Software Design Document

for

Pocket Plane

Version <1.0>

Prepared by

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1. INTRODUCTION

1.1 Purpose

The purpose of this software design document is to describe the implementation, architecture and system design of the Pocket Plane Application presented in the IEE Software Requirements Specifications document.

The targeted audience can vary widely based on the current needs the person, but in general, the target audience are the people who want to travel in a fast and convenient way, tourists, business people and other people that need fast and reliable transportation.

1.2 Scope

The application “Pocket Plane” was made for managing the flights of an Airline. The Airline administrators will be able to manage the list of flights available for the airline. They will have the permission to add new flights for which tickets can be purchased by clients or edit/cancel planned flights and also see the details of past flights.

Clients will be able to create an account, log in, search for the wanted flights and make a reservation for that flight.

The goal of this software application is to facilitate the selling and buying of tickets, thus helping the stakeholder’s business on the commercial flights market.

1.3 Overview.

This software design document contains representations of software components necessary for the implementation. This document outlines the design of the application.

The outline of the design is done in the next sections, presented in the document. The most important parts are: System Architecture, Data Design, Component Design, Human Interface Design and Requirements Matrix.

All of these parts facilitate and clarify the implementation of the application, outlining the design and requirements that Pocket Plane needs to meet.

1.4 Reference Material

No.	Reference	Description
1	https://en.wikipedia.org/wiki/Software_design_description	This site was used to accomplish a base of knowledge on the creation of the SDD
2	https://www.lucidchart.com	Used for developing the diagrams

1.5 Definitions and Acronyms

Definitions:

No.	Definitions	Description
1	Application server	An application server is a software framework that provides both facilities to create web applications and a server environment to run them.
2	Web server	A web server is server software, or hardware dedicated to running this software, that can satisfy client requests on the World Wide Web.
3	Database	A database is an organized collection of data, generally stored and accessed electronically from a computer system.
4	User	Someone who interacts with the web application
5	Admin/Administrator	System administrator who is given specific permission for managing and controlling the system
6	Stakeholder	Any person who has interaction with the system who is not a developer.

Acronyms:

No.	Acronyms	Description
1	SDD	Software Design Document
2	DB	Data Base
3	HTML	Hypertext Markup Language is the standard markup language for documents designed to be displayed in a web browser
4	CSS	Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language like HTML.

Abbreviations:

No.	Abbreviations	Description
1	App	Application

2. SYSTEM OVERVIEW

The application “Pocket Plane” was developed for the selling of flight tickets and administration of passengers and the flights of an airline.

The Application has client users and administrators. Every type of user has a different kind of account and a different set of permissions. Every user can access his account with a username and a password, this connects the application to a database.

It allows a client user to buy tickets for a flight, to cancel a reservation, to manage/change their data and to delete their account.

The application allows an administrator to create, post, modify, cancel flights, to manage/change their data and to see details about past flights.

Each user has a unique account (with a username and a password) with two different types of users’ levels: admin and client user. That includes multiple actions for 2 types of users.

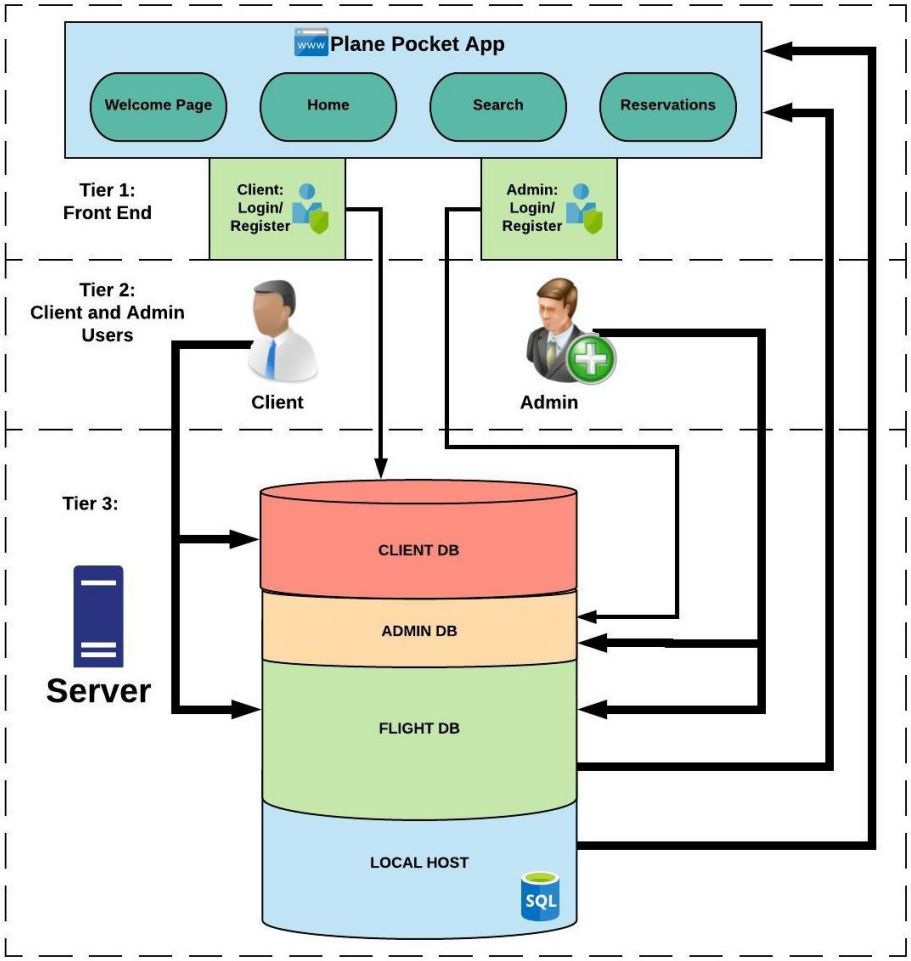
The client can be any computer-user that navigates on the internet. The person needs to have basic computer skills and knowledge about internet browsing. Also, the client can be any person that wishes to buy a plane ticket.

The admin must be a person hired by the airline company to maintain the current flights updated on the site and add new ones. The admin must have a good understanding of computer usage and basic data-base management skills.

The owner of this application is the Pocket Plane Airline Company.

3. SYSTEM ARCHITECTURE

3.1. Architectural Design



Relations between:

Tier 1 – Tier 2

- Client

- can register as a user through the interface;
- can login through the interface;
- can visualize the airline website;
- is able to book a flight, edit/delete his account, see/cancel his reservations;

- Administrator

- can register as an administrator through the interface;
- can login through the interface;
- can visualize the airline website;
- is able to add a flight, edit/delete his account, see/cancel/edit existing flights;

Tier 1 – Tier 3

-the data introduced by the user and administrator from the server updates the database;
-the back-end of this website is located in the local host;

Tier 2 – Tier 3

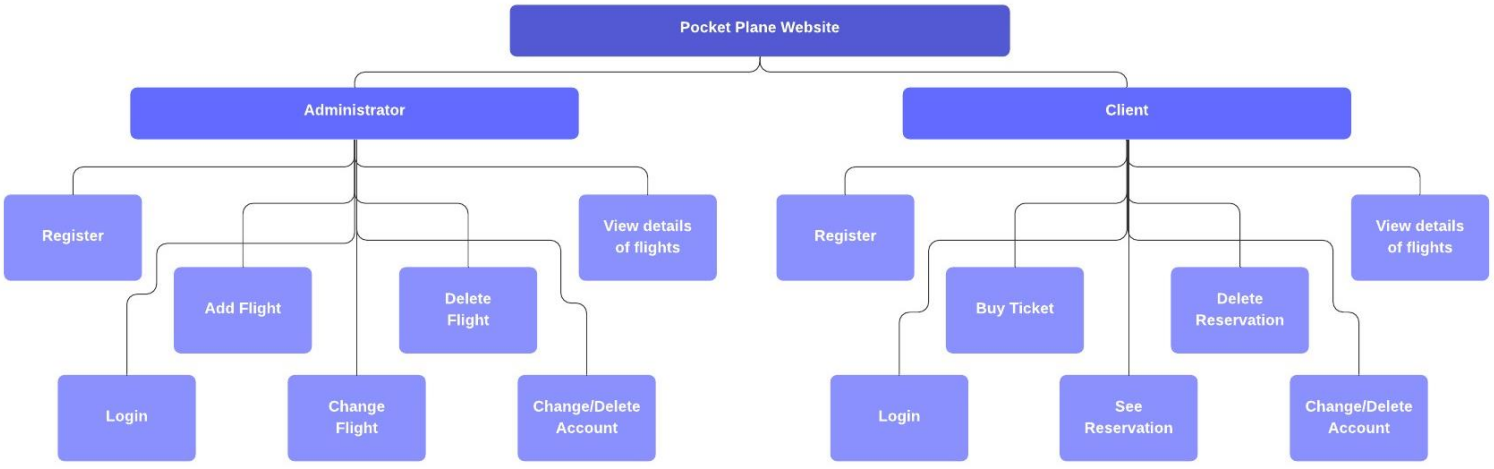
- Client

- at the client register, the information is added in the client database;
- the login interface sends a query to the database;
- as the client performs command such as bookings and changes, edits his account, etc, it gets added to the database;

- Administrator

- at the admin register, the information is added in the admin database;
- admin login interface sends a query to the database;
- whenever the administrator adds new flight or changes information about flights, edits his account, etc, these changes get added to the database;

3.2. Decomposition Description



3.3. Design Rationale

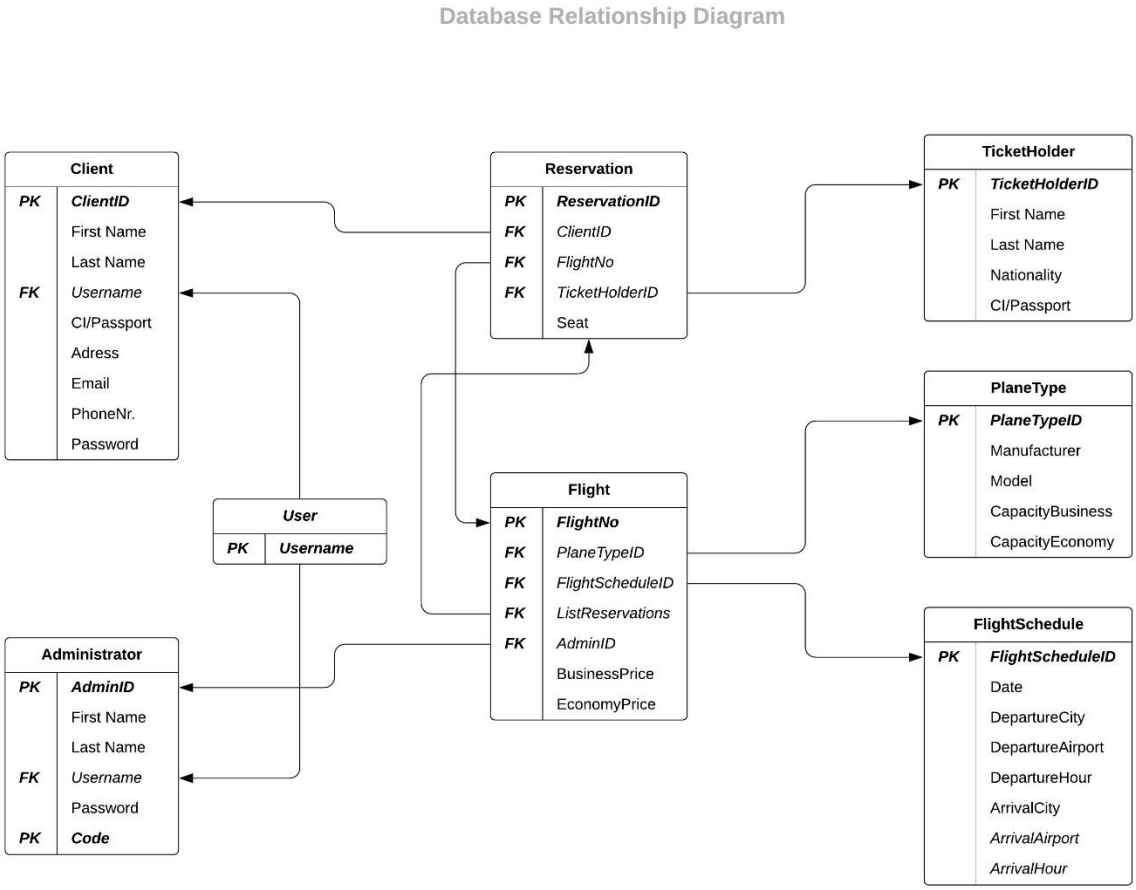
The approach for this airline website architecture has been selected because it is probably the most common; it is built around the database as many applications in business naturally lend themselves to storing information in tables.

The architecture is arranged so the data enters the top layer and works its way down each layer until it reaches the bottom, which is the database. Along the way, each layer has a specific task, like checking the data for consistency or reformatting the values to keep them consistent. It is the standard software development approach offered by most of the popular web frameworks and it is a layered architecture. Just above the database is the model layer, which often contains business logic and information about the types of data in the database. At the top is the front-end part of the website. In the middle, you have the controller, which has various rules and methods for transforming the data moving between the view and the model.

The advantage of a layered architecture is the separation of concerns, which means that each layer can focus solely on its role. This makes it maintainable, testable, easy to assign separate "roles" and easy to update and enhance layers separately.

4. DATA DESIGN

4.1 Data Description



4.2 Data Dictionary

Table structure for User

ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
USERNAME	varchar(100)	No	Yes	No

Table structure for Administrator

ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
ADMIN_ID	int	No	Yes	No
FIRST_NAME	varchar(100)	No	No	No
LAST_NAME	varchar(100)	No	No	No
USERNAME	varchar(100)	No	No	Yes (from the user table)
PASSWORD	varchar(100)	No	No	No
CODE	varchar(100)	No	Yes	No

Table structure for Client

ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
CLIENT_ID	int	No	Yes	No
FIRST_NAME	varchar(100)	No	No	No
LAST_NAME	varchar(100)	No	No	No
USERNAME	varchar(100)	No	No	Yes (from the user table)
CI/PASSPORT	varchar(100)	No	No	No
ADDRESS	varchar(100)	No	No	No
EMAIL	varchar(100)	No	No	No
PHONE_NR	varchar(20)	No	No	No
PASSWORD	varchar(100)	No	No	No

Table structure for Reservation

ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
RESERVATION_ID	int	No	Yes	No
CLIENT_ID	int	No	No	Yes (from client table)
FLIGHT_NO	int	No	No	Yes (from flight table)
TICKET_HOLDER_ID	int	No	No	Yes (from ticket holder table)
SEAT	int(200)	No	No	No

Table structure for TicketHolder

ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
TICKET_HOLDER_ID	int	No	Yes	No
FIRST_NAME	varchar(100)	No	No	No
LAST_NAME	varchar(100)	No	No	No
NATIONALITY	varchar(20)	Yes	No	No
CI/PASSPORT	varchar(20)	No	No	No

Table structure for Flight

ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
FLIGHT_NO	varchar(10)	Nu	Yes	No
PLANE_TYPE_ID	int	No	No	Yes (from plane type table)
FLIGHT_SCHEDULE_ID	int	No	No	Yes (from table)
LIST_RESERVATIONS	int	Yes	No	Yes (from reservation table)
ADMIN_ID	int	No	No	Yes (from admin table)
BUSINESS_PRICE	int(1)	No	No	No
ECONOMY_PRICE	int(1)	No	No	No

Table structure for PlaneType

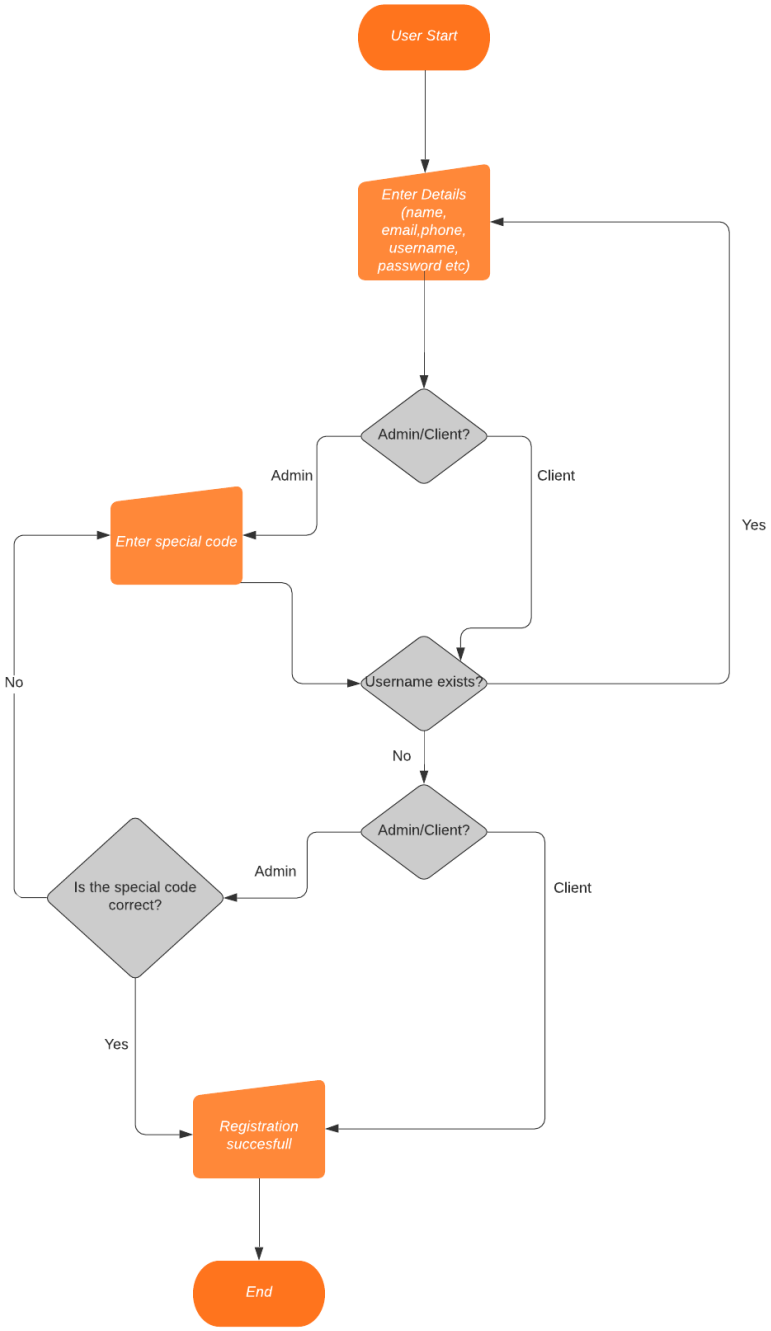
ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
PLANE_TYPE_ID	int	No	Yes	No
MANUFACTURER	varchar(100)	No	No	Yes (from table)
MODEL	varchar(100)	Yes	No	Yes (from reservation table)
CAPACITY_BUSINESS	int(1)	No	No	No
CAPACITY_ECONOMY	int(1)	No	No	No

Table structure for FlightSchedule

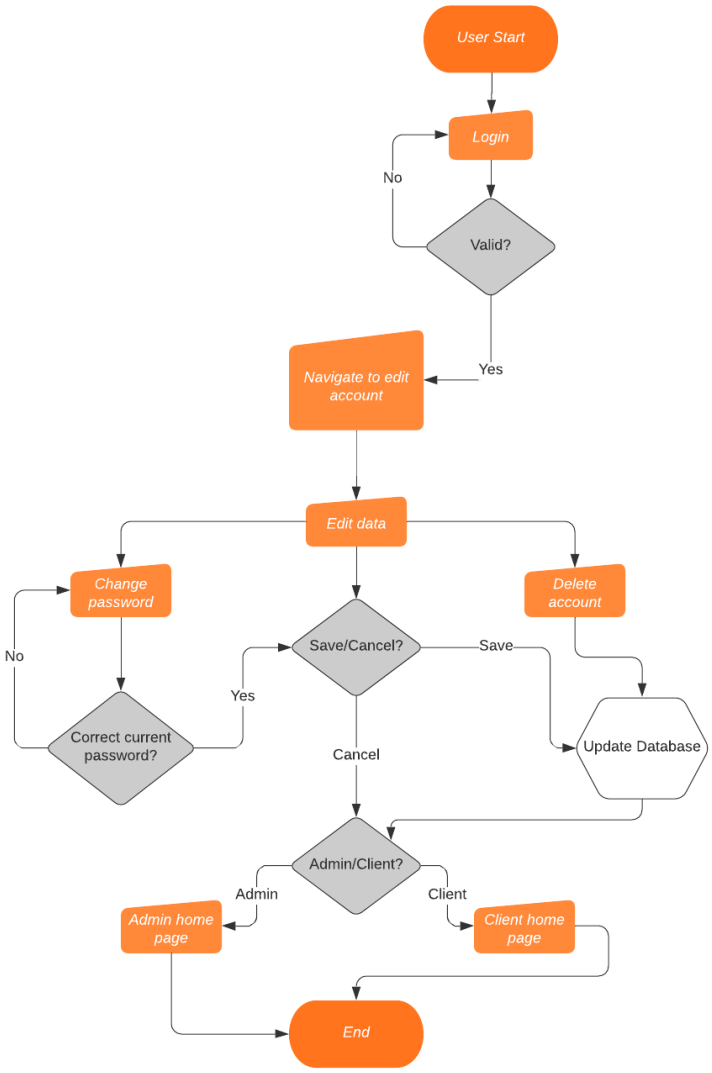
ATRIBUTES	TYPE	NULL	PRIMARY KEY	FOREIGN PRIMARY KEY
FLIGHT_SCHEDULE_ID	int	Nu	Yes	No
DATE	date	No	No	No
DEPARTURE_CITY	varchar(100)	No	No	No
DEPARTURE_AIRPORT	varchar(100)	Yes	No	No
DEPARTURE_HOUR	varchar(10)	No	No	No
ARRIVAL_CITY	varchar(100)	No	No	No
ARRIVAL_AIRPORT	varchar(200)	No	No	No
ARRIVA_HOUR	varchar(10)	No	No	No

5. COMPONENT DESIGN

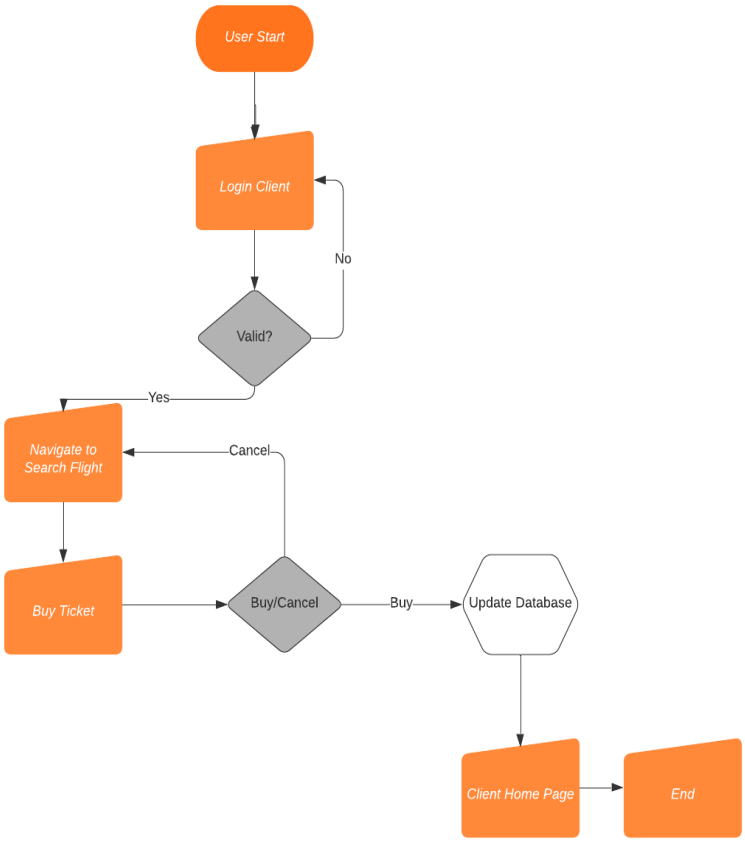
User Registration



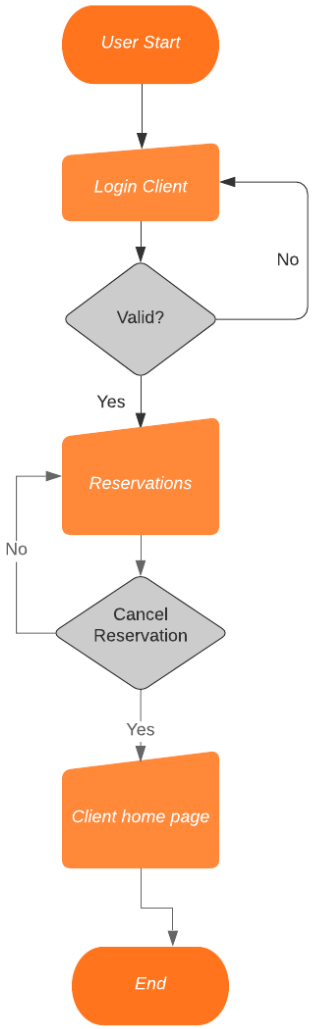
User Edit Account



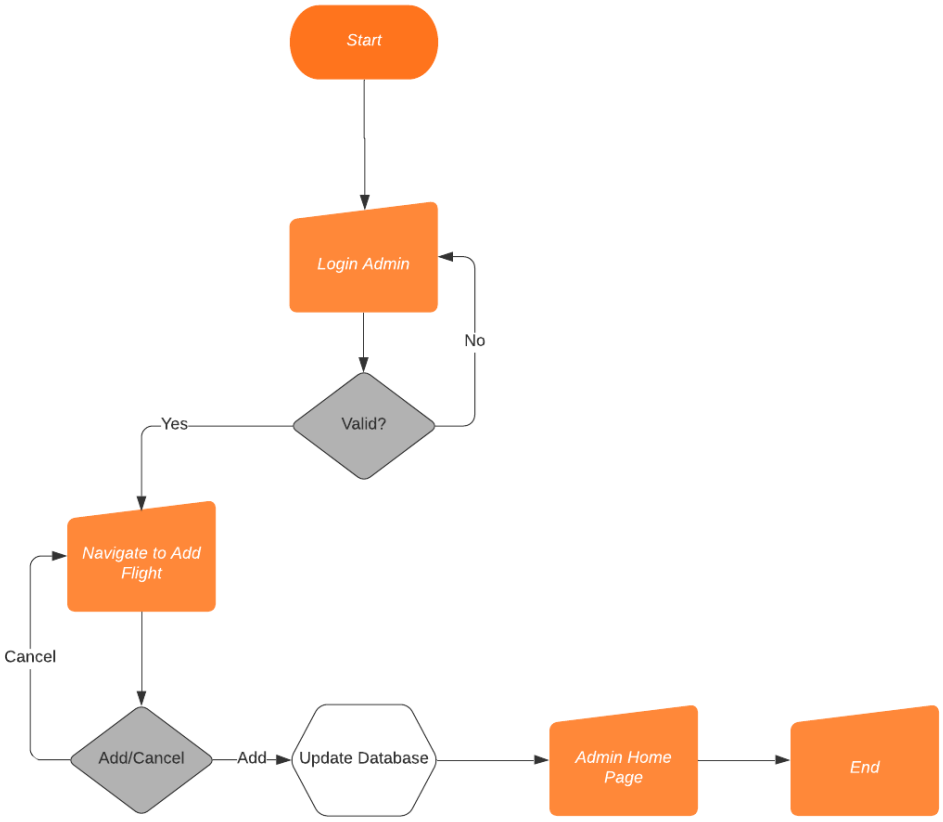
Client Search and Buy Tickets



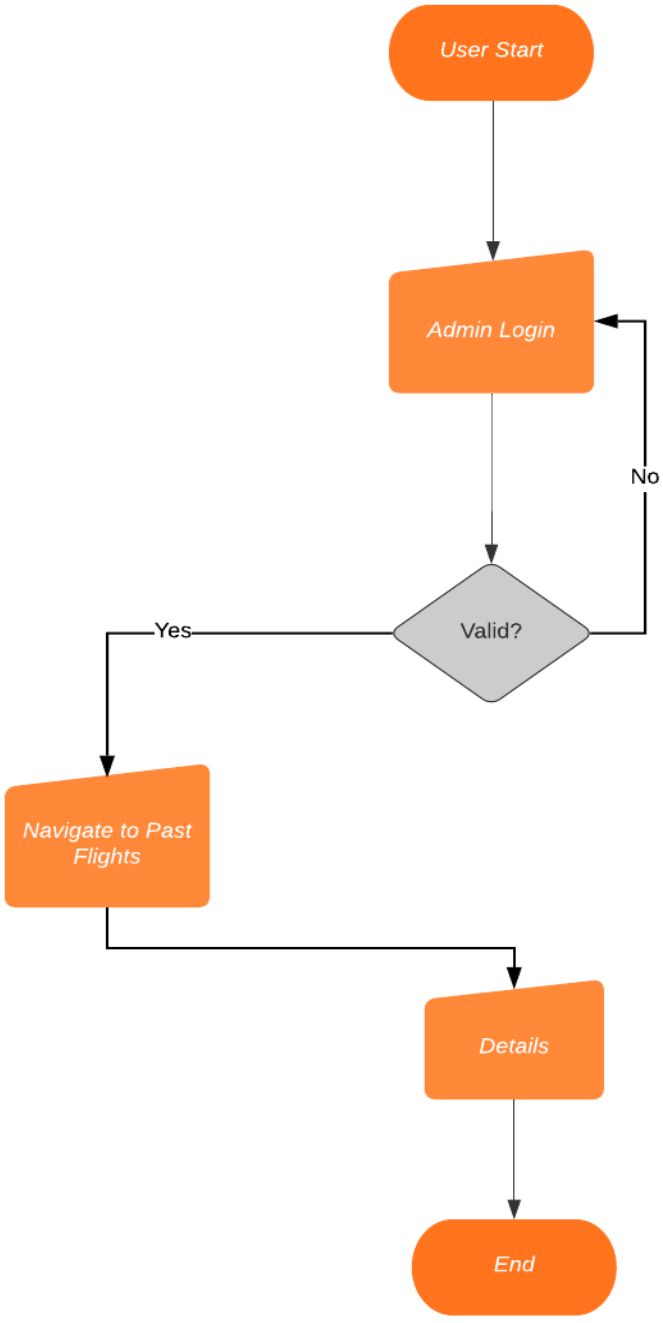
Client Reservations



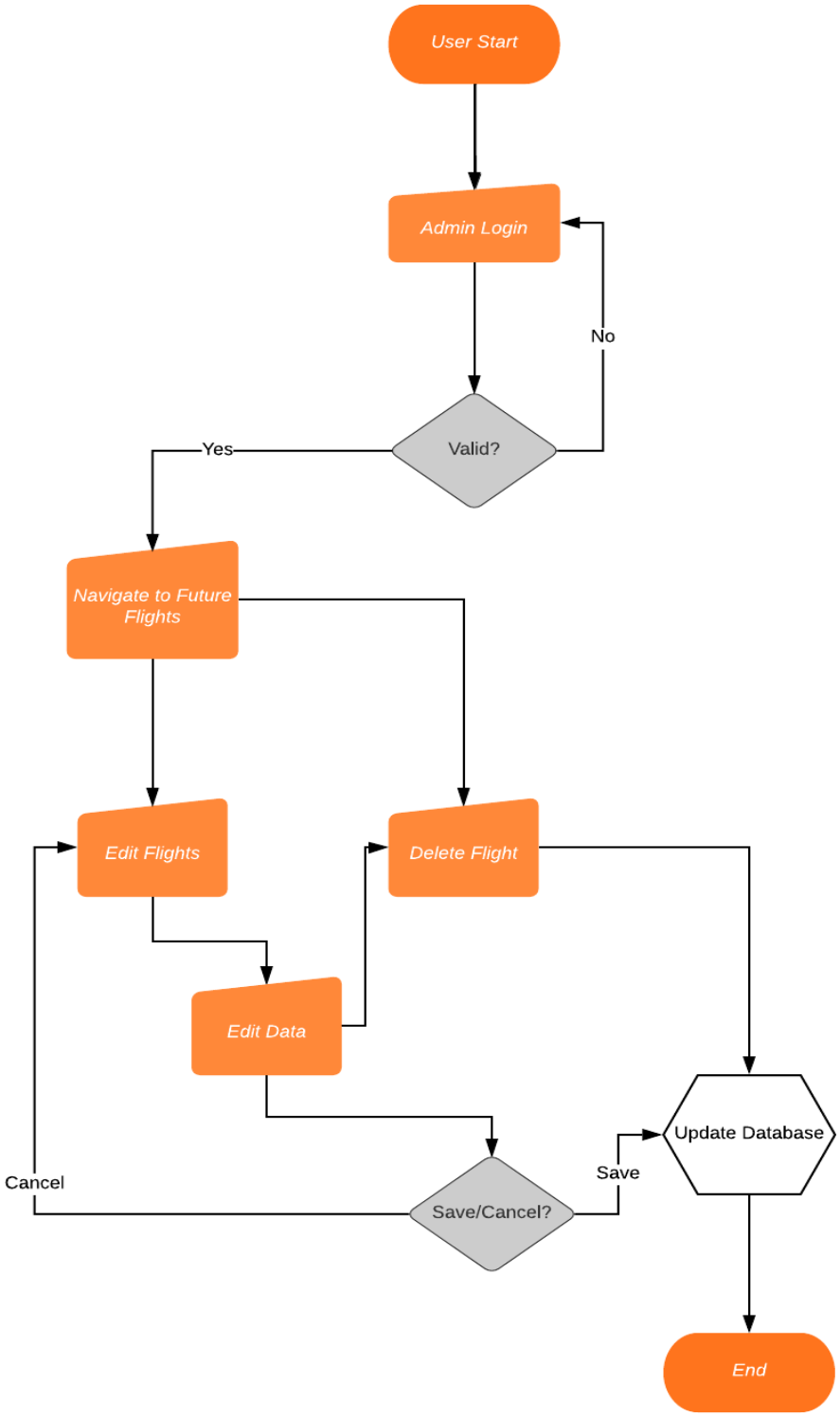
Admin Add New Flight



Admin See Past Flights



Admin See Future Flights



6. HUMAN INTERFACE DESIGN

6.1 Overview of User Interface

Based on the user's perspective, upon accessing the website they will see the welcome page, where they can see a short description + details about the airline company and two buttons ("Register" and "Log in"). Everyone that wants to access the website's functionalities needs to make an account (client or admin) before moving forward, this is done by pressing the "Register" button. On this page, a user will have to fill in some information to create their new account, the information given is different between a user and an admin (Admins also have to fill in a code given by the company as a security tool when registering their accounts). After making an account, the user can press the "Log in" button to log on their account and use the services that the website provides.

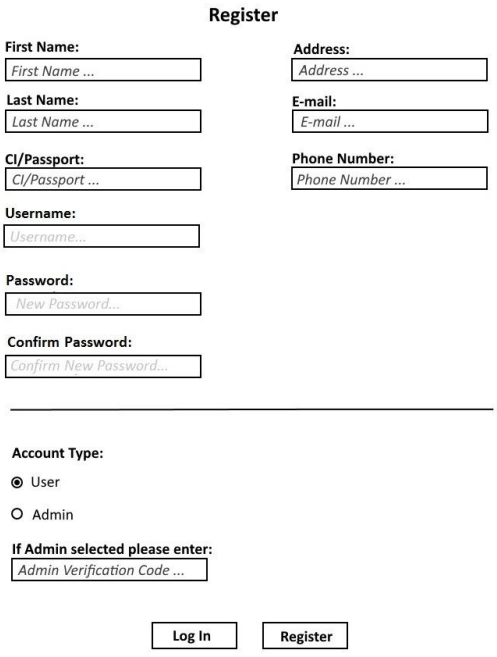
Unsuccessful registrations/logins will lead to a warning. Failing to complete mandatory fields will also lead to a warning. Once logged in, the interfaces for an admin and a client differ.

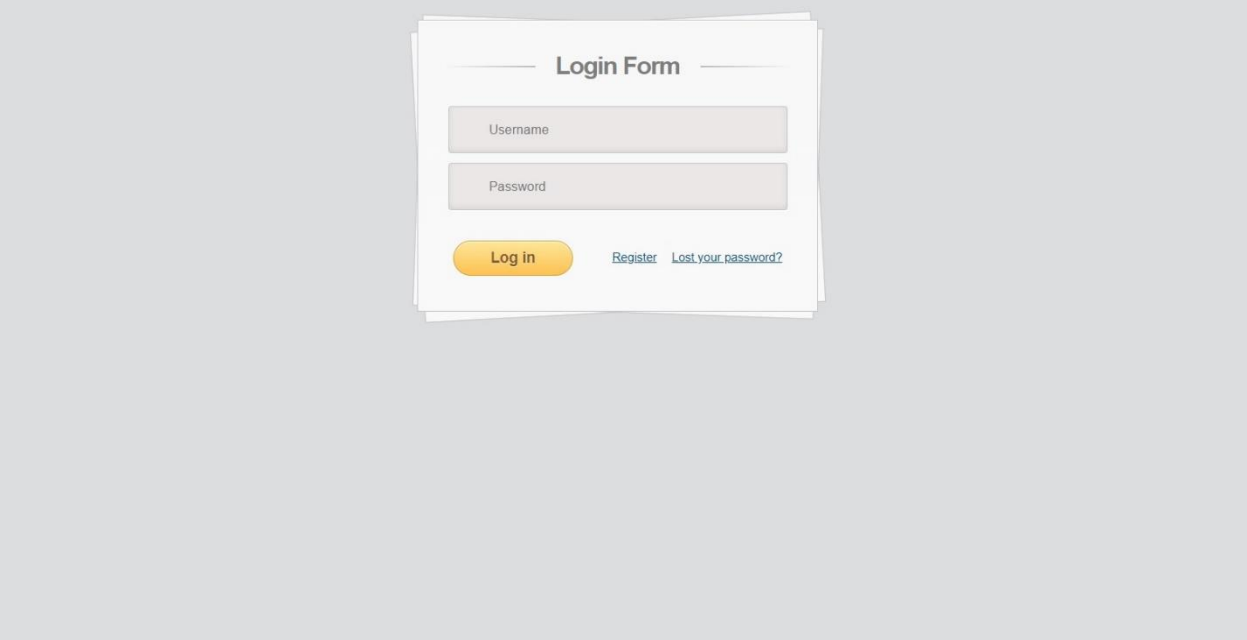
The client user will be able to browse all the pages available in his menu ("Reservations", "Edit Account", "Search Flights") or log out from their account (the "Log Out" button will appear on every page from now on). The client will be able to book a flight from the "Search Flights" page. This page contains a list of available flights. Each flight will have details about them, such as the Departure and Arrival Airport, Date of the flight and so on. On the right of every flight there is a "Buy Ticket" button that will redirect the user to a page where they can finalize their purchase. There, he/she has to choose on what class the ticket will be (Business or Economic) as that will affect the final price. The client can buy tickets for other people as well, thus, he has to provide some information about the recipient of the ticket as well as adding a Payment Method and his/her Card Info; he can also cancel the purchase and be redirected to the Home Page. On the "Reservations" page, a client can see his booked flights with some additional information (the seat assigned and the price paid) and has an option to cancel them. On the "Edit Account" page, a user can edit all the information he has given when he registered his account. On this page there is also a "Delete button" that when pressed will ask the user if he wants to continue with this operation and will delete his account. In case the user wants to change his password, he needs to press the "Change Password?" button. This will redirect him to a page where he will have to input the current password once and the new password twice to change it. He has the option to cancel this operation and go back to the previous page.

The admin user will be able to browse all the pages available in his menu ("Add New Flight", "Future Flights", "Past Flights", "Edit Account") or log out from their account (the "Log Out" button will appear on every page from now on). The admin will be able to add a new flight from the "Add New Flight" page. The page contains a list of inputs where the admin will have to provide the information about the new flight (such as the flight number, Departure City, Date, etc). On the "Future Flights" Page, the admin can see a list of the flights that will take off in the

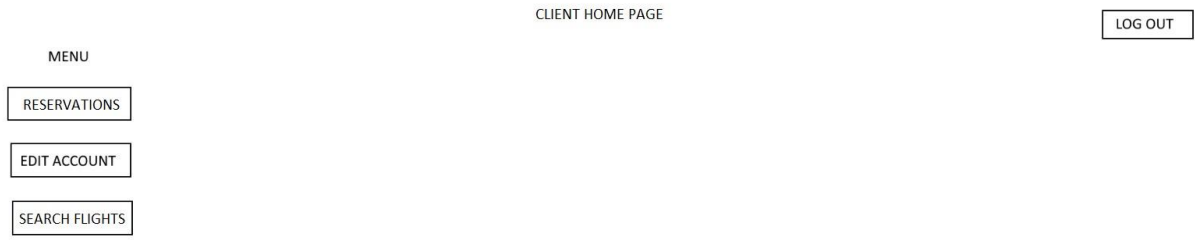
future. He has the option to edit or delete the flight. If he wishes to edit the flight, he will be redirect to a page where he can change every detail about the flight. On the “Past Flights” Page, the admin can see a list of the flights that have departure and arrived successfully. He has the option to view details about every flight. He will be redirected to a page with the list of the people on the flight and some information about them. The “Edit Account” page is similar to that of the client’s edit account page.

6.2 Screen Images





Client interface:



SEARCH FLIGHTS PAGE

LOG OUT

MENU

HOME PAGE

RESERVATIONS

EDIT ACCOUNT

FLIGHT NO.	DEPARTURE	DEPARTURE AIRPORT	DEPARTURE HOUR	DATE D.M.Y	ARRIVAL	ARRIVAL AIRPORT	ARRIVAL HOUR	PRICES FROM	
PP2020	CRAIOVA	CRAIOVA AIRPORT	07:30	10.03. 2020	LONDON	LUTON AIRPORT	11:15	23 EUR	BUY TICKET

Buy Ticket

LOG OUT

MENU

HOME PAGE

SEARCH FLIGHTS

EDIT ACCOUNT

FLIGHT NO.	DEPARTURE	DEPARTURE AIRPORT	DEPARTURE HOUR	DATE D.M.Y	ARRIVAL	ARRIVAL AIRPORT	ARRIVAL HOUR
PP2020	CRAIOVA	CRAIOVA AIRPORT	07:30	10.02. 2020	LONDON	LUTON AIRPORT	11:15

Class:

Price:

CI/Passport: *CI/Passport ...*

First Name: *First Name:*

Nationality: *Nationality ...*

Last Name: *Last Name:*

Select Payment Method: *Visa / Master Card / etc*

Card Number: *Card Number ...*

Cardholder Name: *Cardholder Name ...*

Expiration Date: *Expiration Date ...*

CVV: *CVV ...*

Cancel **Buy**

LOG OUT

MENU

HOME PAGE

SEARCH FLIGHTS

EDIT ACCOUNT

Edit Account

First Name: *First Name ...*

Last Name: *Last Name ...*

CI/Passport: *CI/Passport ...*

Address: *Address ...*

E-mail: *E-mail ...*

Phone Number: *Phone Number ...*

Change password?

Delete my Account

Cancel **Save**

CHANGE PASSWORD PAGE

LOG OUT

MENU

HOME PAGE

Current Password: *Current Password...*

New Password: *New Password...*

Confirm New Password: *Confirm New Password...*

Cancel **Save**

Admin interface:

Add Flight

LOG OUT

MENU

HOME PAGE

FUTURE FLIGHTS

EDIT ACCOUNT

PAST FLIGHTS

Flight Number: *Flight Number ...*

Date: *Date ...*

Departure: *Departure ...*

Departure Airport: *Departure Airport ...*

Arrival: *Arrival ...*

Arrival Airport: *Arrival Airport ...*

Departure Hour: *Departure Hour ...*

Arrival Hour: *Arrival Hour ...*

Number of Seats: *Number of Seats ...*

Price: *Price ...*

Cancel **Add**

FUTURE FLIGHTS PAGE

LOG OUT

MENU

HOME PAGE

PAST FLIGHTS

EDIT ACCOUNT

FLIGHT NO.	DEPARTURE	DEPARTURE AIRPORT	DEPARTURE HOUR	DATE D.M.Y	ARRIVAL	ARRIVAL AIRPORT	ARRIVAL HOUR	PRICES FROM		
PP2020	CRAIOVA	CRAIOVA AIRPORT	07:30	10.03. 2020	LONDON	LUTON AIRPORT	11:15	23 EUR	EDIT	DELETE

LOG OUT

MENU

HOME PAGE

FUTURE FLIGHTS

EDIT ACCOUNT

PAST FLIGHTS

Edit Flight

Flight Number: *Flight Number ...*

Date: *Date ...*

Departure: *Departure ...*

Departure Airport: *Departure Airport ...*

Arrival: *Arrival ...*

Arrival Airport: *Arrival Airport ...*

Departure Hour: *Departure Hour ...*

Arrival Hour: *Arrival Hour ...*

Number of Seats: *Number of Seats ...*

Price: *Price ...*

Delete This Flight

Cancel **Save**

PAST FLIGHTS PAGE

LOG OUT

MENU

HOME PAGE

FUTURE FLIGHTS

EDIT ACCOUNT

FLIGHT NO.	DEPARTURE	DEPARTURE AIRPORT	DEPARTURE HOUR	DATE D.M.Y	ARRIVAL	ARRIVAL AIRPORT	ARRIVAL HOUR	PRICE FROM	
PP2020	CRAIOVA	CRAIOVA AIRPORT	07:30	10.02. 2020	LONDON	LUTON AIRPORT	11:15	23 EUR	DETAILS

DETAILS PAGE

LOG OUT

MENU

HOME PAGE

FUTURE FLIGHTS

EDIT ACCOUNT

PAST FLIGHTS

FLIGHT NO.	DEPARTURE	DEPARTURE AIRPORT	DEPARTURE HOUR	DATE D.M.Y	ARRIVAL	ARRIVAL AIRPORT	ARRIVAL HOUR
PP2020	CRAIOVA	CRAIOVA AIRPORT	07:30	10.02. 2020	LONDON	LUTON AIRPORT	11:15

NO	FIRST NAME	LAST NAME	CI/PASSPORT	NATIONALITY	ADRESS	EMAIL	PHONE NUMBER	SEAT	PRICE PAID
1	ION	POPESCO	DZ223344	ROMANIAN	CALEA BUCURESTI No.30	p.ion@ex.com	0770111222	12A	23EUR

LOG OUT

MENU

HOME PAGE

FUTURE FLIGHTS

EDIT ACCOUNT

PAST FLIGHTS

Edit Account

First Name: *First Name ...*

Last Name: *Last Name ...*

CI/Passport: *CI/Passport ...*

Address: *Address ...*

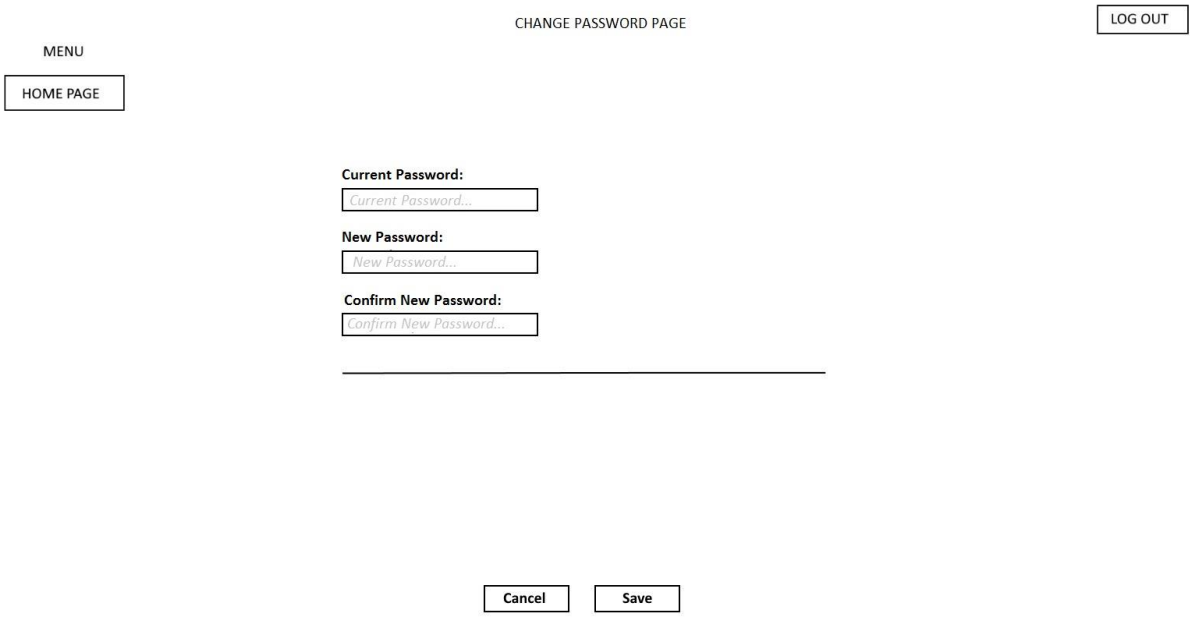
E-mail: *E-mail ...*

Phone Number: *Phone Number ...*

Change password?

Delete my Account

Cancel Save



6.3 Screen Objects and Actions

Interface elements include:

- **Input Controls**: dropdown lists, list boxes, buttons, text fields
- **Navigational Components**: menus
- **Informational Components**: notifications, message boxes, modal windows

7. REQUIREMENTS MATRIX

REQUIREMENTS TRACEABILITY MATRIX Pocket Plane					
User Class Name		Business Requirement / Business Use Case	Functional Requirement ID#	Functional Requirement Name/Use Case	Test Case ID#
Client	User	Registration/ Login Module	1.1	Client Registration	#TC001
			1.2	Client Login	#TC002
		Profile/Edit Account Module	1.3	Change Password	#TC003
		Booking Module	1.4	Search Flight Ticket	#TC004
			1.5	Buy Ticket	#TC005
			1.6	Manage Reservations	#TC006
		Registration/ Login Module	1.7	Log out	#TC007
		Profile/Edit Account Module	1.8	Delete Account	#TC008
			1.9	Edit Account	#TC009
Admin	User	Registration/ Login Module	2.1	Admin Registration	#TC010
			2.2	Admin Login	#TC011
		Profile/Edit Account Module	2.3	Change Password	#TC012
		Flight Addition/Edit Module	2.4	Display Flights	#TC013
			2.5	Add Flight	#TC014
			2.6	Edit Flight	#TC015
			2.7	Delete Flight	#TC016
		Registration/ Login Module	2.8	Log out	#TC017
		Profile/Edit Account Module	2.9	Delete Account	#TC018
			2.10	Edit Account	#TC019