SOFTWARE REQUIREMENTS SPECIFICATION

Bed-and-Breakfast Management System

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1. Introduction

1.1. Purpose

The purpose of this document is to outline the requirements for a software system designed to manage a small bed and breakfast. This includes checking availability, taking reservations, storing customer information, and monitoring profits and expenses. This document is intended for the developers of the software and the clients for whom the software is intended.

1.2. Scope

The application being developed is called the Bed-and-Breakfast Management System (BBMS).

The BBMS will be used by employees and managers of the bed-and-breakfast. The system will help manage and keep track of booking rooms for guests, store this information, and monitor profits and expenses such that it will replace the need for a paper record/calendar system.

The capabilities of the BBMS are as follows

- Contains a calendar that tracks the availability of each room
- Allows the user to check the calendar and see the available rooms on each date
- Allows the user to view the status of each room on a particular date
- If a room is reserved, then the user can check the information about the guest
- If a room is not reserved, the user can create a reservation
- A room can be reserved until the guarantee deadline
- If the cost of one day's use is paid before the guarantee deadline, then the room is guaranteed.
- If a room is not guaranteed by the guaranteed deadline, it becomes available
- Payments can be tracked for each reservation
- Customer information will be stored securely in a database
- Profits from each room rental will be tracked and reviewable
- Expenses for each room will be able to be tracked and reviewable

1.3. Definitions, Acronyms, Abbreviations

1.3.1 BBMS: This is an acronym that stands for Bed & Breakfast Management System.

1.3.2 guaranteed: An agreement between the owner and a guest that a room will be available for use upon the agreed upon time made after the first day's payment is received.

1.3.3 guarantee deadline: A chosen time period that a guest must pay for one day of a reservation before it becomes guaranteed.

1.3.4 reservation: An agreed upon date and room that will be held for a customer until it is guaranteed.

1.4. References

IEEE Guide for developing system requirements specifications. (1998). IEEE Std 1233-1998. https://doi.org/10.1109/IEEESTD.1998.88826

IEEE Recommended practice for software requirements specifications. (1998). IEEE Std 830-1998. https://doi.org/10.1109/IEEESTD.1998.88286

UMGC. (n.d.). *Module 2: Requirements engineering and modeling*. [CMIS 330 Course material]. Retrieved September 29, 2021, from https://learn.umgc.edu/d2l/le/content/613803/viewContent/22437382/View

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1.5. Overview

The rest of this document contains the following

- A description of the software
- Specific requirements of the software
- Level 0 Data Flow Diagram
- Level 1 Data Flow Diagram
- Use Case Diagrams
- Class Diagram
- Entity Relationship Diagram
- State Diagram

2. Overall Description

2.1. Product Perspective

The BBMS is self-contained within a single computer system located within the client's Bed-and-Breakfast management office and will be used to assist management operations.

2.1.1 System Interfaces

The BBMS will be self-contained on a single computer and will not be part of a larger system.

2.1.2 User Interfaces

User interfaces consist of the following

- Main Menu Interface – This interface is the first interface the user will interact with while using BBMS. It shall provide options to select the other interfaces they wish to see, calendar, room, reservation, or budget interface.

- Calendar Interface – This interface shall provide a calendar for each day of the selected year. It shall provide an easy to view availability of each room on that day. It shall provide access to the room interface.
- Room Interface – This interface shall provide information about the room on the selected date. This shall include availability, reservation information, guest information. It shall provide access to the reservation interface, calendar interface, and main menu interface.
- Reservation Interface – This interface shall allow the user to enter the guest information and allow a reservation to be created or removed. It shall provide a guarantee deadline to be set. It shall provide the ability to enter financial information and perform payments. It shall provide access to the reservation interface, calendar interface, and main menu interface.
- Budget interface – This interface shall allow the user to enter expenses for each room per day. It shall allow the user to see the profits and expenses for the room per day, per week, per month, and per year. It shall also allow the user to see the profits and expenses for all rooms together per day, per week, per month, and per year. It shall provide access to the main menu interface.
- Database Management Interface – This interface will allow the user to create the database, modify, retrieve, and manage data within the database.

2.1.3 Hardware Interfaces

Hardware interfaces consist of the following

- Personal Computer – Computer system will have efficient memory to run the BBMS software.
- Backup Hard Drive – Database should be backed up on a separate hard drive.
- Keyboard – Keyboard will be used to enter data into the system.
- Mouse – Mouse will be used to provide functionality of the BBMS.

2.1.4 Software Interfaces

Software interfaces consist of the following

- Windows operating system – The BBMS will be accessed from within the operating system.
- BBMS – The software that will be used to provide the user interfaces necessary for operation of the BBMS.
- Database management system – The database management system will be used to provide a database that can be accessed to store and retrieve data by the BBMS.

2.1.5 Communications Interfaces

There will be one communications TCP/IP local interface to connect the BBMS with the database.

2.1.6 Operations

Operations include the following user-initiated operations

- Inputting data
- Retrieving and viewing data
- Storing data
- Processing transactions

2.2. Product Functions

The primary functions of BBMS are as follows

- Return the availability of each room on each day
- Reserve the room for a guest
- Remove a reservation for a room
- Set a guarantee deadline for a reservation
- Process a payment for a select number of days
- Input expenses for a room
- Display profits and expenses for a room for a select timeframe

See Appendix A and B for a Data Flow Diagrams.

2.3. User Characteristics

The users of BBMS will be the managers or employees of the Bed-and-Breakfast. They will be required to have basic computer knowledge and skills. This will include the ability to use an operating system and understand how to enter input into forms using a mouse and a keyboard.

See Appendix C for Use Case Diagrams.

2.4. Constraints

The BBMS is self-contained and will be used within the context of the Bed-and-Breakfast. Customers of the Bed-and-Breakfast will not be able to access it via online means to check for availability or make reservations. Customers will call the Bed-and-Breakfast and speak with the users of the BBMS to find availability and make reservations.

2.5. Assumptions and Dependencies

The BBMS will operate under these assumptions and dependencies. The first is that the Bed-and-Breakfast will contain a computer system that uses the Windows operating system to install the software and database management software on. The second is that the user will operate the BBMS from the Bed-and-Breakfast using a phone system to interact with customers.

3. Specific Requirements

3.1 External Interface Requirements

The following sections describe in more detail from a design perspective each interface that will be needed for the BBMS.

3.1.1 User Interfaces

3.1.1.1 Main Menu Interface – This interface is the first interface the user of BBMS will use.

- This interface shall consist of four buttons each button will open a different interface for the user.
- The interfaces that shall be accessed are as follows
    - Calendar interface
    - Room interface
    - Reservation interface
    - Budget interface

3.1.1.2 Calendar Interface – This interface shall provide an interactive yearly calendar for the user to quickly view available rooms.

- This interface will be a visual representation of a calendar.
- This interface shall open on the current month of the current year.
- This interface shall have the ability to switch to a select month and a select year.
- This interface shall show the four rooms on each day and mark them visually to notify the user if they are available or not available.
- This interface shall allow the user to select an available room and open the reservation interface.
- This interface shall allow the user to select any room and open the room interface.
- This interface shall have a button to access the main menu interface.

3.1.1.3 Room Interface – This interface shall provide the user the ability to select and view information on room

- This interface shall allow the user to select between four different rooms.
- This interface shall allow the user to select a specific date.
- This interface shall retrieve and display the room information for the selected room on a selected date.
- This interface shall display the room and date from the calendar interface when accessed from the calendar interface.
- This interface shall show the availability of the room on selected date.

- This interface shall show guest information on selected date if the selected room is reserved.
- This interface shall allow the user to access the reservation interface for an available room.
- This interface shall allow the user to remove a reservation.
- This interface shall have a button to access the calendar interface.
- This interface shall have a button to access the main menu interface.

3.1.1.4 Reservation Interface – This interface shall provide the user the ability to reserve a room, set a guarantee deadline, and perform financial transactions.

- This interface shall allow the user to select between four rooms.
- This interface shall allow the user to select a specific date.
- This interface shall not allow reservations when the date and room selected already has a reservation.
- This interface shall display the room and date from the calendar interface when accessed from the calendar interface.
- This interface shall display the room and date from the room interface when accessed from the room interface.
- This interface shall have a feature to select the date range for the reservation.
- This interface shall allow the user to enter guest information for a reservation.
- This interface shall allow the user to enter a guarantee deadline.
- This interface shall allow the user to enter financial information of the guest.
- This interface shall have a button to store the information.
- This interface shall have a button to process a financial transaction.
- This interface shall have a button to access the calendar interface.
- This interface shall have a button to access the room interface.
- This interface shall have a button to access the main menu interface.

3.1.1.5 Budget Interface – This interface shall allow the user the ability to add expenses for selected rooms and view the profits for selected rooms for a selected time frame.

- This interface shall have buttons to select from one to four rooms.
- This interface shall have options to select between day, week, month, year.
- This interface shall show the profits, expenses, and revenue for each selected room during the selected time frame.
- This interface shall allow the user to enter an expense amount and type for a selected room on a selected day.
- This interface shall have a button to access the main menu interface.

3.1.2 Hardware Interfaces

The keyboard and mouse will be used to enter data and retrieve data within the BBMS software.

3.1.3 Software Interfaces

The BBMS software and the database management software shall be installed on the Windows operating system.

3.1.4 Communications Interfaces

Using the database management software, a TCP/IP local network interface shall be set up to allow BBMS to access the database.

3.2 Classes/Objects

The following provides the classes that the BBMS shall use to provide functionality.

See Appendix D for a Class Diagram.

3.2.1 Room Class

3.2.1.1 Attributes

3.2.1.1.1 private int: roomNumber

3.2.1.1.2 private boolean: available

3.2.1.2 Functions

3.2.1.2.1 private int: getRoomNumber()

Returns the room number

3.2.1.2.2 private void: setRoomNumber()

Sets the room number

3.2.1.2.3 private boolean: getAvailable()

Gets the boolean available

3.2.1.2.3 private void: setAvailable()

Sets the boolean available

3.2.2 Reservation Class

3.2.2.1 Attributes

3.2.2.1.1 private int: reservationID

3.2.2.1.2 private string: startDate

3.2.2.1.3 private string: endDate

3.2.2.1.4 private int: reservedRoomNumber

3.2.2.1.5 private int: guestIDNumber

3.2.2.1.6 private string: guaranteeDeadline

3.2.2.1.7 private boolean: guaranteed

3.2.2.1.8 private double: totalBill

3.2.2.1.9 private double: paidAmount

3.2.2.2 Functions

3.2.2.2.1 private int: getReservationID

Returns the reservationID

3.2.2.2.2 private void: setReservationID

Sets the value of reservationID

3.2.2.2.3 private string:g etStartDate

Returns startDate

3.2.2.2.4 private void: setStartDate

Sets the value of startDate

3.2.2.2.5 private string: getEndDate

Returns endDate

3.2.2.2.6 private void: setEndDate

Sets the value of endDate

3.2.2.2.7 private int: getReservedRoomNumber

Returns reservedRoomNumber

3.2.2.2.8 private void: setReservedRoomNumber

Sets the value of reservedRoomNumber

3.2.2.2.9 private int: getGuestIDNumber

Returns guestIDNumber

3.2.2.2.10 private void: setGuestIDNumber

Sets the value of guestIDNumber

3.2.2.2.11 private string: getGuaranteeDeadline

Returns guaranteeDeadline

3.2.2.2.12 private void: setGuaranteeDeadline

Sets the value of guaranteeDeadline

3.2.2.2.13 private boolean: getGuaranteed

Returns guaranteed

3.2.2.2.14 private void: setGuaranteed

Sets the value of guaranteed

3.2.2.2.15 private double: getTotalBill

Returns totalBill

3.2.2.2.16 private void: setTotalBill

Sets the value of totalBill

3.2.2.2.17 private double: getPaidAmount

Returns paidAmount

3.2.2.2.18 private void: setPaidAmount

Sets the value of paidAmount

3.2.2.2.19 private void: retrieveReservationData

Queries the database for a date and a room and returns the values from the database and sets the objects attributes to the data retrieved

3.2.2.2.20 private void: storeReservationData

Creates a database entry for the new reservation using the values that are set to this object as the parameters

3.2.2.3 Messages

This Class shall communicate with the database through a local port to collect and store the necessary data

3.2.3 Budget Class

3.2.3.1 Attributes

3.2.3.1.1 private array[array[double]]: expenses

3.2.3.1.1 private array[array[double]]: profits

3.2.3.2 Functions

3.2.3.2.1 private void: populateExpenses

Populates expenses array with data retrieved from the database for

Each day of the time frame, start date and end date are given as arguments

3.2.3.2.2 private void: populateProfits

Populates profits array with data retrieved from the database for

Each day of the time frame, start date and end date are given as arguments

3.2.3.3 Messages

This class shall retrieve data from the database only to determine the profits and expenses from each room.

3.2.4 Calendar Class

3.2.4.1 Attributes

3.2.4.1.1 private array[array[boolean]]: calendarDays

3.2.4.2 Functions

3.2.4.2.1 private array[boolean]: getAvailability

Returns the availability of each room when given a day as an argument

3.2.4.2.2 private void: populateCalendar

Populates calendarDays array with data retrieved from the database for

Each day of the month, month and year are given as arguments

3.2.4.3 Messages

This class shall retrieve data from the database only to determine if the rooms are available on every day of that month.

3.2.5 Guest Class

3.2.5.1 Attributes

3.2.5.1.1 private int: guestIDNumber

3.2.5.1.2 private string: firstName

3.2.5.1.3 private string: lastName

3.2.5.1.4 private string: address

3.2.5.1.5 private int: phoneNumber

3.2.5.1.6 private int: creditCardNumber

3.2.5.2 Functions

3.2.5.2.1 private int: getGuestIDNumber

Returns guestIDNumber

3.2.5.2.2 private void: setGuestIDNumber

Sets the value of guestIDNumber

3.2.5.2.3 private string: getFirstName

Returns firstName

3.2.5.2.4 private void: setFirstName

Sets the value of firstName

3.2.5.2.5 private string: getLastName

Returns lastName

3.2.5.2.6 private void: setLastName

Sets the value of lastName

3.2.5.2.7 private string: getAddress

Returns address

3.2.5.2.8 private void: setAddress

Sets the value of address

3.2.5.2.9 private int: getPhoneNumber

Returns phoneNumber

3.2.5.2.10 private void: setPhoneNumber

Sets the value of phoneNumber

3.2.5.2.11 private int: getCreditCardNumber

Returns creditCardNumber

3.2.5.2.12 private void: setCreditCardNumber

Sets the value of creditCardNumber

3.2.2.2.13 private void: retrieveGuestData

Queries the database for a guestIDNumber and returns the values from the database and sets the objects attributes to the data retrieved

3.2.2.2.14 private void: storeGuestData

Creates a database entry for the new Guest using the values that are set to this object as the parameters

3.2.5.3 Messages

This Class shall communicate with the database through a local port to collect and store the necessary data

3.3 Performance Requirements

The BBMS software shall have minimal performance requirements. The BBMS shall not have high data transference traffic. BBMS shall process one data transaction at a time. There shall be one user at a time using BBMS.

3.4 Design Constraints

The BBMS software is designed for use on local hardware. The BBMS software shall not have online capabilities. The BBMS software shall only have one user at a time.

3.5 Software System Attributes

Reliability – The database should be backed up onto another hard drive to maintain reliability in case of hardware failure.

Security – The database management software and database will be accessed by the Bed-and-Breakfast employees only. The database management software shall be accessed with a password. The only communications to the database shall be through the BBMS software.

3.6 Logistical Database Requirements

The following information will be contained within the database and accessed to provide data for various functions within the BBMS.

See Appendix E for an entity relationship diagram.

Guest Table

- Guest ID Number
- First Name
- Last Name
- Address
- Phone Number
- Credit Card Number

Reservation Table

- Reservation ID Number
- Guest ID Number
- Room Number

- Reservation Start Date
- Reservation End Date
- Total Bill
- Paid Amount
- Guarantee Deadline
- Guaranteed

Calendar Table

- Calendar Date
- Room 1 Reservation
- Room 2 Reservation
- Room 3 Reservation
- Room 4 Reservation
- Room 1 Expenses
- Room 2 Expenses
- Room 3 Expenses
- Room 4 Expenses

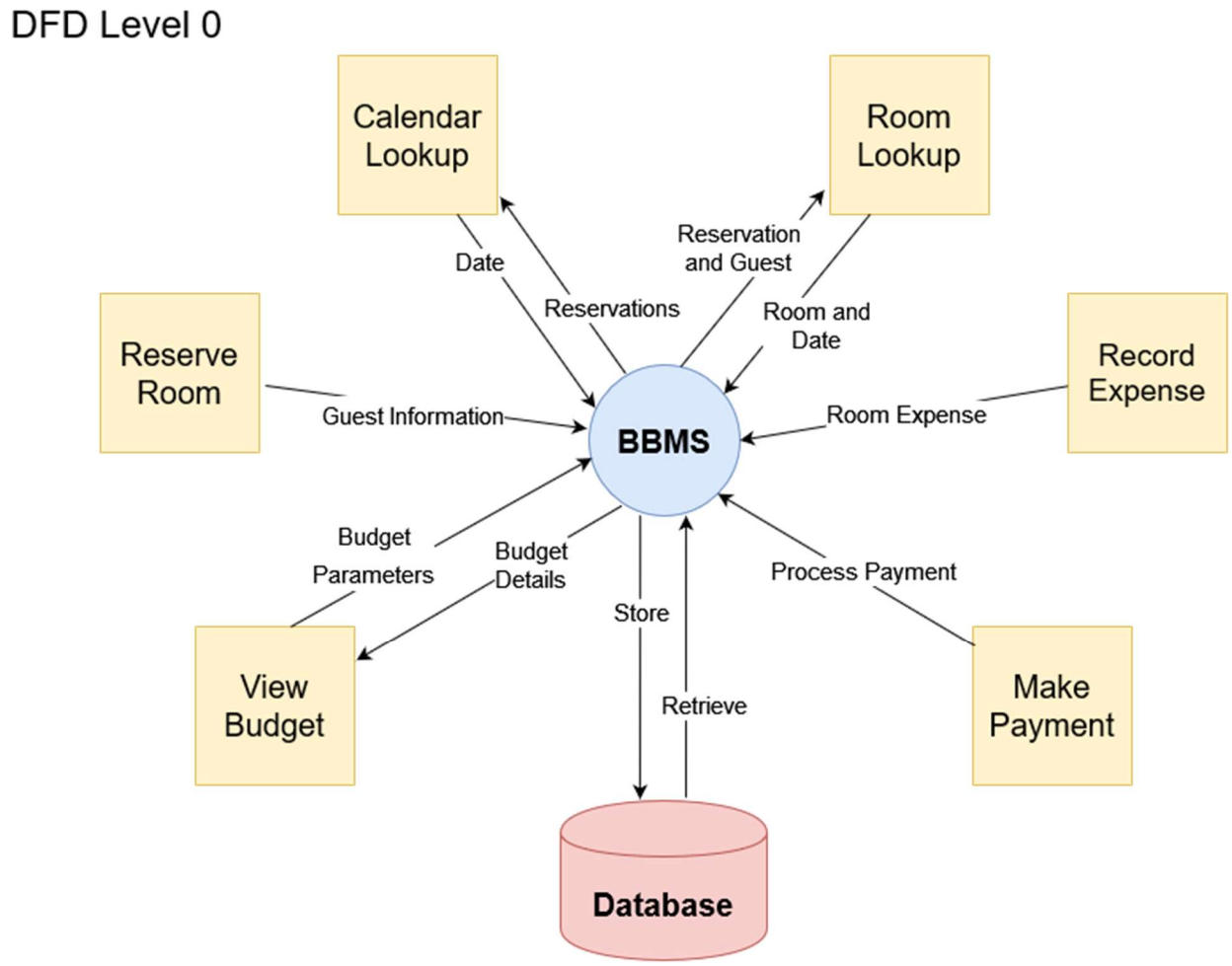
This data shall only be accessed through the BBMS software. Data retrieval from the database will be minimal with only one transaction per function call.

Appendixes

The following items in the appendix are to be considered part of the software requirements specification.

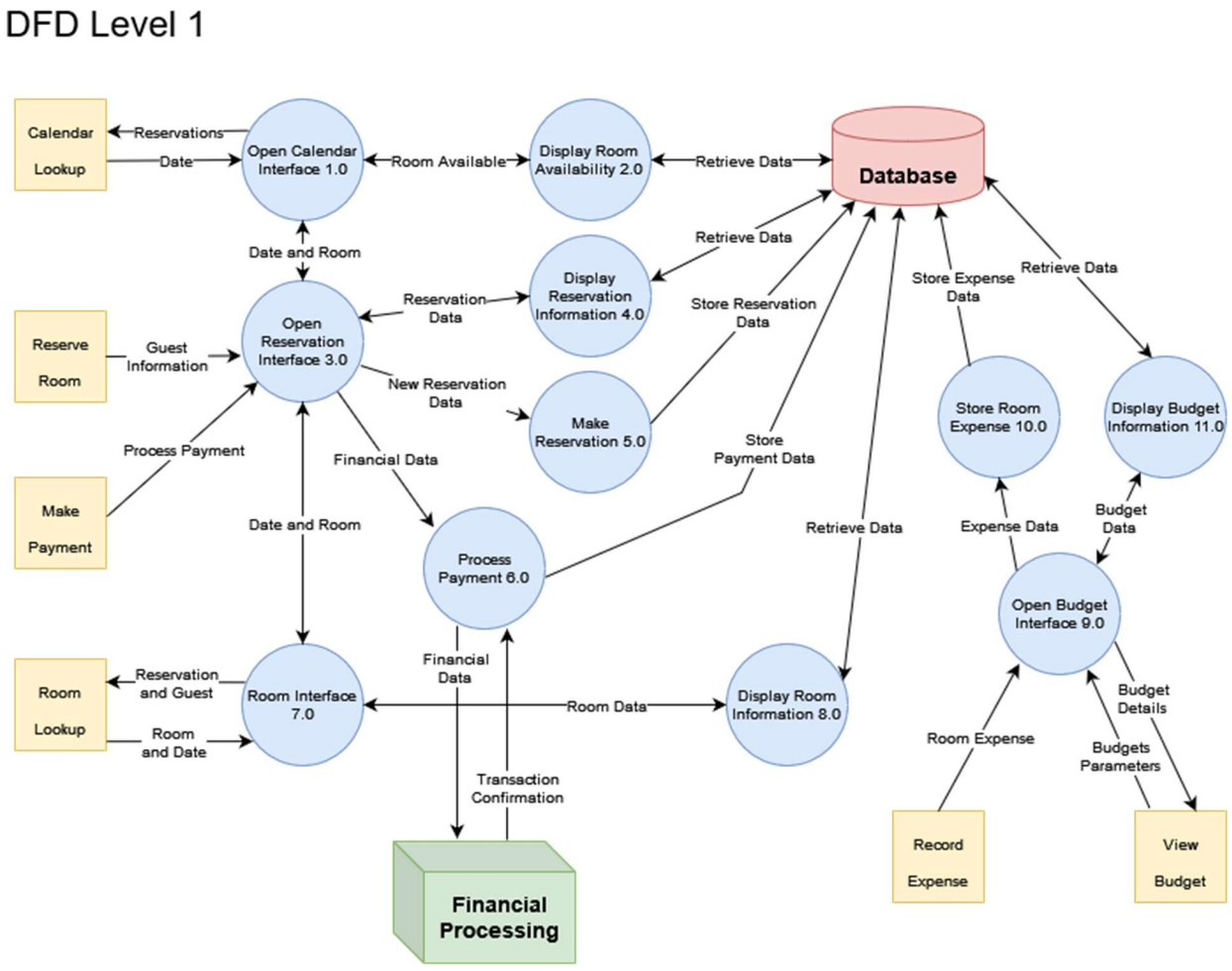
Appendix A

Data Flow Diagram Level 0



Appendix B

Data Flow Diagram Level 1



Appendix C

Use Cases with Use Case Diagrams

Use Case to Reserve a Room

Use Case 1.0: Reserve a room

A guest calls the Bed-and-Breakfast and asks for a reservation in one of the rooms for two days.

Precondition: The BBMS software must be running on the Bed-and-Breakfast's computer.

Post-condition: The reservation interface is open and ready to be used.

Actor Profile: The actor is the manager or employee of the Bed-and-Breakfast. They have been at the front desk and received a phone call for a reservation.

Sequence of Events:

1. Guest calls the Bed-and-Breakfast and asks to reserve a room.
2. Manager enters the date of the reservation and verifies an available room.
3. Manager enters the guest information.
4. Manager enters the guarantee deadline.
5. Manager confirms the reservation and stores the data into the database.

User Scenario for the Reserve a Room Use Case

User scenario 1: Check the availability

1. Manager enters the dates of the reservation.
2. Manager verifies that there is a room available.

User scenario 2: Enter the guest information

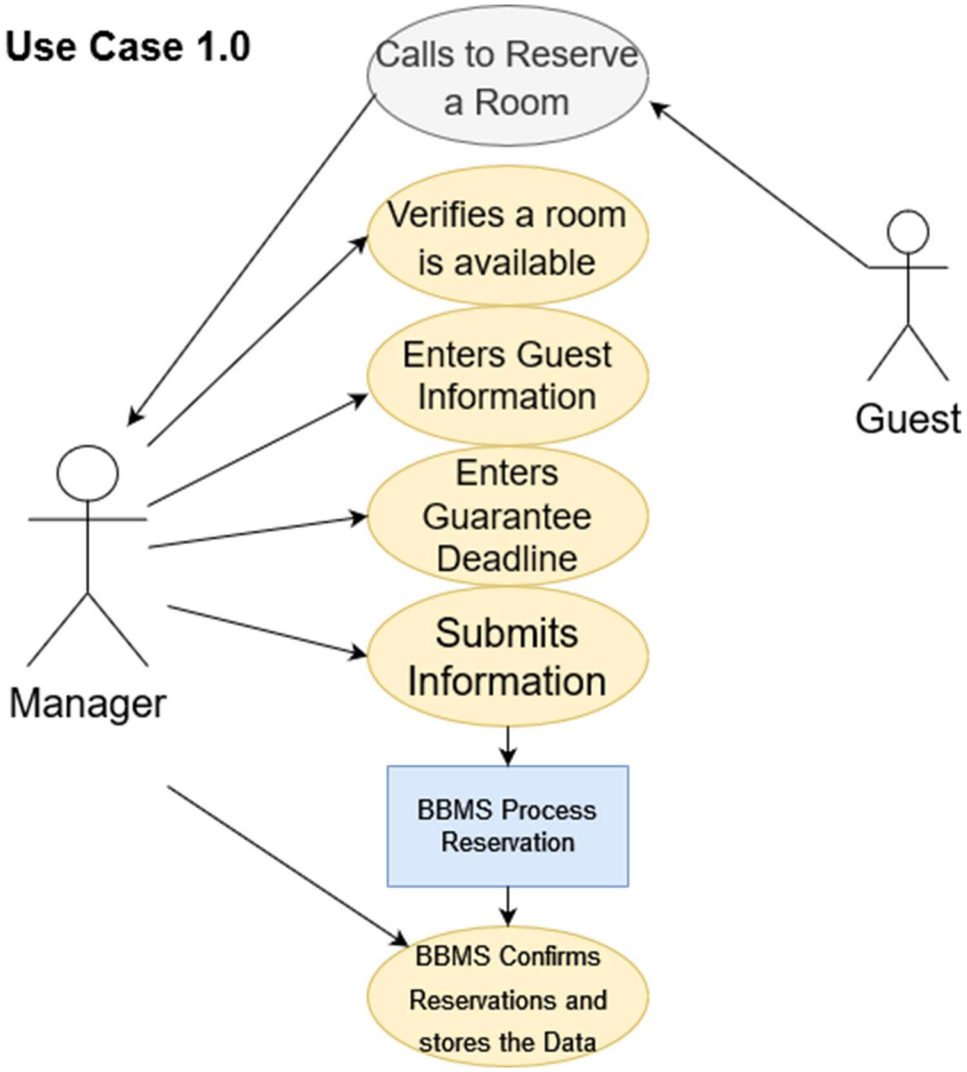
1. Manager enters the name of the guest.
2. Manager enters the address of the guest.
3. Manager enters the phone number of the guest.

User scenario 3: Enter guarantee deadline

1. Manager asks the guest for the timeline to pay the first day fee.
2. Manager enters the date that will be the guarantee deadline.

User scenario 2: Complete the reservation

1. Mangers presses the button to complete the reservation.
2. Manager checks for error notifications.
3. Manager receives the confirmation notification.
4. Manager tells guest the reservation has been made.



Use Case to Guarantee a Reserved Room

Use Case 2.0: Guarantee a reserved room

A guest calls the Bed-and-Breakfast and asks to make a payment and guarantee their reservation.

Precondition: The BBMS software must be running on the Bed-and-Breakfast's computer.

Post-condition: The BBMS reservation interface is open, and the guest's reservation is open.

Actor Profile: The actor is the manager or employee of the Bed-and-Breakfast. They have been at the front desk and received a phone call to make a payment and guarantee a guest's reservation.

Sequence of Events:

1. Guest calls the Bed-and-Breakfast and asks to guarantee their reservation.
2. Manager enters the guest's credit card information.

3. The BBMS software saves the information and sends the transaction.
4. The financial institution authorizes the transaction.
5. The BBMS software updates the data and confirms that the room has been guaranteed.

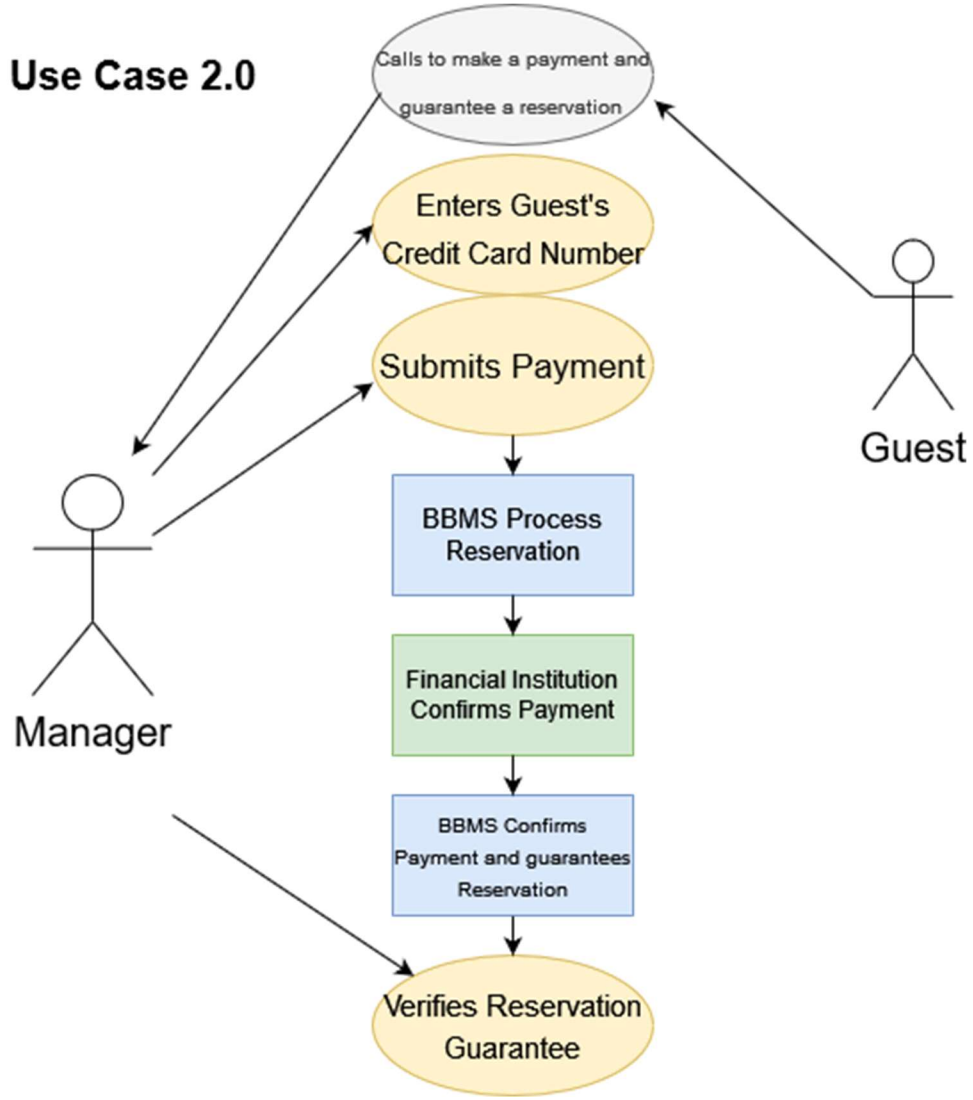
User Scenario for the Reserve a Room Use Case

User scenario 1: Enter the financial information

1. Manager enters credit card information.
2. Manager submits financial information to be processed.

User scenario 2: Confirm transaction

1. The financial institute will authorize the transaction.
2. If the transaction is valid, then BBMS will update the data to reflect payment.
3. Manager verifies that the reservation is guaranteed.



Use Case to Enter Room Expense and Check Revenue

Use Case 3.0: Enter room expense and check revenue

Manager enters a rooms expense after room upkeep. Then the Manager wants to review the revenue for that room.

Precondition: The BBMS software must be running on the Bed-and-Breakfast's computer.

Post-condition: The Budget interface is open, and room selected.

Actor Profile: The actor is the manager or employee of the Bed-and-Breakfast. They have expended money to clean and replenish a room. They wish to enter the expense and see the revenue for that room.

Sequence of Events:

1. The manager Enters the expense for the Room.
2. Then the manager submits the expense.
3. The BBMS software updates the data for that room.
4. The manager then selects the room, and a time frame.
5. The manager presses the button to view the revenue.
6. The BBMS software displays the screen with the profits, expenses, and revenue for that time frame.

User Scenario for the Reserve a Room Use Case

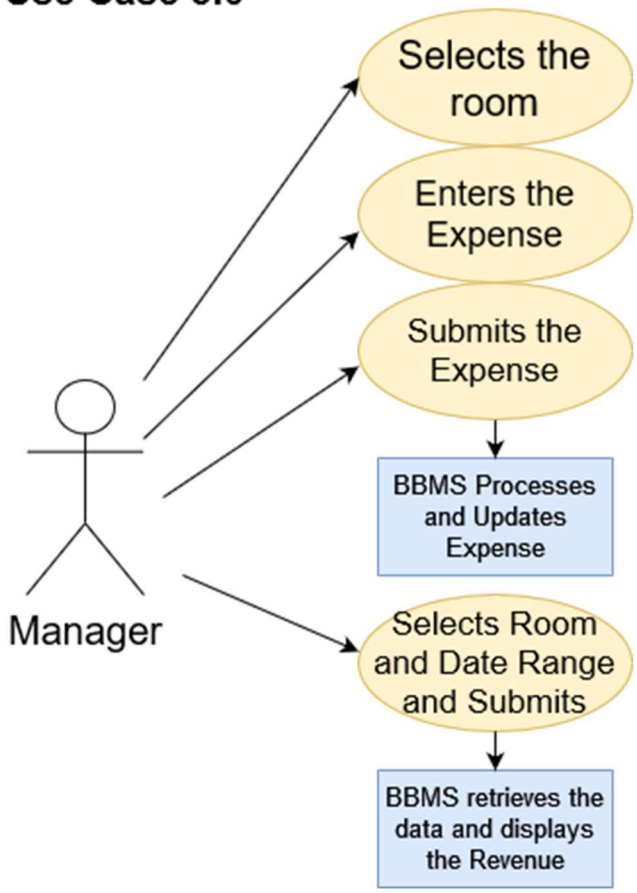
User scenario 1: Update the expense

1. Manager selects the room.
2. Manager enters the amount of the expense.
3. Manager presses the submit button and update the data.

User scenario 2: View the revenue of the room

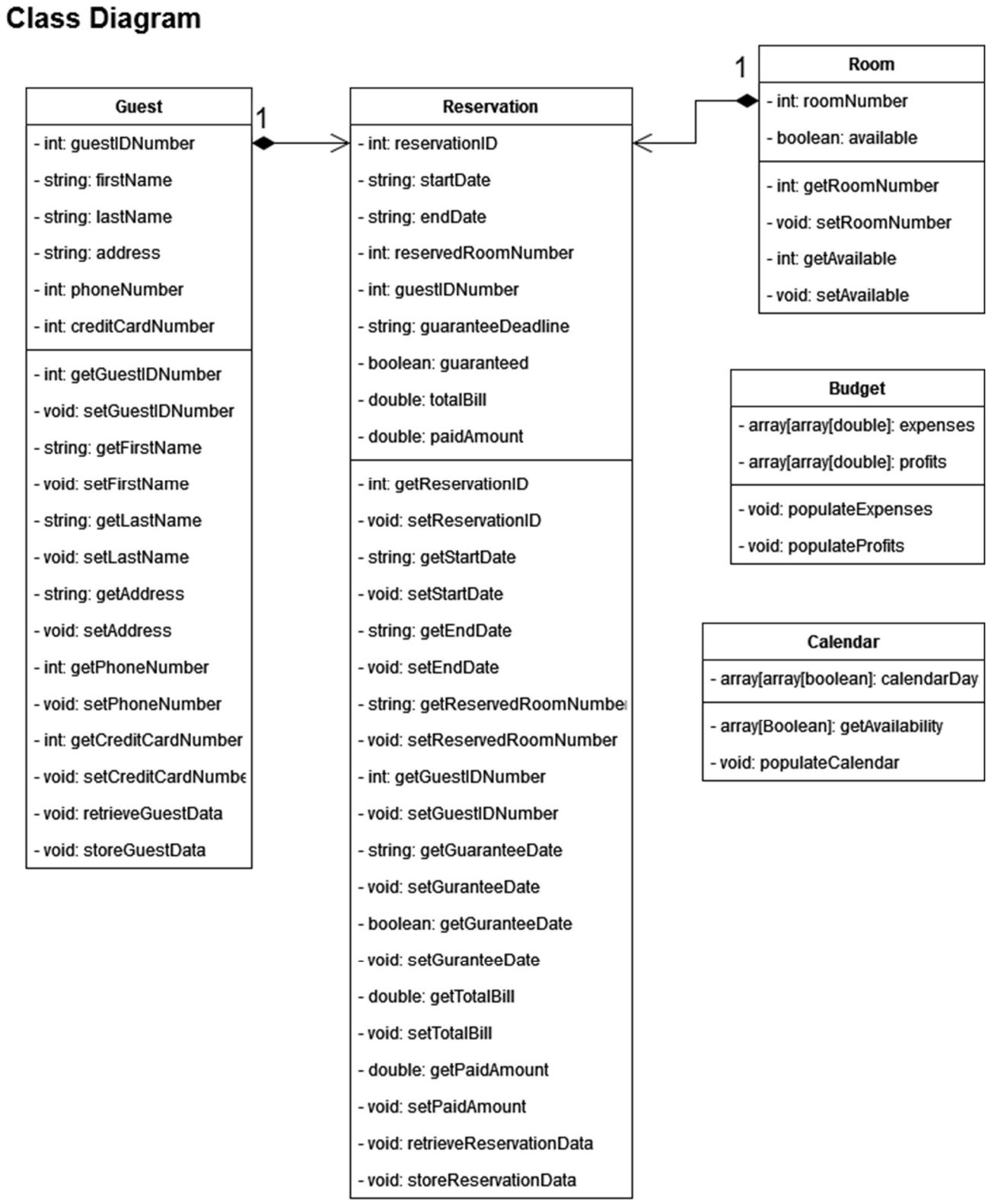
1. Manager selects the room.
2. Manager selects the time frame.
3. Manager submits the query.
4. The BBMS software displays the screen with the profits, expenses, and revenue.

Use Case 3.0


Selects the room
Enters the Expense
Submits the Expense
BBMS Processes and Updates Expense
Manager
Selects Room and Date Range and Submits
BBMS retrieves the data and displays the Revenue

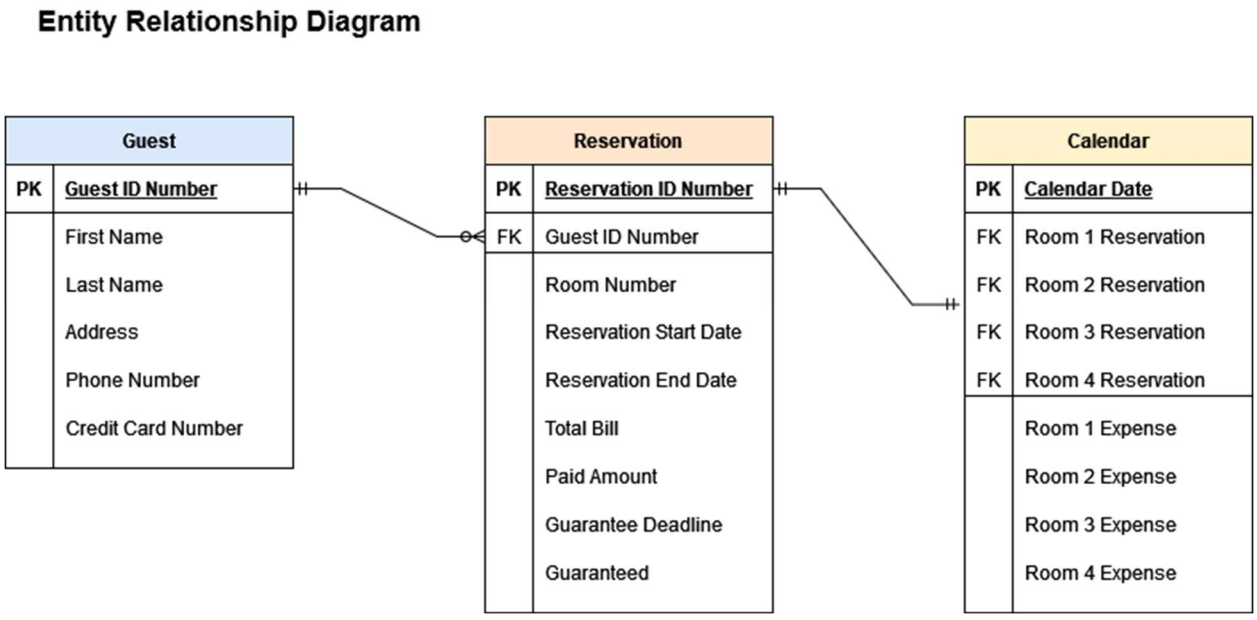
Appendix D

Class Diagram



Appendix E

Entity Relationship Diagram



Appendix F

State Diagram