Airline Crew Scheduler
Requirements Analysis Document

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Introduction

Purpose

The purpose of this software is to provide Cornhusker Airlines with scheduling software, allowing the airline crew administrator to schedule staff and airplanes for flights.

Scope

The crew manager will be able to input and remove information to facilitate the flight and corresponding crew schedules from CHA to any airport around the world. There are three crew positions: the Captain, First Officer, and Flight Attendant. Each flight has a Captain, a First Officer and one Flight attendant for every 50 passengers. Additionally, the crew will be able to search the schedules for information on flights and working time. The system needs to have a backup and restore capabilities. Also, the guest user will be able to search the flight and track them.

Objectives and Success Criteria

There are two types of aircraft at CHA and 3 types of crew members. The scheduler needs to keep track of each flight and its takeoff and landing times as well as staff and their working hours. The software will have input for all flights then generates flight numbers. The software will be considered successful when it can have this information input, update the information, retrieve the information, and backup and restore the information.

Definitions, Acronyms, and Abbreviations

CHA - Cornhusker Airways
Captain - Qualified pilot for a particular aircraft
First Officer - Qualified pilot or co-pilot for a particular aircraft
Flight Attendant - Crew member responsible for the safety of the passengers in the main cabin for the duration of a flight.

GBR-10 - Type of aircraft, capacity 45 passengers
NU-150 - Type of aircraft, capacity 75 passengers

Overview

This project is based on a crew scheduling system for Cornhusker Airways (CHA) that performs various tasks for different levels of administrators. It enables CHA to keep track of employees who are scheduled to be on the aircraft. CHA operates two types of aircrafts GBR-10 and NU-150 with a capacity of 45 passengers and 75 passengers respectively. There are different authorization protocols for different administrative positions like qualified Captain, First Officer, flight attendant.

Current System

Overview

The scheduling system should be able to keep track of the CHA crew members. The system should be able to assign a correct position and number of crew members required for each type of airplane. Furthermore, the system should be able to keep track of both the estimated and actual time of takeoff/touchdown of the airplanes. The system should also be able to log in all the updates made to the schedules and these updates should be accessible for searching based on the flight number.

Functional Requirements

F1. System Administrator can log in with correct credentials.
F2. Place employee to establish the initial airport for a crew member
F3. Qualify pilot or co-pilot to operate an aircraft
F4. Create flight complete with flight number, aircraft, origin & destination airports, scheduled takeoff & touchdown times, and required crew members
F5. Cancel flight, which frees crew members for other flights
F6. Change crew member on a flight.
F7. Change aircraft for a flight, which cannot be done after takeoff has been set
F8. Change estimated takeoff time, which needs to automatically update the estimated touchdown time.
F9. Maintain updates in an electronic log that can be searched by flight, crew member, airport and/or date range.
F10. Each update in the form n-MMYYYY where n is a positive integer, MM YYYY are for month and year.
F11. Set actual takeoff time, which will set the estimated touchdown time.

F12. Change estimated touchdown time to account for in-flight delays.
F13. Set actual touchdown time.
F14. The crew can log in with their own credentials and place themselves.
F15. Create Airport with coordinates, location and airport code.

Nonfunctional Requirements

N1. Each flight must have sufficient staffing of qualified crew members
N2. An aircraft can't be flown from CHA if it is not located at CHA
N3. There must be 30 minutes between touching down for one flight and taking off for the next flight for each aircraft.
N4. If a flight delay causes more the time between flights to be less than 30 minutes after the aircraft has landed, either the next flight needs to be delayed to allow for 30 minutes or the aircraft needs to be changed out for a different one that has been grounded for at least 30 minutes.
N5. Flights from CHA cannot use crew that are not located at CHA
N6. Employees can only work up to 8 hours a day.
N7. Employees must have a rest period of 16 hours between work days.
N8. Each airport must have full standby crew members for each type of flight
N9. The flight that lasts longer than eight hours must have at least three pilots to allow rest break in-flight.
N10. The flight that lasts longer than eight hours must have one additional flight attendant.

System Models

Scenarios

Best case :
The manager is able to access the admin page with his credential into the airlines' system database and he/she is able to set time the actual time and other administration functionality. After all change manager is able to log out successfully and can see changes in the database in real time.

Normal case: The system is working but at some time it crashes. It means there must be some bug in the code. Like might be the admin is not able to add an aircraft.

Worst case: The system is not working at all.

Use Case Model

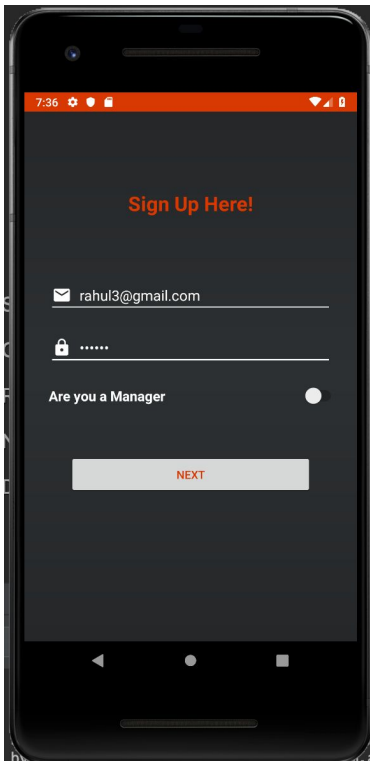
The system administrator opens the airline phone application and clicks on login. They enter their admin username and password. If the credentials are correct, the page is redirected to the administrator control dashboard. If the credentials are not correct, they are directed to try again.
After logging on:
The system administrator can choose flight between flight, crew, airport, and aircraft from the dashboard. A list of all the flights is presented in recycler view in the sorted order of their flight number. The system administrator can choose to tap create flight icon from the top right. A form is presented with spaces for the destination location, departure and arrival times, plane, and drop-down menus for the pilot, co-pilot, and crew selection. The only staff that has not exceeded their workday hours will be available in the drop-down menu. The admin presses save icon button when complete, and a flight number is automatically created by the system and provided on the confirmation page.
The system administrator can choose a flight from the dashboard to edit get the recycler view of all the flights that have already been created. A search box is also presented for the admin to lookup the desired flight. Once the flight is found, the editable fields are opened. Once editing is complete, the admin presses an enter button and is redirected to a confirmation page.
The system administrator can choose to search for flights, crew members and apply filters to the searches. The administrator can see all the details of the item searched, including how many hours employees have worked over a period of time and where employees are currently located.
The system administrator can log off from the dashboard. Any unsaved changes will be discarded and the page will redirect to the login page.

The system administrator can click in aircraft and can see every aircraft available in the database. Detail include aircraft name, current place, and type. The manager can also add an aircraft by clicking on add button below which will redirect the manager to Activity add aircraft. This page will ask the manager to input airport name and type of aircraft in the spinner. After choosing the value manager can click on add button. The database will automatically generate aircraft name and add it to the database. The Manager will be able to see that particular aircraft in Aircraft page.

The system administrator can click in airport button and can see every airport available in the database. Each card will provide the details of the airport like the airport location, code, and coordinates. The manager can also add an airport by clicking on adding airport button below which will redirect the manager to Activity add airport. This page will ask the manager to type airport name with the state(Hint provided), airport code and coordinates to check the distance from one airport to another. After clicking on the add button the system will check if the airport already exists and will give a response accordingly. After successful registration, it will show up on the airport page.

User Interface: Navigational Paths and Screen Mockups

System Administrator can access privilege service to change or add the functionality like adding flight and crew and also can change or set the flight takeoff and landing time through his/her phone application.Here in the flow from top to down manager is login into the phone application. After successful login manager is in the dashboard where he/she is adding airport and aircraft. After successfully placing airport and aircraft in the database, the manager can see the available airport and aircraft. He/she can also see the electronics logs after every update or query made into the database.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rahul3@gmail.com
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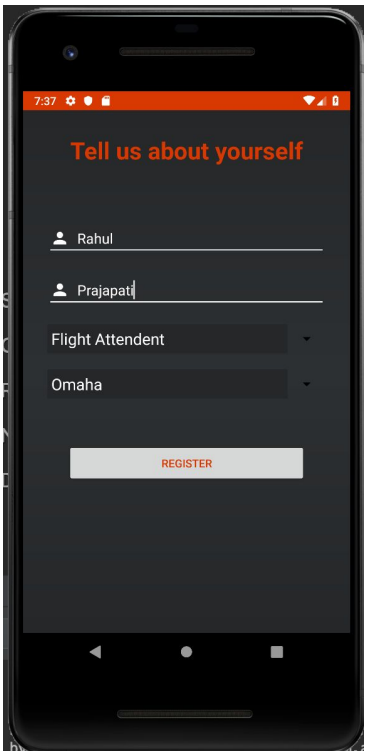
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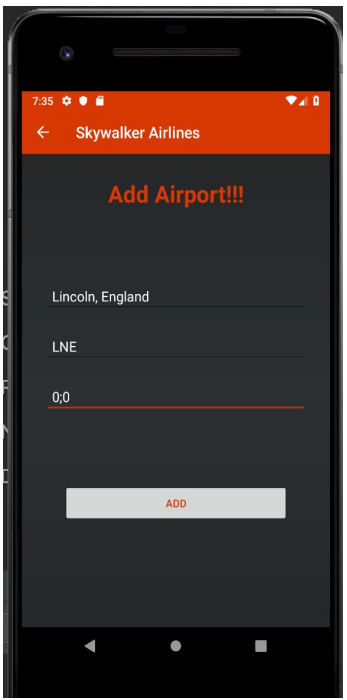
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Glossary

Actual Takeoff/Landing – the precise time at which the aircraft takeoff/landed.
Administrator – Someone who has all the access over the system.
Aircraft – vehicles operated by the Airways.
Captain – a senior pilot who commands the crew of an airplane.
Estimated Takeoff/landing – predicted the time at which the aircraft might takeoff/land.
Functional Requirements – describes the functionality of the system.
Grounded – An aircraft not being used for a while.
Non-Functional Requirements – User level requirements including usability, reliability and implementation.
Pilot – a person who flies or is qualified to fly an aircraft.