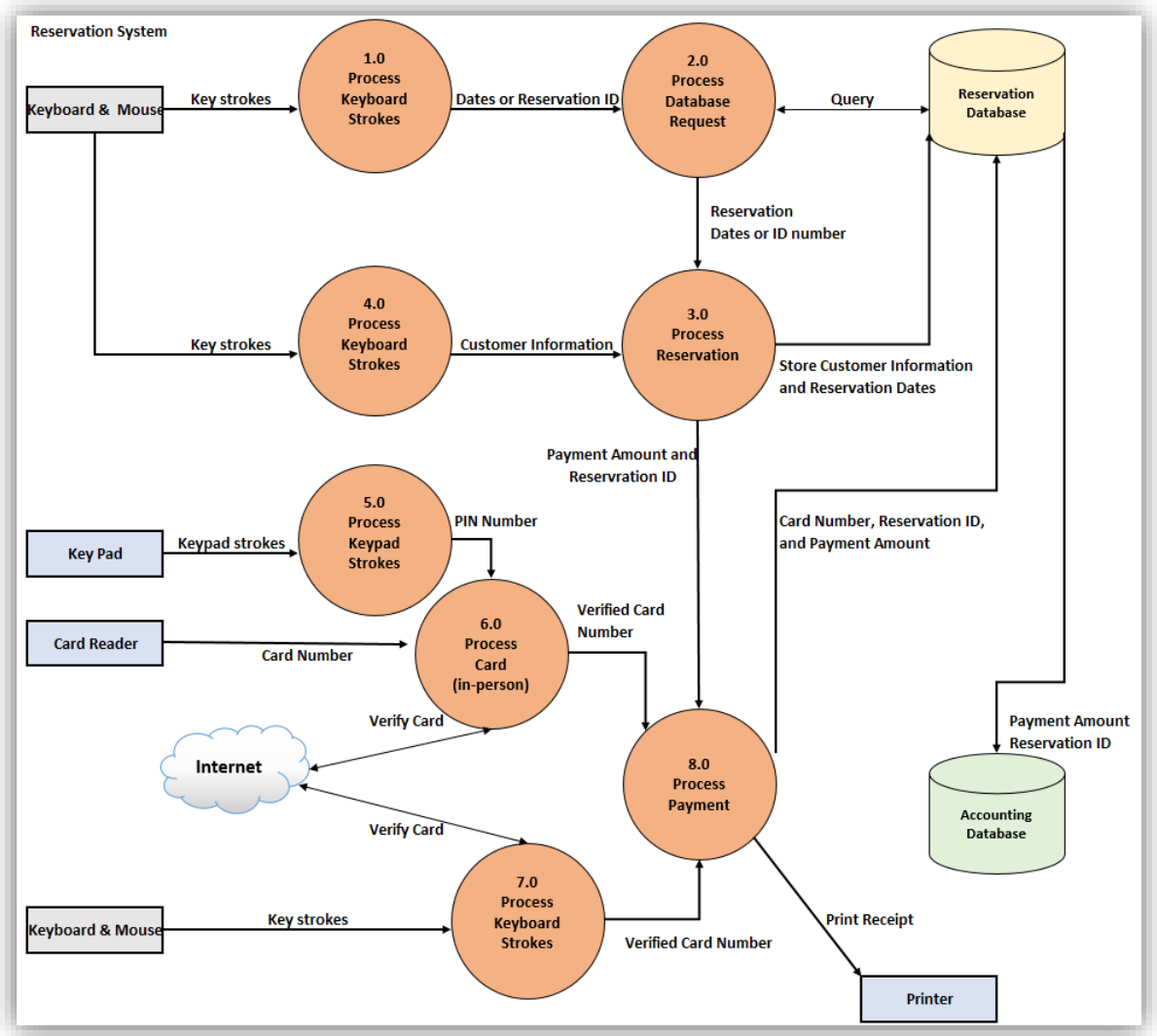


Figure 2. Data Flow Diagram for Reservation System. Process 1.0 and 2.0 show data flow for Use Case 2.0 Search for Room Vacancy.

3.2.3 User Class 3: ACCT users

3.2.3.1 Functional Requirement 3.1 : Search for Financial Data

Use Case 3.0 : Search for Financial Data

Precondition: The software is ready and has a network connection. The ACCT end-user is logged into the system. The user interface displays the option to select Reservation information or Financial Information.

Post-condition: The system will display the financial data that meets the user's search requirements or an error message.

Actor Profile: A staff member with ACCT authorization needs to access financial data about net income.

Sequence of Events
1. A staff member needs to view financial data for the bed and breakfast.
2. The staff member logs into the system
3. The staff member has ACCT authorization and selects the financial database option.
4. The staff member searches for financial data.

User Scenario for Search for Financial Data

Scenario 1: Access Accounting Database search
1. End-user selects "Financial Data" option.
2. System displays screen for user to enter date ranges to look for information.

Scenario 2: Initiate Accounting Database search
1. End-user enters a start date and an end date into the system.
2. End-user selects the "Search" option.
3. System displays data on income, expenses, and net profit.
4. System displays an option to print financial data.

Requirement 3.1: Search for Financial Data

3.1 The system shall display two option to ACCT end-users.

3.1.1 The system shall display a button labeled "Begin Reservation."

3.1.2 The system shall display a button labeled "Financial Data."

3.2 The system shall detect which button is selected by the end-user.

3.3 The system shall respond to a "Financial Data" button selection by creating two Date objects for starting date and ending date.

3.3.1 The start date for the reservation shall be labelled "Start Date."

3.3.1.1 The system shall display a drop-down menu containing each of the 12 months of the year.

3.3.1.2 The system shall display a drop-down menu containing the numbers 1 through 31 for the days of the month.

3.3.1.3 The system shall display a drop-down menu containing the current year and the next year.

3.3.2 The end date for the reservation shall be labelled "End Date."

3.3.2.1 The system shall display the drop-down menu containing each of the 12 months of the year.

3.3.2.2 The system shall display a drop-down menu containing the numbers 1 through 31 for the days of the month.

3.3.2.3 The system shall display a drop-down menu containing the current year and the next year.

3.4 The system shall display a button labeled “Search.”

3.5 The system shall detect when the “Search” button is selected.

3.5.1 The system shall detect an incorrect number for the day of the month.

3.5.2 The system shall display an error message to tell the user to select the correct date for the month.

3.5.3 The system shall create a Date object for the start date.

3.5.4 The system shall create a Date object for the end date.

3.6 The system shall retrieve all financial data between the starting and ending dates when the “Search” button is selected.

3.7 The system shall display all financial data to the user.

3.7.1 The system shall display a title called “Income” in bold letters.

3.7.2 The system shall display all financial data related to Income below the “Income” title.

3.7.3 The system shall display a title called “Expenses” in bold letters.

3.7.4 The system shall display all financial data related to Income below the “Expenses” title.

3.7.5 The system shall display a title called “Net Profit” in bold letters.

3.7.6 The system shall calculate net profit.

3.7.7 The system shall display the calculated net profit value.

3.8 The system shall display a button labeled “New Search” at the top and bottom of the displayed data.

3.9 The system shall detect when the “New Search” button is selected.

3.9.1 The system will clear the screen of existing financial data.

3.9.2 The system will return to step **3.3** and repeat the same process.

3.10 The system shall display a button labeled “Print” at the top and bottom of the displayed data.

3.11 The system shall detect when the “Print” button is selected.

3.11.1 The system will print the financial data.

Data Flow Diagram for Use Case 3.0 Search for Financial Data

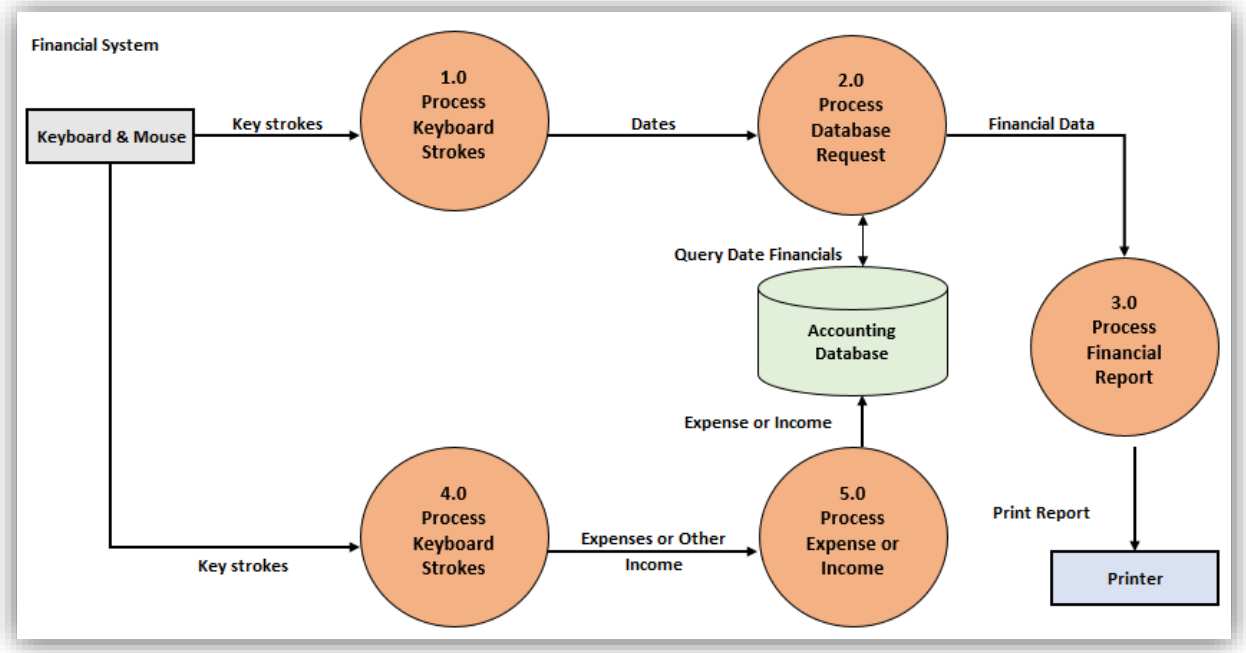


Figure 3. Data flow diagram (Level 1) for Financial System. Processes 1.0, 2.0, and 3.0 show the flow of data for Use Case 3.0 Search for Financial Data.

3.3 Logical database requirements

The DBMS will use authentication to verify an end-user's credentials. After verification, the DBMS will provide the user with access to customer information, room availability, and/or financial data, as described below.

Customer Information: The customer's name, customer ID number, address, phone number, reservation ID number, reservation guarantee, reservation cost, room number, and customer credit card number will be stored

Room Availability: Each room's vacancy status over the next 365-day period. Completed reservations for the preceding 365-day period will also be stored.

Financial Data: Expenses for wages and other expenses will be stored. Each expense object will contain a transaction ID number, the amount paid, payee ID number, check number, date of payment, services provided, authorization number, as well as payee contact information.

The DBMS will transfer reservation ID number, reservation cost, and reservation guarantee information from the reservation database to the accounting database. All financial data in the accounting database can be transferred to the user interface of the end-user software for an ACCT user.

The Entity-Relationship Diagrams in Figures 4 and 5 show the entities and attributes of the Reservation and Accounting Systems.

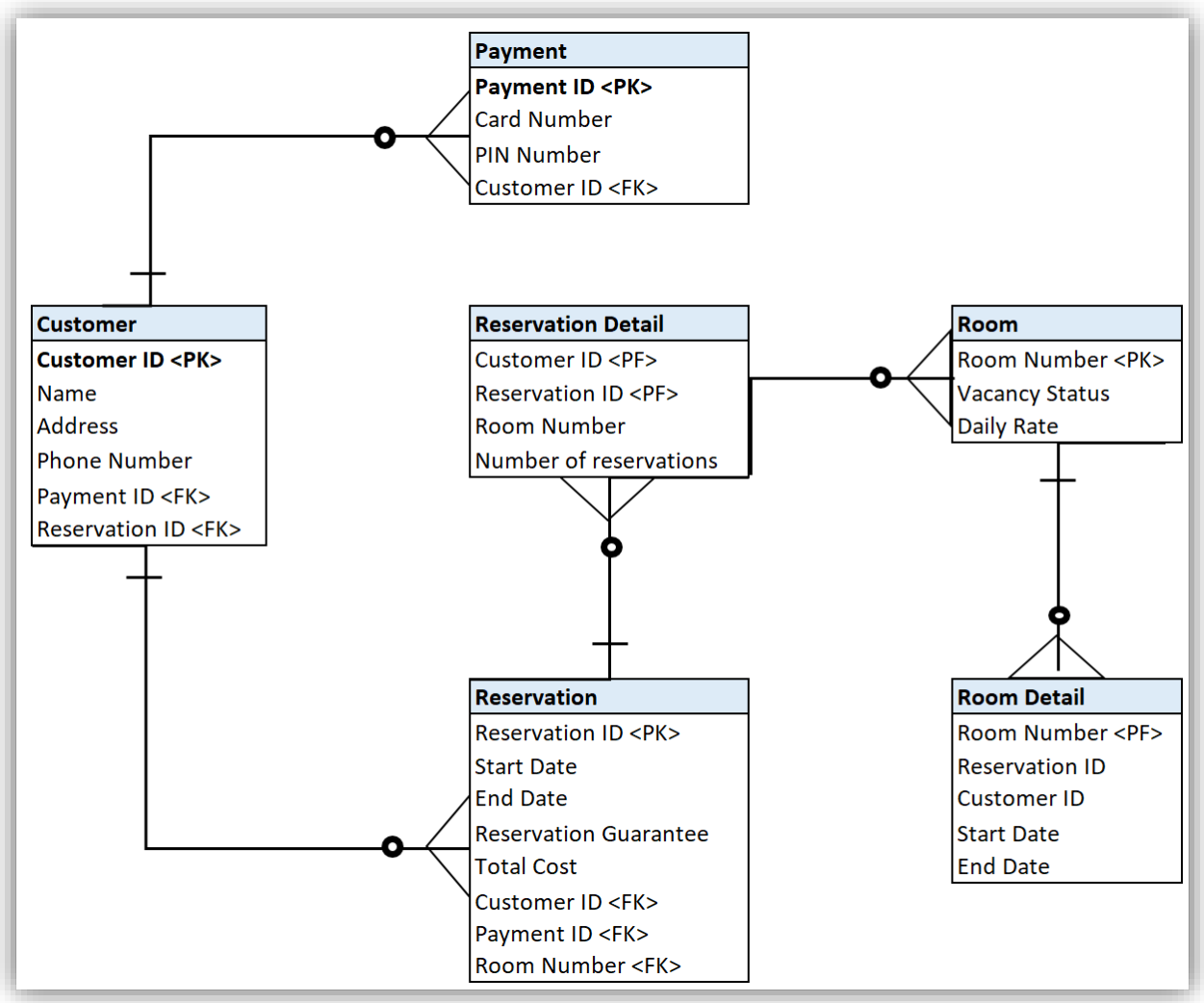


Figure 4. Entity-Relationship Diagram of Reservation System

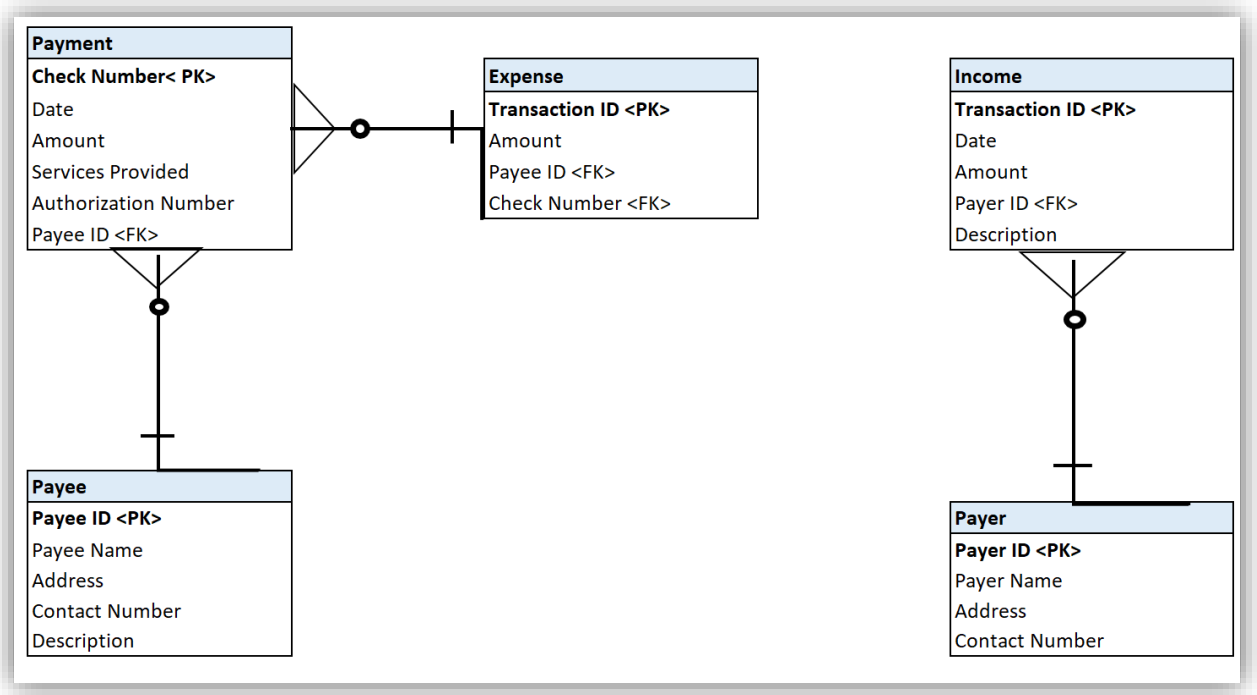


Figure 5. The entity-relationship diagram for the Accounting System.

3.4 State Diagram