
SKY**LINES**

We believe you can fly.

TONGJI UNIVERSITY
JAVA ENTERPRISE DEVELOPMENT TECHNIQUES
COURSE PROJECT

PROJECT DOCUMENTATION

Skylines Team (**Group 5**)

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PREFACE

Air transportation is one of the most important services to offer both significant social and economic benefits.

It gives a broad choice of holiday destinations around the world and is an affordable means to visit distance friends and relatives.

The airline business is characterized as being one of the most complex, involving multiple conflicting decisions that all need to be optimized at the same time.

INTRODUCTION

This project will be realized for the ***Java Enterprise Development Techniques*** course under the teaching of Professor Liu Yan of Tongji University.

For the final course project, we decided to design and develop an airline management system using J2EE to implement and format the website. The system can be compared to a company intranet providing functionalities in order to organize and manage a fictive airline company named as **SKYLINES**.

This document will expose at first the requirements and specifications of the project then the work plan and finally the data model design created for it.

The data model also contains the customer management system which is not a main feature of this project. It is here, in case we are able to succeed in the implementation of all the features of the company's intranet, to implement as a bonus the website that will manage all of the customer's functionalities.

REQUIREMENTS AND SPECIFICATIONS

The project is a web based application accessible and usable with a web browser. The online system will permit the management of an airline company.

As a complete airline management system is a very large and complex application, the design and implementation is reduced and emphasizes the airline operations management in order to respect time limitation accorded to the project development. Some of the functionalities are external from the management (for example Aircraft Maintenance that correspond to maintenance department) but are highly simplified and implemented to the system as example of interaction between airline's departments that can influence management parameters. A bonus part of the system is the customer management that is actually not planned for development but will be implemented if there is enough time after completion of the main system.

Features

The intranet must include these functionalities:

- **Login/Account System:** The system a login page in order to limit the access only to company staff members. A role system must be implemented in order to differentiate an Administrator account with all privileges and Normal User account with normal usage privileges.
- **Staff Management:** We can manage the company staff, by adding or deleting employee and editing personal information. Moreover, we must have the possibility to dispatch crew and set employees salary.
- **Fleet Management:** This section of the system will allow the management of the airline's fleet. We can add or delete aircraft and manage it (set employee on aircraft, set aircraft registration or aircraft status).
- **Route Management:** Flight plans can be planned and assigned to specific aircraft of the company.
- **Price Management:** The price of plane tickets can be set with the system. A next upgrade of the system that includes customer booking system can be integrated and linked with tickets price.

The system must contain a job list that can be assigned to employees. Each job category will provide access to specific part of the system.

The job list is composed of:

- **System Administrator:** This is the administrator account, it can access to all functionalities of the system and can also reset password of user accounts.
- **Human Resources:** Can add and delete employee of the company. The user has the possibility to keep the employee personal information updated and set salaries.
- **Fleet Manager:** The fleet manager user can add or delete aircraft on the system. He can set aircraft registration number and manage its maintenance. He can also update the aircraft models in order to add new type of aircraft if aircraft manufacturer releases new models.
- **Airline Manager:** The airline manager role is to create flight plans and assign it to aircraft. The user can also create new destination airport, set ticket price and assign crew members to aircraft.
- **Pilot:** The pilot account can consult the assigned flight plans.
- **Cabin Crew:** Cabin crew job category is for employee management and has no interaction with the system in the first version of the intranet.

Technologies

The technologies used to develop the system are:

- **J2EE:** This is used to implement and format the information in the browser but also to generate dynamic web pages
- **AJAX:** Used to add user interactivity and data update without reloading pages.
- **SQL:** In order to retrieve and manage all the data

Development Environment

- **Glassfish Server:** Glassfish Server will be used to create a local web server in order to develop and test the system without uploading it online.
- **MySQL Server:** The database used to store all data for system operation is MySQL Server.

WORK PLAN

Employee Management

- ADD/DELETE/MODIFY Employee information
- SHOW Employee Profile
- ASSIGN Employee to Aircraft

Assigned to: **THAI** Jean - **EA** Loyd

Flight Management

- ADD/DELETE/MODIFY Flight planning
- ASSIGN Flight to Aircraft
- ADD/DELETE/MODIFY Destination Airports

Assigned to: **PIENWITTAYASAKUL** Chatri

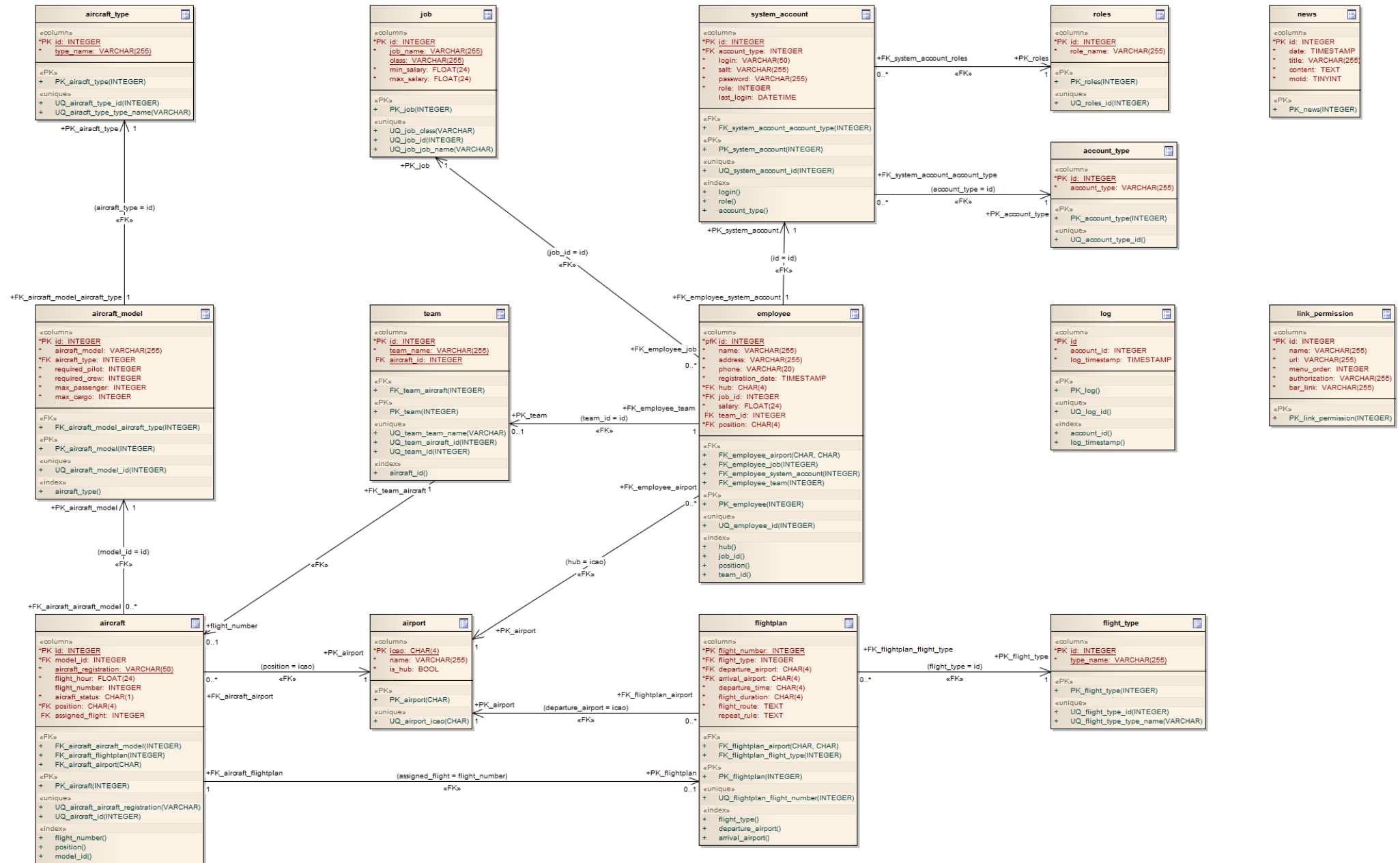
Aircraft Management / Maintenance

- ADD/DELETE Company Aircraft
- SHOW Aircraft Status
- ADD/DELETE/MODIFY Aircraft model
- SEND TO MAINTENANCE
- REPAIR

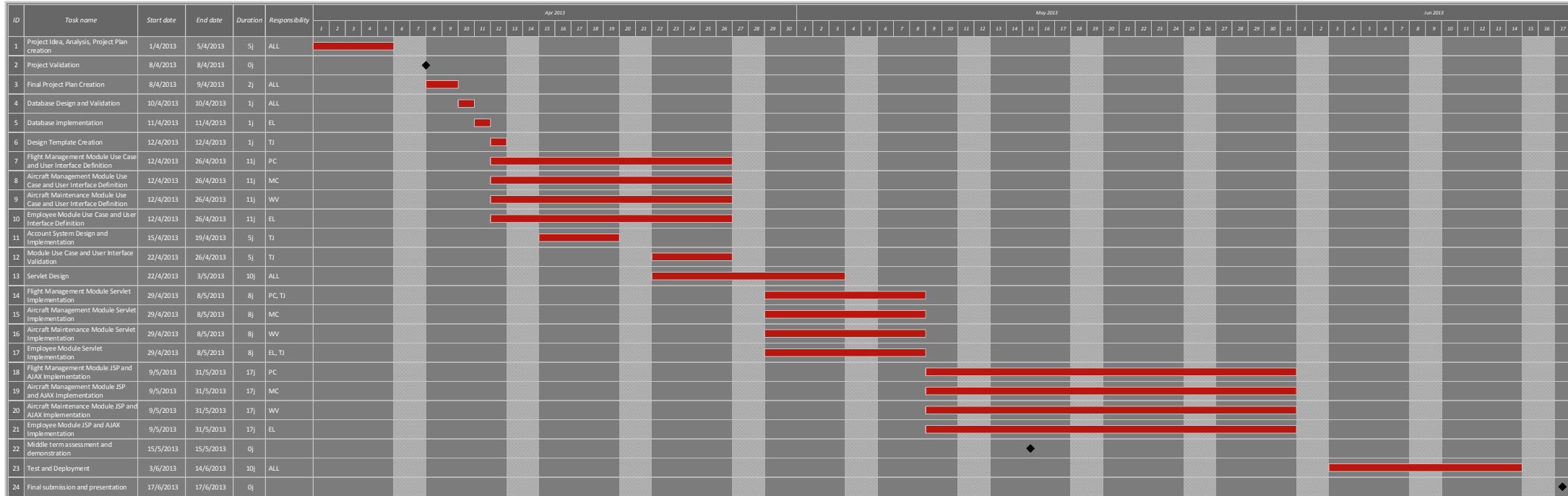
Assigned to: **MA** Catherine - **WANG** Velan

DATA MODEL

class Airline System Database



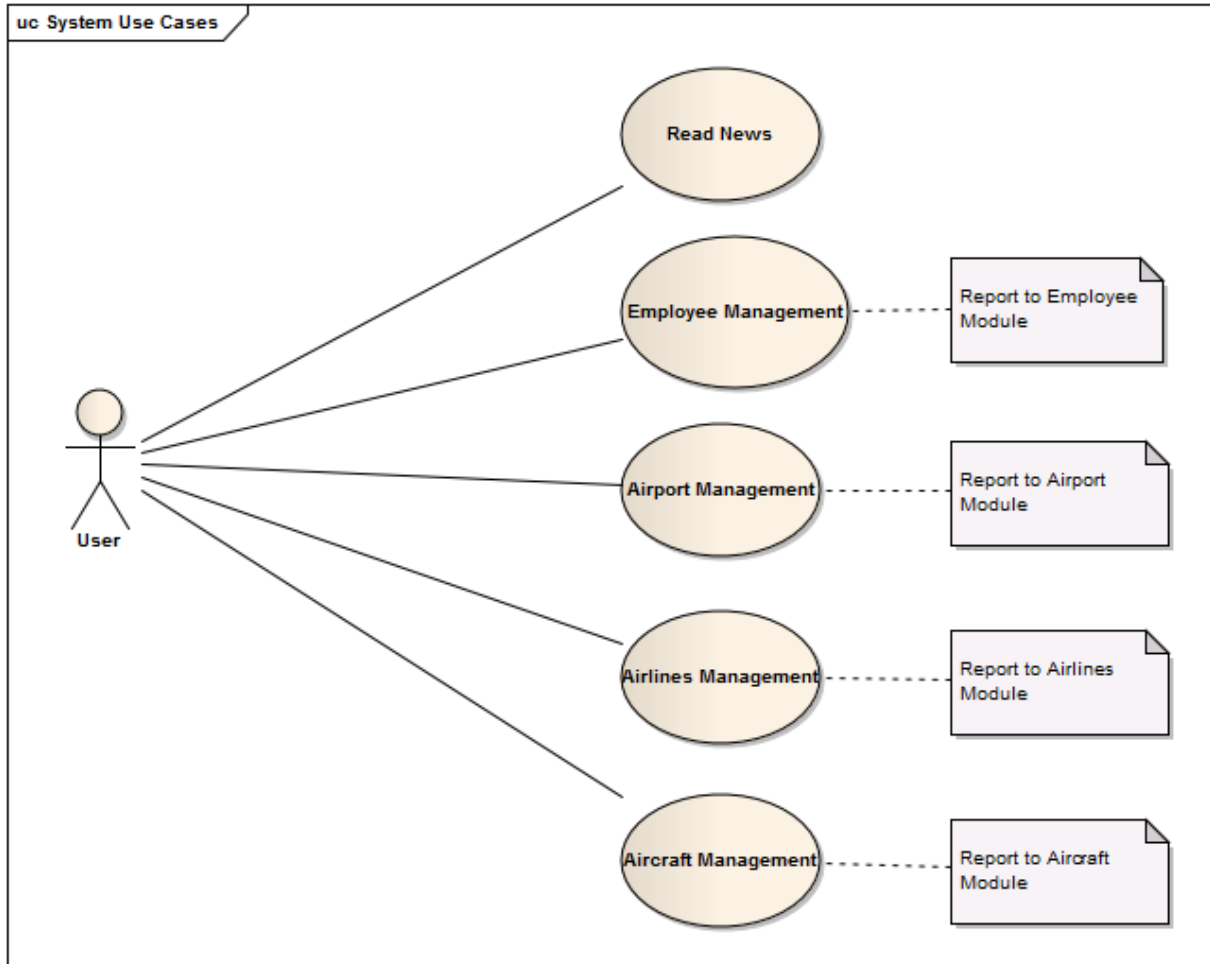
GANTT DIAGRAM



Responsibility Key
ALL – Everyone in the Group
TJ – Thai Jean
PC – Pienwittayasakul Chatri
EL – Ea Loyd
MC – Ma Catherine
WV – Wang Velan

STRUCTURE OVERVIEW

Global Use Cases



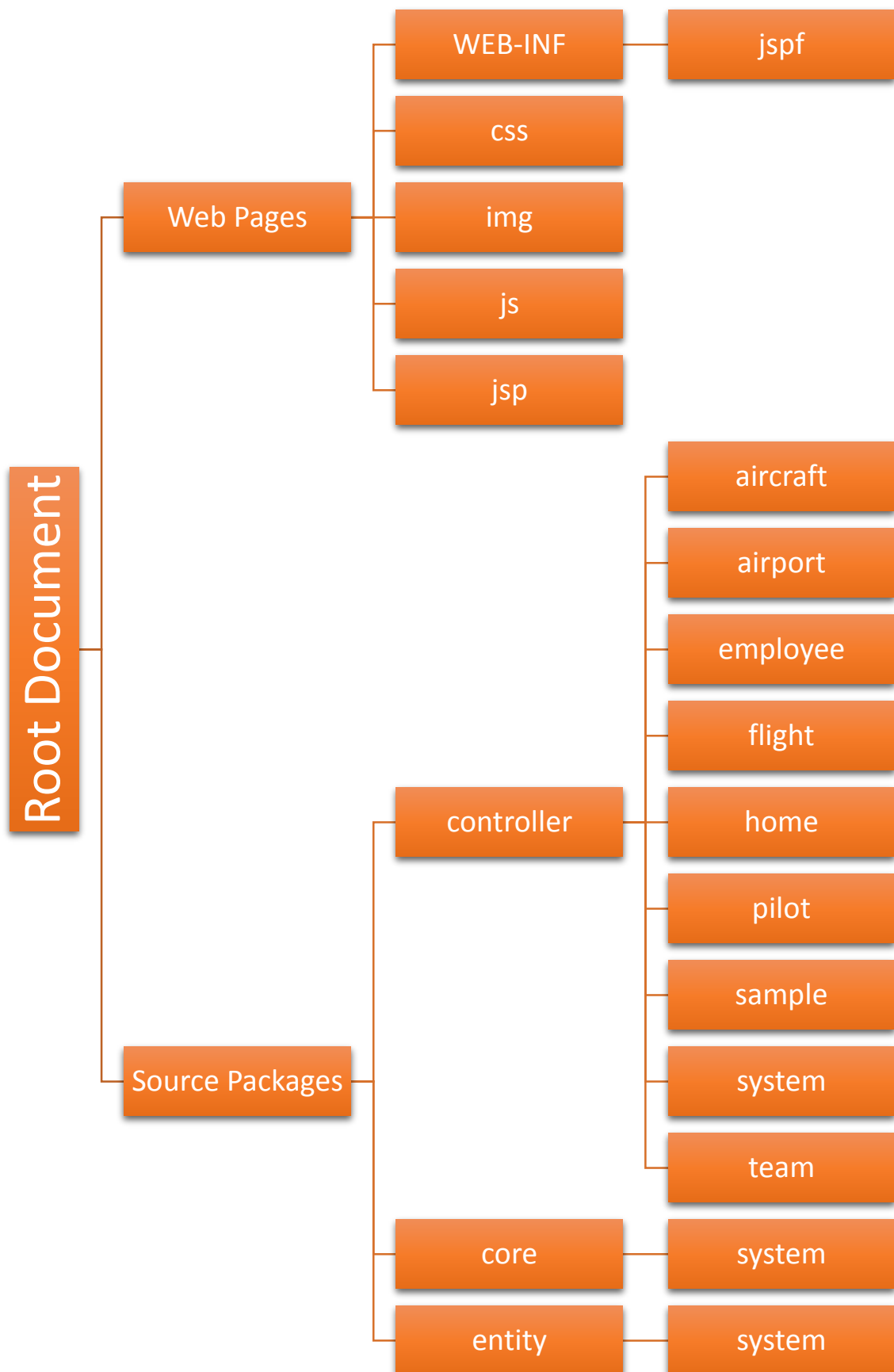
User Account Type

The system possesses many type of accounts. According to the account permission level, each user have access to a specific part of the system.

Here are the list of account types available for the system:

- **System Administrator:** Globally have access to all the system's features.
- **Airline Manager:** Have access to Airlines Management part, allows creation and management of company's airline routes.
- **Human Resource:** Have access to Employee Management part, allows management of company's employees.
- **Pilot:** Receive flight plans and submit flight reports.
- **Cabin Crew:** This type of account have not features implemented yet.
- **Fleet Manager:** Have access to Aircraft Management part, allows management of company's aircrafts.

File Structure



DEVELOPER FRAMEWORK

Purpose

The Airline Management System comes with a framework for developers. This framework was created in order to simplify the integration of new modules and features into the system.

This framework do these tasks for the developers:

- **Session verification:** verifies if the user is logged into the system.
- **Account permission verification:** verifies if the account have enough permission to access the page.
- **Menu generation:** generates the navigation menu.

Code Integration

Here is an example on how to use the framework in the code. Generally, there is two places the developer need to place fragment of code in order to use this framework.

First from the servlet side. When the developer creates a new servlet this fragment of code needs to be placed at the beginning of **processRequest** method.

```
if (!AppCore.initPage(request, response))
    return ;
```

Second from the JSP side. After creating the servlet, we need to create a JSP file templated as follow in order to integrate the base design (with header, menu and footer).

```
<!-- You must include this part -->
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@include file="/WEB-INF/jspf/page_begin.jspf" %>
<!-- End of inclusion -->

<!-- Put the content of the page here -->

<!-- You must include this part -->
<%@include file="/WEB-INF/jspf/page_end.jspf" %>
<!-- End of inclusion -->
```

After proceeding as follow, the developer will obtain a basic webpage with a generated frame. The developer can now implement the servlet and integrate the content of the JSP page as wanted.

Database integration

Second part of the framework when the developer creates a new webpage is the registration of the webpage into the database. This allows the system to verify the account permission level and generates all the frame by retrieving data from the database.

All these data are stored into the table **link_permission**. This table contains all webpages from the system and all information about the type of accounts which can access to the page and diverse information for the framework.

List of columns of the table link_permission

Name	Data Type	Length	Primary	Foreign Key
id	INT	11	X	
name	VARCHAR	255		
url	VARCHAR	255		
menu_order	INT	11		
authorization	VARCHAR	255		
bar_link	VARCHAR	255		

Description

- **id (PK):** Primary key of the table, each row contains an incremental id identifying each row of the table.
- **name:** Name of the page. Used for menu generation.
- **url:** URL of the page. Used for menu generation and access verification.
- **menu_order:** Position of the link on menu. If not desired to be displayed on menu, put 0.
- **authorization:** Type of account authorized to access to the page. Must be id of job separated by semicolon. (id1;id2;id3;...)
- **bar_link:** Used for generation of link bar below the header. Must be id of link permission separated by semicolon. (id1;id2;id3;...)

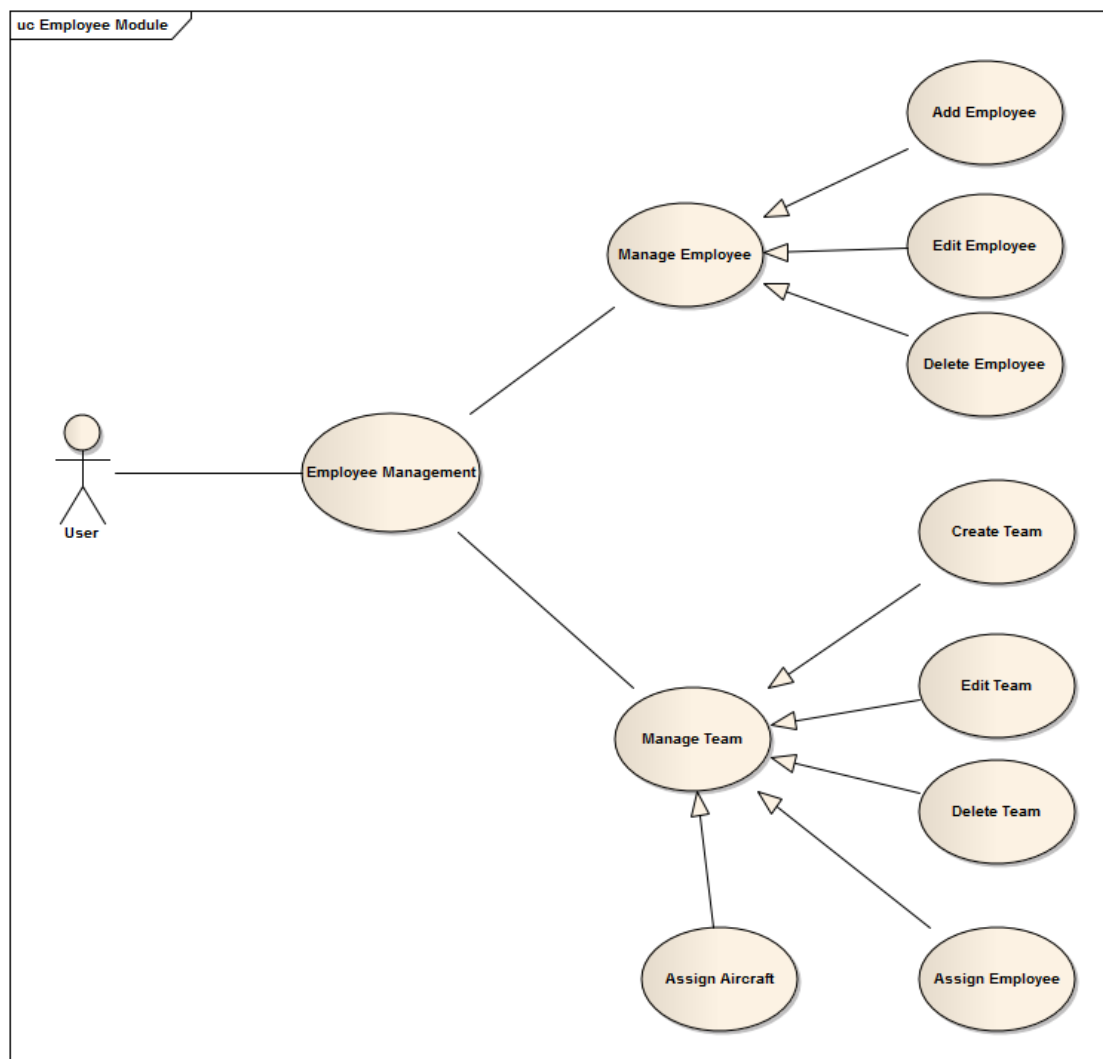
MODULES DESCRIPTION

Employee Module

Module Chart

Authorized account	<i>System Administrator Human Resource</i>
Related Servlets	<i>employee.controller.*</i>
Related JSPs	<i>jsp.employee.*</i>

Use Cases



Description

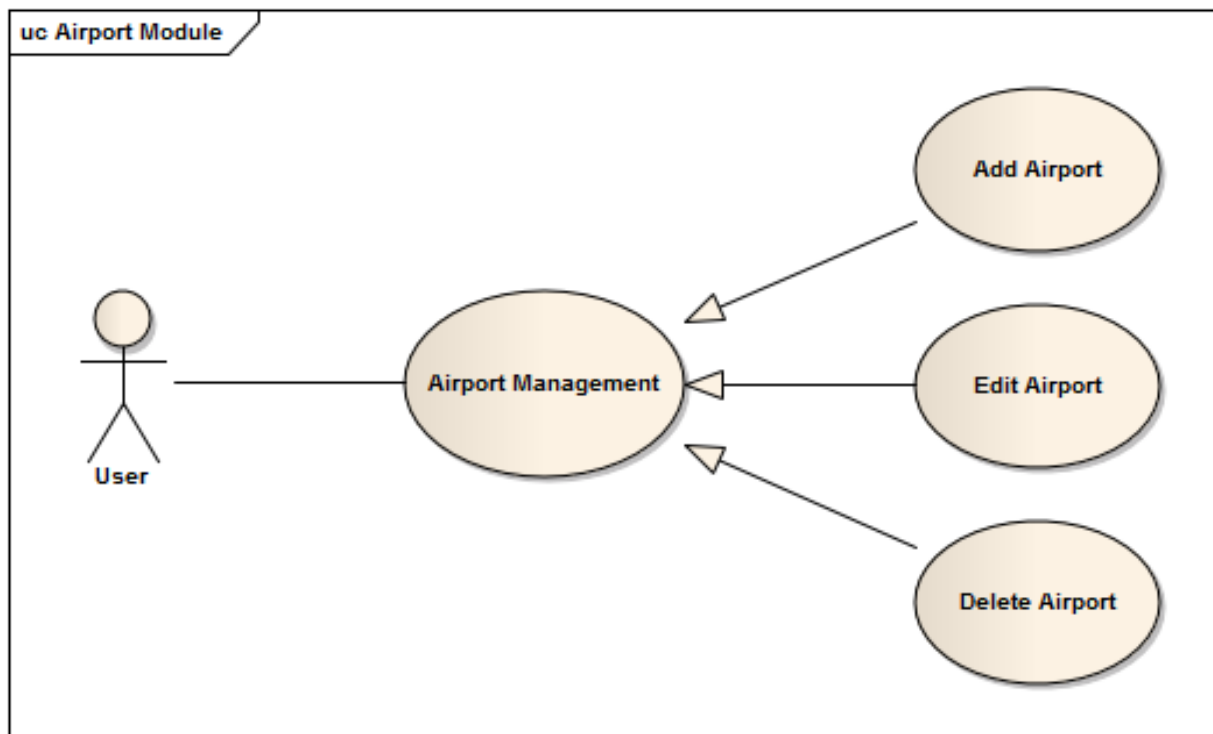
The employee module allows Human Resource to manage all the employee of the company. They can add new employees, edit or delete them. Data for each employees such as salary can be edited. We can also manage teams and aircrafts to each teams from this interface.

Airport Module

Module Chart

Authorized account	<i>System Administrator Airline Manager</i>
Related Servlets	<i>airport.controller.*</i>
Related JSPs	<i>jsp.airport.*</i>

Use Cases



Description

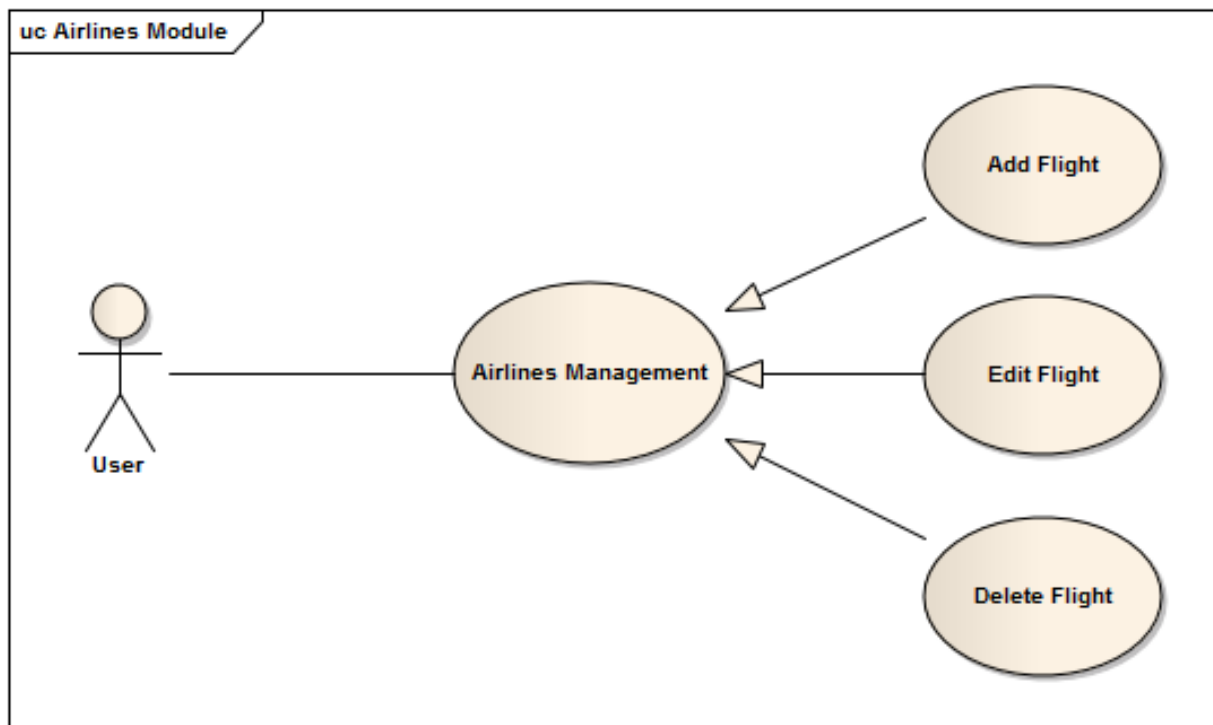
The airport module allows airline managers to add new airports, edit information or delete closed airport for the creation of new airlines. These airports are usable as departing or arrival airports available for the company.

Airlines Module

Module Chart

Authorized account	<i>System Administrator Airline Manager</i>
Related Servlets	<i>flight.controller.*</i>
Related JSPs	<i>jsp.flight.*</i>

Use Cases



Description

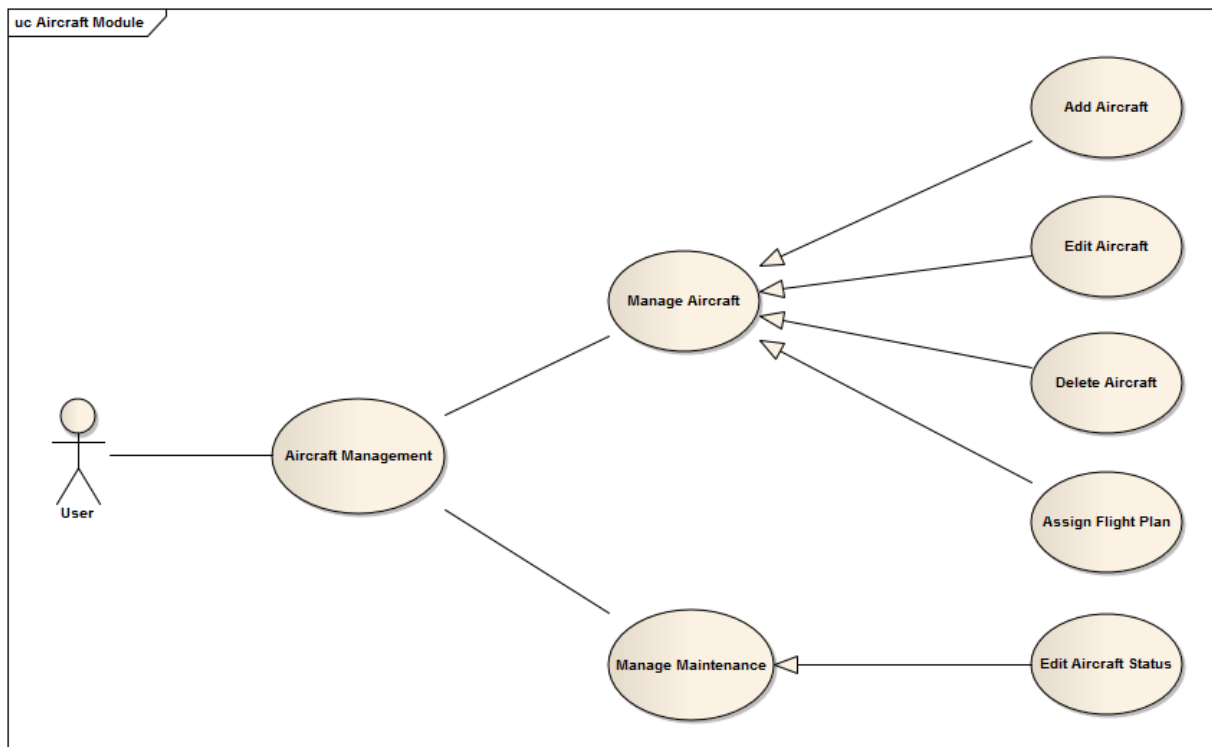
The airlines management modules allows airline managers to create edit and delete new flight plans for the company with all required data for pilots. These created flight plans then can be assigned to company's aircrafts.

Aircraft Module

Module Chart

Authorized account	<i>System Administrator Fleet Manager</i>
Related Servlets	<i>aircraft.controller.*</i>
Related JSPs	<i>jsp.aircraft.*</i>

Use Cases



Description

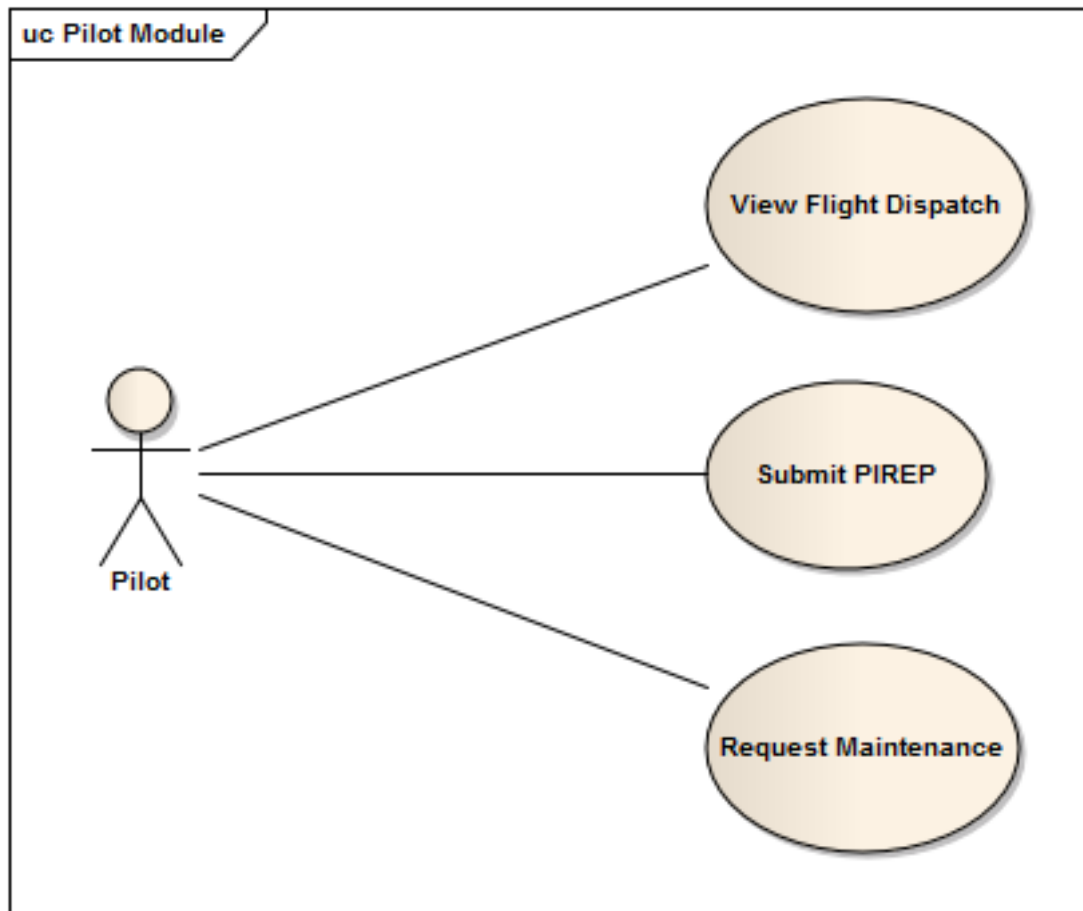
The aircraft management module allows fleet managers to create, edit and delete aircraft that are available in the company. We can also assign flight plan and manage the maintenance of each aircraft from this module.

Pilot Module

Module Chart

Authorized account	<i>Pilot</i>
Related Servlets	<i>pilot.controller.*</i>
Related JSPs	<i>jsp.pilot.*</i>

Use Cases



Description

The pilot module is a special part of the system designed for pilot dispatches. It displays flight data for pilots. After a flight, they can submit pilot reports by using the system and request aircraft maintenance if issues are encountered.