Software Design Document (SDD)
John and Jane Bed and Breakfast Reservation Manager (BBRM)

CMIS 330 6380 Software Engineering Principles and Techniques (2215)
SDD Project 2

Version <1.0>

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Change History

Date	Version	Description
06-15-21	<1.0>	First version of document

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1. Introduction

1.1 Purpose

The purpose of this Software Design Document shall be to provide descriptions of the design of the Bed and Breakfast reservation manager, based on the requirements specified by John and Jane, so enough understanding of how the software shall be built is established in order to begin development of a prototype for the Bed and Breakfast reservation manager.

1.2 Scope

This Document shall describe the design of the Bed and Breakfast reservation manager on the base level of the software from the data, architecture, interface, and procedure design viewpoints. This Document shall describe the data structures used to create, read, update, and delete reservations in the database. It shall describe the data flow through the system and maps this data into the structure of the program. It shall describe the interfaces used between components of the system and between the user and the system. It shall describe the procedures used to perform the tasks specified in the requirements for the Bed and Breakfast Reservation Manager.

1.3 Context

This document shall address the design decisions and guidelines in developing the reservation manager system for John and Jane's Bed and Breakfast. The designs were made to meet the customer requirements derived from John and Janes statement of need.

Statement of Need

John and Jane are starting a bed-and-breakfast (B&B) in a small New England town. They will have four bedrooms for guests. They want a system to manage the reservations and to monitor expenses and profits. When a potential customer calls for a reservation, they will check the calendar, and if there is a vacancy, they will enter the customer name, address, and phone number, dates, agreed upon price, credit card number, and room numbers. Reservations must be guaranteed by 1 day's payment. Reservations will be held without guarantee for an agreed upon time. If not guaranteed by that date, the reservation will be dropped.

1.4 Summary

Design viewpoint	**Design concerns**
Data (4.2)	Data structures and system inputs and outputs
Architecture (4.4)	Structure style and data flow of reservation manager
Interface (4.6)	Component - component interface and Human - component interface
Procedure (4.8)	Algorithms; sequences and conditions

2. References

Institute of Electrical and Electronics Engineers. Standard for Information Technology — System Design — Software Design Descriptions, (ANSI IEEE Standard 1016-2009.) New York: IEEE, 2009.

3. Glossary

Name	**Description**
customer, user	John and Jane
clients	Johna and Jane’s Customers requesting reservations
Reservation manager	System that is the subject of this design document
Calendar page	Interface component of the reservation manager
Accounting page	Interface component of the reservation

	manager
Database	System where input and output information is created, read, updated, and deleted from
Data design	Design viewpoint of data structures, inputs and outputs of the system
Architecture design	Design viewpoint of overall structure and data flow of the system, external systems, and actors
Interface design	Design viewpoint of interaction between users and the system and components of the system
Procedure design	Design viewpoint of logic constructs of the system
Design concern	Area of interest with respect to software design
Design element	Item occurring in a design view: design entity, design relationship, design attribute, design constraint

4. Body

4.1 Identified stakeholders and design concerns

Stakeholders for this design document shall be the software developers who are responsible for developing the reservation manager system, the managers involved with the project, the customers John and Jane, and the clients who request the reservation.

The primary concerns for the software developers and managers shall be the time-cost commitment of developing the reservation manager system. The primary concern for the customers John and Jane shall be the readability and reliability of the reservation manager system as well as the specified requirements being met. The primary concern for the clients of John and Jane shall be that the personal information that is provided is accurate and maintains privacy from all but those involved in the service.

4.2 Data Design viewpoint

Design Concerns

This design shall pertain to the data inputs and outputs maintained by the reservation manager as specified by the requirements of the system. This section shall specify how the information collected by the User is stored in the system. This design shall describe to the developers how the data shall be formatted for input and this design should provide the guidelines for the user on how to input the data.

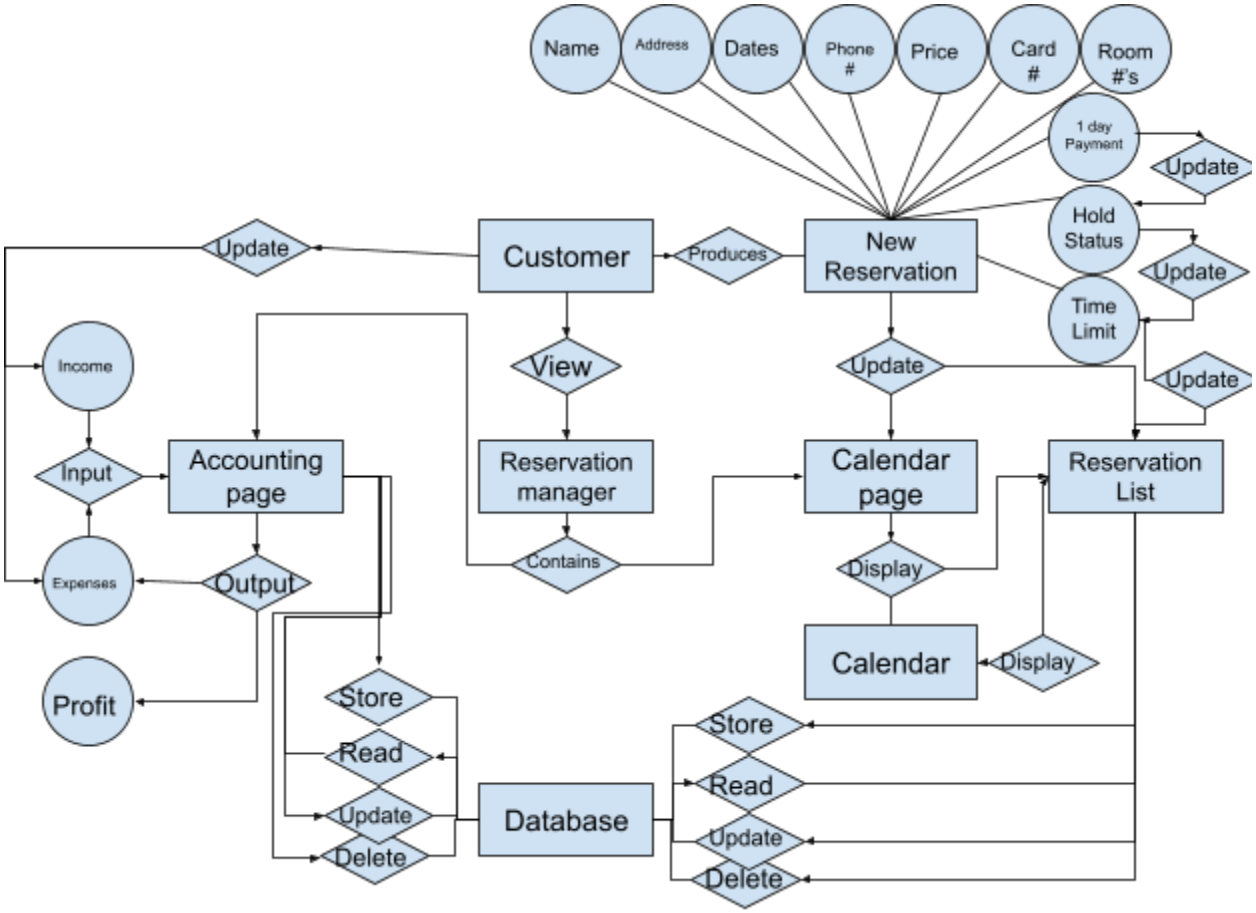
Design Elements

Table 4.2.1 Data Dictionary for Inputs and Outputs

Term	Data Type	Example	Notes
name	string	“John Smith”	
address	string	“101 Someplace Drive”	
phoneNumber	integer	3235555959	
price	float	100.50	
dates	List of strings	<”may 9”,”may 10”, “may 11”>	
creditCardNumber	integer	4568414120002548	
roomNumbers	Array of boolean	[1,1,0,1]	
oneDayPayment	float	25.25	
holdStatus	boolean	1	This data entity is dependent on the oneDayPayment input
timeLimit	string	“May 8”	This data entity is dependent on the holdStatus input

expenses	float	50.50	
income	float	100.50	
profit	float	50.00	

Figure 4.1.1 Entity Relationship Diagram



Description: The entity relationship diagram has been updated to more accurately represent the interactions and procedures between the user and the system, and between the inputs of the system. The most notable changes are the updated representation of the create, read, update, and delete processes between the database and the components of the reservation manager, and the conditional updates between the 1 day payment, hold status, and time limit inputs.

4.3 Data Design view

The reservation manager system shall maintain the accuracy of the information that is inputted and stored in the database, while performing error checks where applicable.

4.4 Architecture Design viewpoint

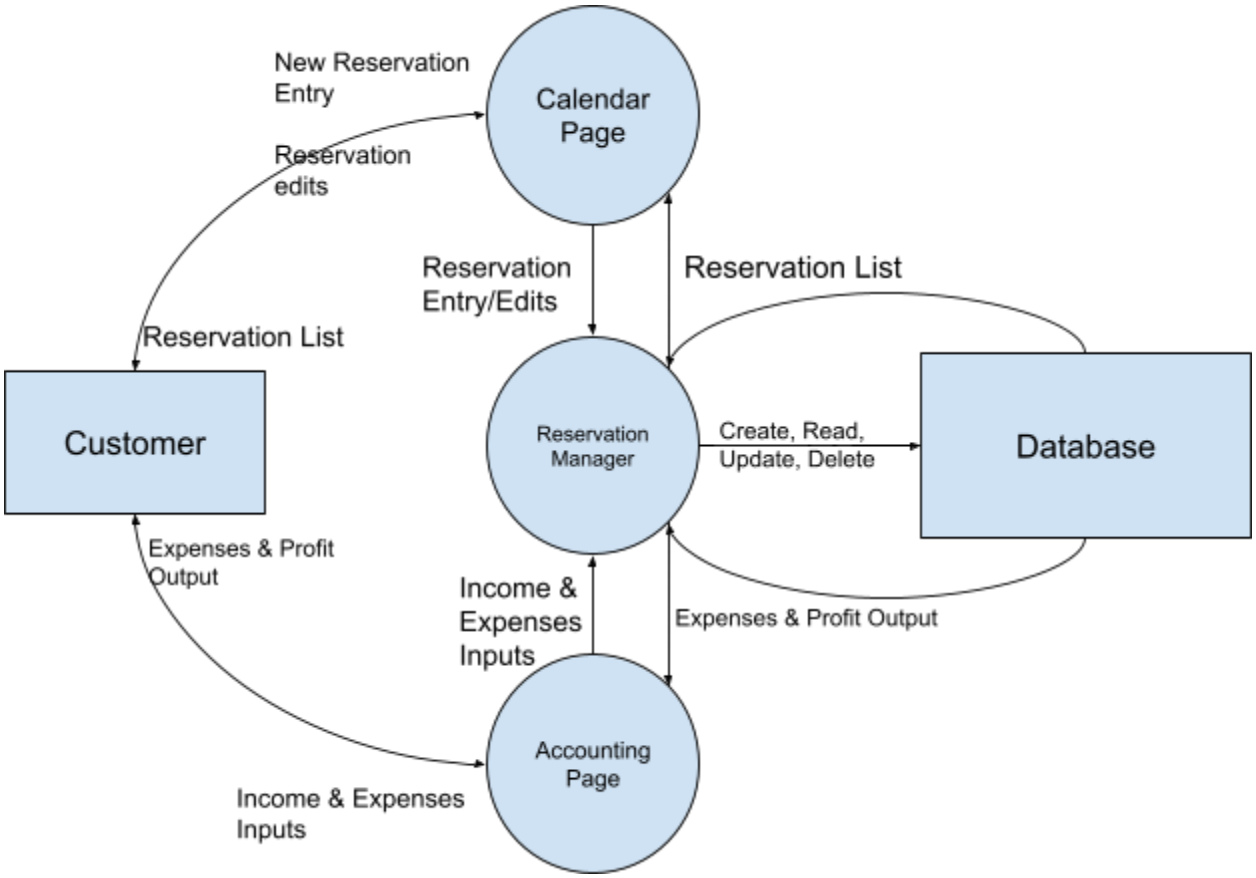
Design Concerns

This design shall pertain to the flow of data through the system and how the system shall be structured to meet the specified requirements. This architecture design for the reservation manager shall follow the client/server style as the system shall be established on the Bed and Breakfast intranet systems. The customer shall use the reservation manager system to perform create, read, update, and delete requests to the reservation list and accounting information stored on the database.

Design Elements

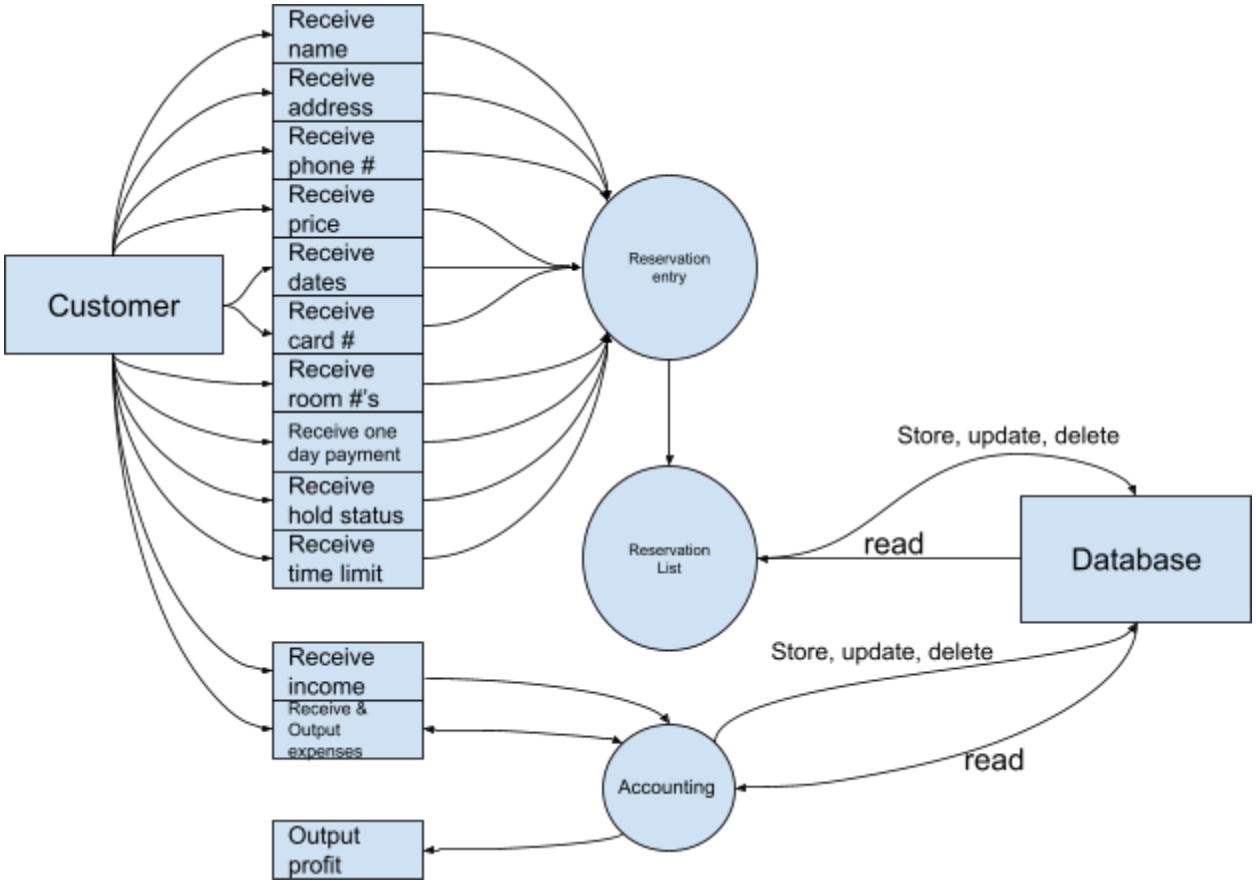
This design shall be composed of the users who interact with the reservation manager, the reservation manager and its calendar and accounting pages, and the database from which information shall be stored, read, updated, and deleted. The primary constraint for this design shall be the hardware available at John and Jane's Bed and Breakfast. This Design shall require at minimum a personal computer set-up to run the reservation manager system, and a database system to store, read, update, and delete inputs and outputs from the reservation system. The reservation manager system shall not be accessible remotely in its initial design.

Figure 4.4.1 Architectural Context Diagram



Description: This figure portrays how the input data shall flow between actors and objects in the system. Primary additions include the two interface components currently planned for implementation in the reservation manager system. All relevant data shall be received from the customers John and Jane and be translated into entries in the reservations list maintained by the database.

Figure 4.4.2 Level 1 DFD



Description: *This figure portrays the level 1 Data Flow Diagram mapped from the Architectural Context Diagram. It describes all relevant inputs from the customer that are necessary to construct a new reservation entry as well as update the accounting page of the reservation manager system.*

4.5 Architecture Design view

This design shall be developed to meet the minimum required hardware specifications stated above. This design shall be developed to be scalable as necessary, so long as the information is contained on the Bed and Breakfast private network.

4.6 Interface Design viewpoint

Design Concerns

This design shall pertain to the interface between the reservation manager system and the database, as well as the interface between the reservation manager and the user. This design shall

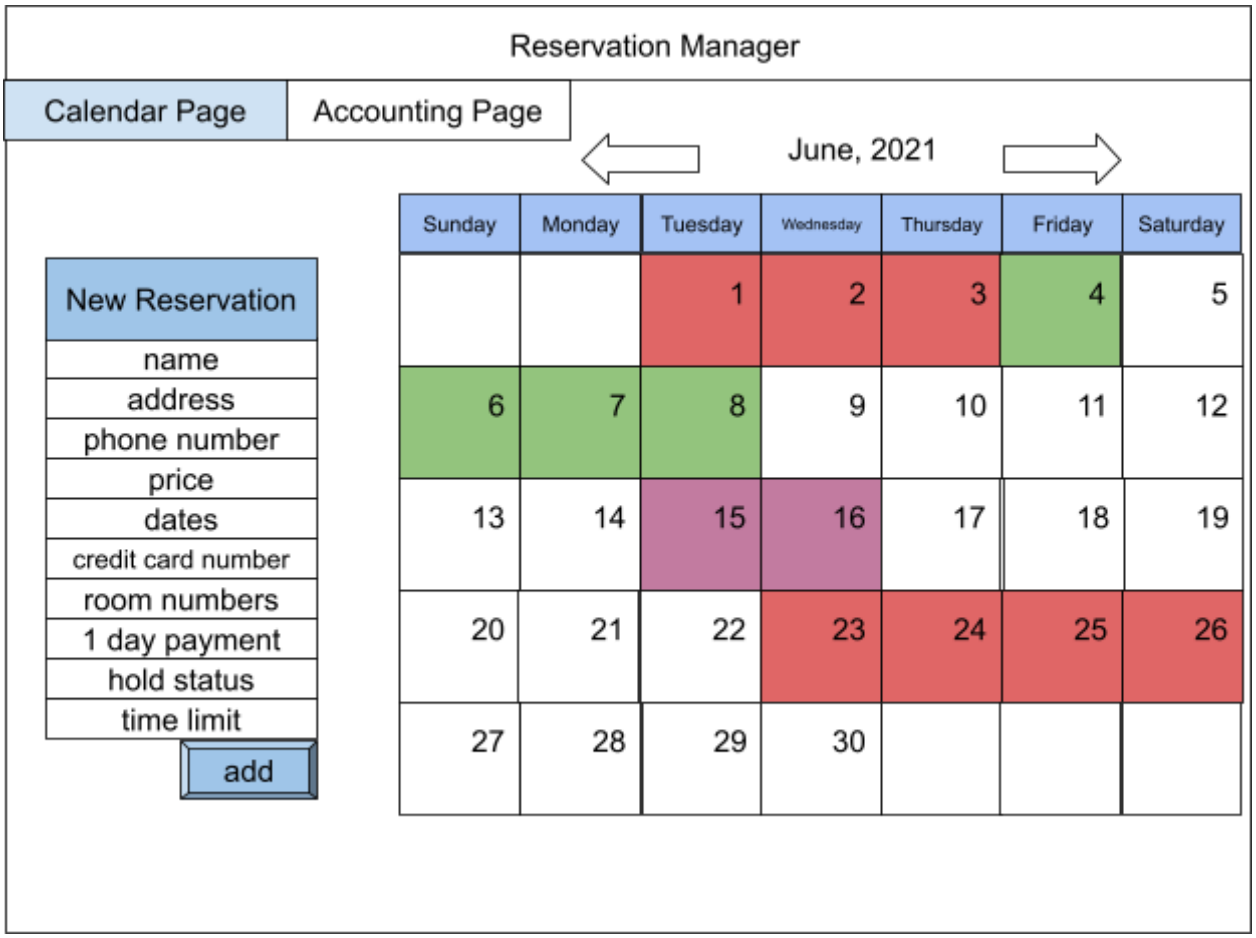
be used by the software developer to guide the development of the interfaces, and by the customers to ensure that the interface meets their requirements needs. This design shall be developed to be adequately user-friendly, with the customers level of comfort in using personal computers in mind. This design shall require sufficient testing and iteration from the development team in order to meet the users needs.

Design Elements

The component - to - component interface is between the reservation manager and the database. The main interaction between the two components is to create, read, update, and delete reservations from the reservation list that is constructed in the reservation manager and maintained in the database. These components shall be connected on the intranet of the Bed and Breakfast servers.

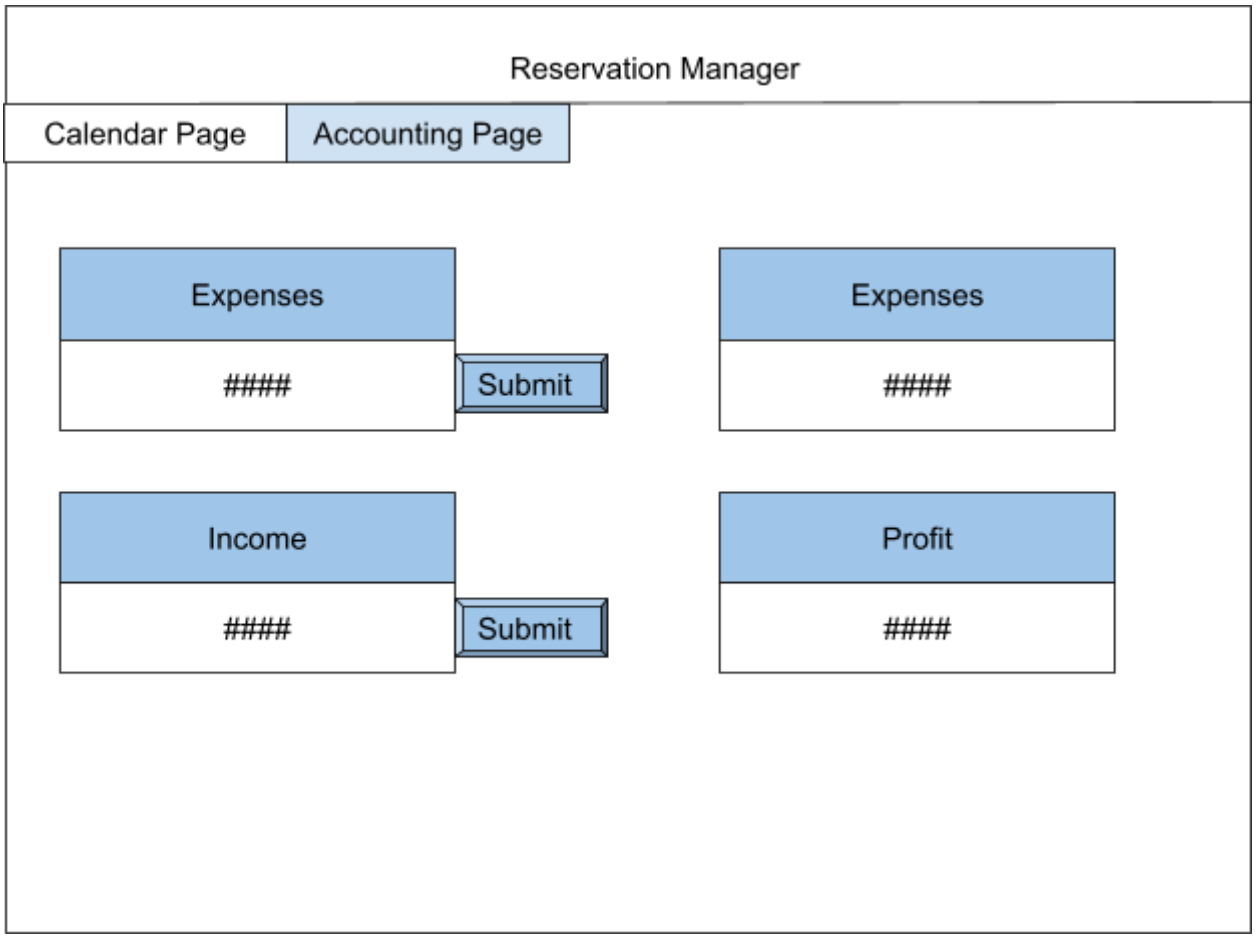
The human - to - component interface shall be between the accounting and calendar pages displayed on the reservation manager system to the computer monitor for the users John and Jane. Users shall be able to view and manage the reservations list on the calendar page of the reservation manager system directly from the calendar display. The calendar displayed on the calendar page shall accurately represent the entries in the reservation list as they are contained in the database. Reservation states shall be distinguishable on the calendar and shall be governed by room availability and hold status. Users shall be able to view-on-click reservations displayed on the calendar, and shall be able to add, edit, and delete reservations through the calendar. Refer to the graphical figures for tentative layouts of the accounting and calendar pages that the user will interact with.

Figure 4.6.1 Graphical User Interface of Calendar Page



Description: *This figure is a tentative representation of the Calendar page user interface. This image consists of the system title at the top of the page, calendar and accounting tabs with the calendar page selected, the calendar which displays the reservation list that is read from the database, and the new reservation tab that contains the required inputs for a new reservation and an add button to update the reservation list in the database. The reservations are color coded to convey the status of reservation availability. White dates represent fully open availability (I.e. room numbers set to [0,0,0,0]. Red dates represent no availability (I.e. room numbers set to [1,1,1,1]. Green dates represent partial availability. And the purple dates represent reservations that are not guaranteed.*

Figure 4.6.2 Graphical User Interface of Accounting Page



Description: *This figure is a tentative representation of the Accounting page user interface. The boxes on the left represent the user inputs of expenses and income, and the boxes on the right represent the output of the expenses and calculated profit. The Submit buttons shall send an update request to the database.*

4.7 Interface Design view

This design shall be developed to provide ease of use for the customers John and Jane. This design shall be developed to display the reservation and accounting information clearly and accurately. This design shall be developed with an emphasis on a user-friendly experience for those with basic skills in using a personal computer, and shall provide sufficient instruction on the appropriate use of each object the user shall interact with.

4.8 Procedure Design viewpoint

Design Concerns

This design shall pertain to the algorithms used by the reservation manager system to manage the reservations list as well as keep track of the expenses and profits as specified in the requirements. This design shall concern the software development team and it shall serve as a guide for how the procedures that maintain the reservation system and the database system shall be constructed.

Design Elements

This design shall contain a sequence construct of inputs by the user to the accounting page for the purpose of computing the total profit and keeping track of the expenses as specified by the user requirements.

- Input received for expenses
- Input received for Income
- Income and Expenses are stored in the database
- Calculates profit: (Income - Expenses)
- Output Expenses and Profit to accounting page.

This design shall contain a conditional construct for determining when a reservation shall be cancelled, based on the one day payment, hold status, and time limit inputs.

- If one day payment is greater than zero, set hold status to true, else set hold status to false
- If hold status is set to false, accept time limit input
- If the time limit matches the current date, and hold status is set to false, cancel reservation and delete from reservation list.

These procedures shall be dependent on the accuracy of the user's inputs, as well as error checking techniques to be implemented by the development team.

4.9 Procedure Design view

This design shall guide the development team in addressing the requirements for tracking the customers expenses and profits, as well as the requirement for managing both guaranteed reservations and non-guaranteed reservations.

4.10 Design rationale

The main goal in the design of the reservation manager system is to meet the requirements specified by the customers John and Jane. The main assumptions made during the design process were that the system would be developed to be used solely in-house at John and Jane's Bed and Breakfast. The main reason governing this assumption is that there would be a need for privacy as John and Jane's clients would provide sensitive personal information. This decision does impact scalability of the reservation manager system. However, this design shall be flexible enough to allow future expansion if requested by the customers. If further expansion of this system is requested (I.e. access via mobile device) security will be a primary concern. A login functionality may be considered in this case.