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, the crew to search for the schedules, and the public to search for flight takeoff and landing times.

Scope

The crew manager will be able to input and remove information to facilitate the flight and corresponding crew schedules from CHA to three nearby airports: Iowa City, Iowa; Evanston, Illinois; and West Lafayette, Indiana. 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 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

References

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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

Empty

Proposed 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. Place employee to establish the initial airport for a crew member
F2. Qualify pilot or co-pilot to operate an aircraft

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

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

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 from a dropdown menu to create a new flight. 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 enter button when complete, and a flight number is automatically created by the system and provided on the confirmation page.
The system administrator can choose from a dropdown menu to edit a flight that has already been created. A search box is 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 information on flights, pilots, co-pilots, and other crew members. The administrator can see all details of 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 at any time, any unsaved changes will be discarded and the page will redirect to the login page.

Crew members open the airline phone application and click on login. They enter their username and password. If the credentials are correct, the page is redirected to the crew dashboard, which does not have the creating and editing abilities of the administrator dashboard. If the credentials are not correct, they are directed to try again.
After logging on:
The crew member can see their schedules on their dashboards. The crew member can search by flight number, airline, or date for all information on flights that match these terms.

Passengers open the phone application. On the homepage, they choose to log in. They type in their username and password. If the credentials are correct, they are logged on to their passenger portal where they will see their own flight information as well as a search box with directions to type flight number, airline, or departure city to receive flight information. If their credentials are not correct they are directed to try again. The passenger chooses to just view their own flight information on the screen after successful login.

Passenger types in flight number and receives the information for that flight number, such as when the flight departs and arrives, current status, and airline.
Passenger types in airline name and receives all flight information for that airline. Flight numbers, their departure and arrival times, and current status.
Passenger types in departure city and receives all flight information for all flights coming in from the departure city. Flight numbers, arrival and departure times, current status, and airline.
Passenger types in a search term that does not match anything in the database. The page redirects to an error page and asks to search again.

All guests open the phone application. On the homepage, there is a search box with directions to type flight number, airline, or departure city to receive flight information.
Guest types in flight number and receives the information for that flight number, such as when the flight departs and arrives, current status, and airline.
Guest types in airline name and receives all flight information for that airline. Flight numbers, their departure and arrival times, and current status.
Guest types in departure city and receives all flight information for all flights coming in from the departure city. Flight numbers, arrival and departure times, current status, and airline.
Guest types in a search term that does not match anything in the database. The page redirects to an error page and asks to search again.

Object Model

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Dynamic Model

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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. A crew member can check their time schedule through phone application and airline phone application.

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 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.