

DOKUZ EYLUL UNIVERSITY

ENGINEERING FACULTY

DEPARTMENT OF COMPUTER ENGINEERING

CME 3201

DATABASE MANAGEMENT SYSTEMS

DEU AIRLINES PROJECT

By

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Project Description:

The reason for undertaking this project is to fulfil the requirements of the "CME 3201 Database Management Systems" course, which involves designing a web-based site that interacts with a database, along with developing an application that facilitates communication between the site and the database. The scope and needs of the project were determined through mutual discussions with the course instructor, Assoc. Prof. Dr. Semih UTKU. As a result of these conversations, the decision was made to create a simulation of airline management.

To elaborate further, the project aims to design a system that operates as a web-based simulation, integrating seamlessly with a database. The communication between the site and the database is a key aspect of the application's functionality. The project involves the comprehensive simulation of managing an airline company, encompassing various aspects such as creating flights, buying and selling aircraft, and implementing features like employee management, unlocking new airports, and incorporating a banking system. The ultimate goal is to develop a practical and engaging application that aligns with the educational objectives of the database management systems course.

Purpose and Benefits:

This project provides a game that players can compete with each other. Benefits include helping to develop management, accounting and business skills in a tactical framework. These features allow users to develop their skills while having fun at the same time.

Stakeholders of the Project:

- Assoc. Prof. Dr. Semih UTKU (Course Instructor): As the course instructor, Dr. UTKU is a key stakeholder who has provided guidance and requirements for the project. He may have specific expectations for the project's outcome, aligning with the course objectives.
- Students (Project Team): The students involved in the project are stakeholders as they actively contribute to the design and development. Their learning experience, success in the course, and understanding of database management systems and web development are at stake.
- Potential Users (Players of the Game): The individuals who will eventually play the airline management game are crucial stakeholders. Their satisfaction, engagement, and overall experience with the game will determine its success.

Problem Domain of the Project:

The aim is to develop a simulation game for airline management that provides users with an enjoyable way to spend their time. The problem domain signifies the primary topic area of the project.

Within this problem domain, the fundamental objectives of the system design are as follows: Store information about the company and player progress.

- 1- Create new flights.
- 2- Buy and sell aircraft.
- 3- Manage the hiring and firing of employees.
- 4- Unlock new airports.
- 5- Include a banking and credit system.
- 6- Gather feedback from players.

These objectives are designed to meet the expectations of users and offer them a delightful simulation experience. In this context, the problem domain encompasses the experience of users in managing a virtual airline company while evaluating requirements from an operational perspective. This provides a crucial foundation for users to interact with the system as they desire, ensuring a meaningful and enjoyable experience.

Solution Domain:

As the project aims to design a system to implement an airline management game, various features and functions will be integrated in this context.

No restrictions have been imposed on the choice of programming languages, IDEs, database systems, and tools for developing this project. Consequently, for the front-end design of the website, HTML, CSS, and JavaScript will be utilized, while for the back-end, MySQL has been chosen since it was one of the two options as mentioned in our progress report earlier. The communication between the database and the site is facilitated using Node.js.

Before initiating the project, the team had no prior experience with any of the languages and tools mentioned above. Therefore, as a preliminary step, the team learned HTML first, followed by CSS and JavaScript. Later on, studies were carried out on database management systems and Node.js.

Functional Requirements:

1. Player and Company Information:

- Recording players and managing their profiles.
- Storing company information (revenue, expenses, profit, etc.).

2. Flight Management:

- Creating new flights.
- Show existing flights.

3. Airplane Operations:

- Purchasing and selling airplane.
- Managing the airplane inventory.

4. Employee Management:

- Hiring and firing employees.
- Edit and show existing employee information.

5. Airports:

- Unlocking and managing new airports.

6. Bank and Credit System:

- Providing players access to virtual bank accounts and the credit system.

7. Feedback:

- Storing player feedback.
- Reporting and analysing feedback.

Non-Functional Requirements:

1. Performance:

- System response times at a specified level.
- Optimization for concurrent player support.

2. Security:

- Secure storage and transmission of user information.
- Authentication and authorization security measures.

3. Usability:

- User-friendly interface design.
- Clear and understandable error messages.

4. Portability:

- Compatibility across different browsers and devices.
- Compatibility across different operating systems.

Constraints:

- The project has a due date. It must be finished until the last week of December.
- A database management system must be used and the system must be on 3rd normal form of normalization.
- The project must be a web application.
- There must be at least 5 tables in the database if the database management system is relational.
- There should be at least 2 at most 4 people working on this project.

Milestones and Timeline:

We started at 16th October 2023 to DEU Airlines project. The developers learned how to use HTML, CSS and JavaScript in the first week of the project. The sections within the site, the locations and sizes of these sections were determined in the second week of the project. In weeks 3 and 4, half of the developer group worked on improving the interface of the site and the other half worked on adding functionality to the buttons on the site.

For the fifth week, we worked on the completion of the remaining interfaces and buttons. In the following 4 weeks, we created the database, work on the integration between the website and the database and create the necessary functions of the game. Debugging and performance controls took place in the last week and our project was finished on 1st January 2024.

Completed Tasks:

As promised, the game provides a virtual atmosphere for a web-based airline company management simulation integrating seamlessly with a database. Players can:

- Manage their employees by hiring and firing employees.
- Manage their fleet by buying and selling planes.
- Unlock airports.
- Generate flights with desired destination, crew members and plane.
- Bank system and loan.

Altered Tasks:

- According to our plans at the beginning of the project, players were going to pay their loan debts manually by visiting pay loan page in our game. Instead, now the payment is taken automatically by our system on a daily basis.
- Instead of returning error messages, we revised our design to get rid of possible errors. So, there is no more error messages.

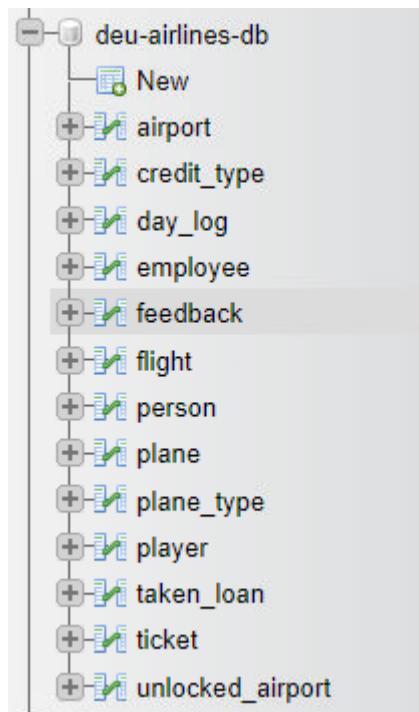
Incomplete Tasks:

- Due to small mistake in time planning, we could not work on the portability of the project.

Database Properties:

As mentioned earlier, we used MySQL for our database and “xampp” to store and manage our web application data. Our database in third normal form. We added two trigger mechanisms to our database. If an employee has been fired after being assigned to a flight in a day, when the player hits on the “NEXT DAY” button, the dismissal operation gets cancelled. And the second trigger works the same way for the planes. If a plane is decided to be sold after being assigned to a flight, the selling operation gets cancelled. These two triggers prevent generating flights without non-existent planes or crew members by aborting update functions on related tables and return an error message.

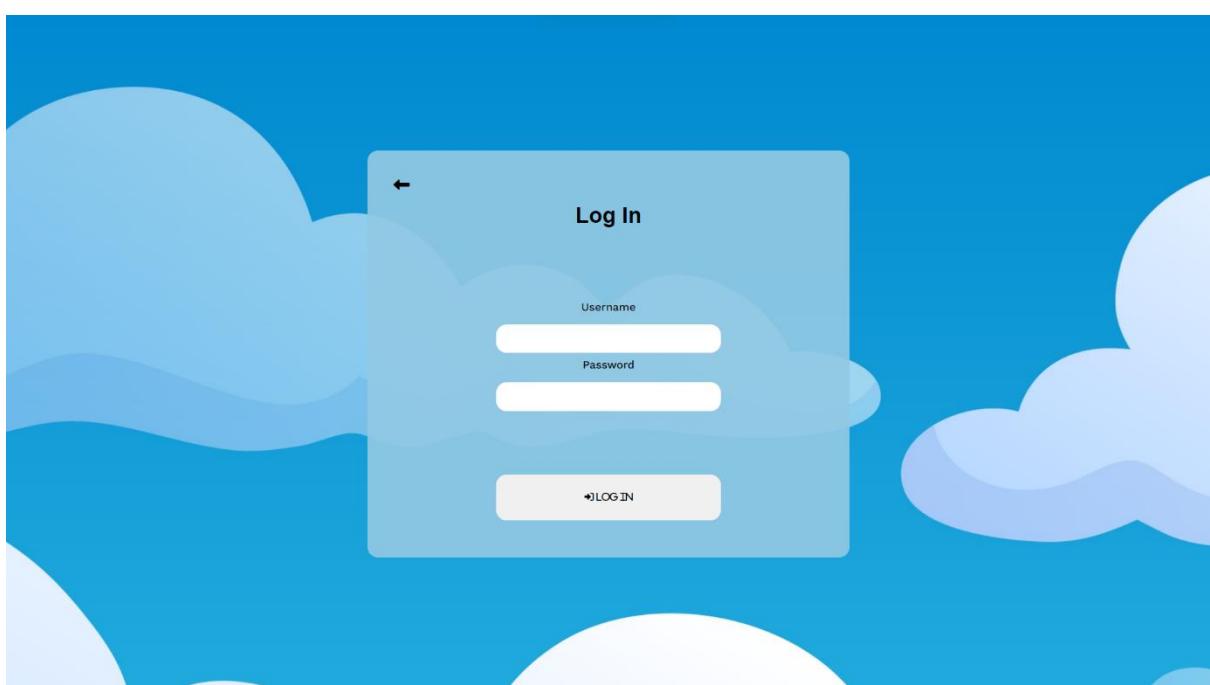
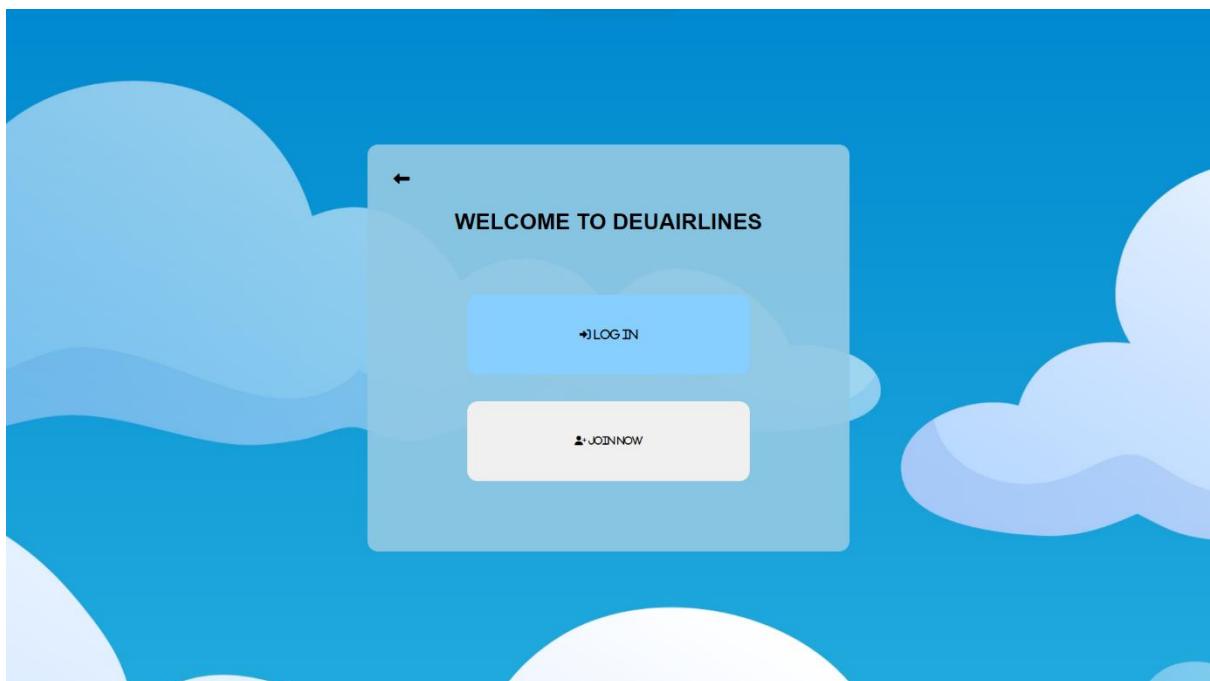
Deu Airlines database tables:



Following part is introduction to DEU AIRLINES

LOG IN SCREEN

This is the first screen you will see when you enter the game. If you already have an account, you can enter the game with your username and password by pressing the "log in" button. This way you will be logged in with your company's data stored in the database. If you are new to the game or want to create a new account, you can click on the "join now" button to create a new username which will be your company's name and sign up with your password. This will add your new company to the database. And welcome! That is all you need to do start our game. But don't forget, you can't have more than one company with same name.



Player table structure:

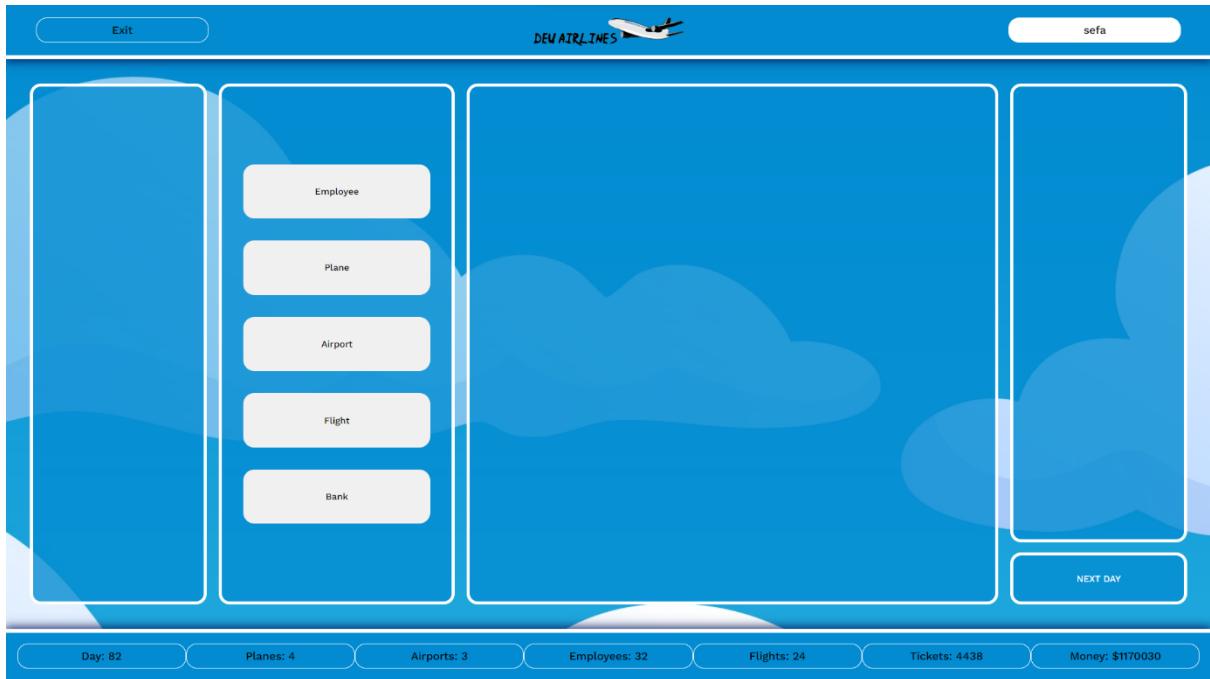
#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	username	varchar(100)	utf8mb4_general_ci		No	None			Change
2	password	varchar(100)	utf8mb4_general_ci		No	None			Change
3	company_name	varchar(30)	utf8mb4_general_ci		No	None			Change
4	day	int(11)			No	0			Change
5	money	int(11)			No	0			Change
6	activity	varchar(30)	utf8mb4_general_ci		No	offline			Change

Example player table:

				username	password	company_name	day	money	activity
<input type="checkbox"/>				admin	admin	admin	0	0	offline
<input type="checkbox"/>				sefa	123	sefa Airlines	202	2757425	offline

MAIN GAME SCREEN

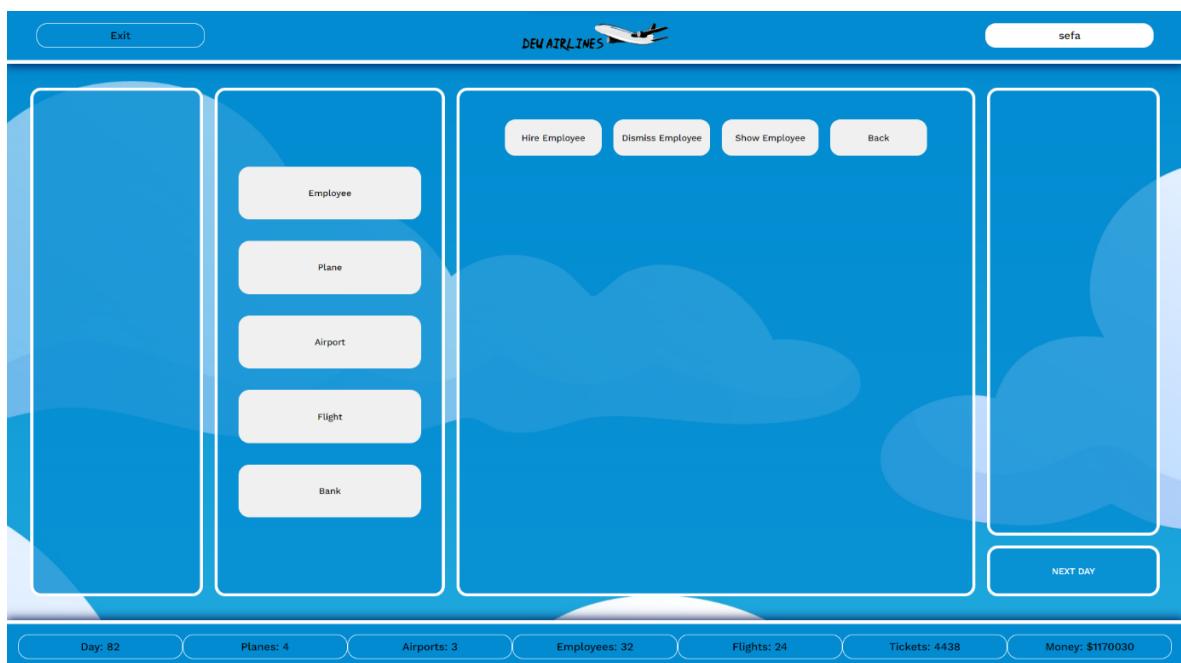
Immediately after logging in, you will be directed to this page, which is basically the main screen of the game. At the bottom of this page, you can see data about your company such as the number of employees, the number of airplanes, the money, the number of days you have been in business. The big area in the middle is where you will be presented with the relevant tables and options after you select the action you want to take. On the far right of the page is your tracking panel, where you can see the transactions you have made within a day of the game, such as hiring employees, creating flights, buying a new airplane or selling an airplane. After you have completed the actions for the day, you can click the "NEXT DAY" button to advance your day in the game. Your information in the database will be updated each time you press this button with the actions you have taken that day. Also, when you press this button, the data stored on the right side of the screen will be written to the panel on the left side of the main screen so you will be able to track your actions from the previous day on this panel. In the bar at the top of the screen, you can see the exit button on the left side, the name of our game in the middle and the name of your company on the right side.



Now let's see what those five option buttons do:

1- EMPLOYEE BUTTON

Employees are your work force in the game. Generating flights are the main source of income and for each flight you need to assign pilots and cabin attendants. The more employee you have, the more flight you can generate thus more the money you can make. Your employees will gain experience as they attend to flights. Once you click on the employee button, you will be presented with three other options inside the big panel.



A – Hire employee

In this tab you will see all the employees in the database that you can hire. Employees will be listed by social security number, first name, last name, salary, experience, and occupation. To make it easier to search, we turn the section that normally contains options into a filtering screen. Here you can filter the employees according to the aforementioned specialities and you can perform your search more easily through the employees with the desired characteristics. To hire an employee, all you need to do is clicking on the hire button at the rightmost section of the table.

The screenshot shows the DevAirlines software interface. At the top, there are tabs for 'Exit', 'DEV AIRLINES' (with a logo), and 'ozan'. On the left, there is a large blue panel with a white input form. The form includes fields for 'Name', 'Experience' (dropdown menu showing 'Entry Level'), 'Profession' (radio buttons for 'All', 'Pilot', and 'Cabin Attendant'), a 'Submit' button, and a 'Clear Filter' button. On the right, there is a table titled 'Hire Employee' with columns: ID, Name, Salary, Experience, Profession, and Hire. The table lists ten employees with the following details:

ID	Name	Salary	Experience	Profession	Hire
37	Brisa Booker	1250	Mid Level	pilot	<input type="checkbox"/>
42	Adilson Okamoto	600	Mid Level	cabin attendant	<input type="checkbox"/>
43	Braxton Fantozzi	600	Mid Level	cabin attendant	<input type="checkbox"/>
44	Paula Kim	700	Senior Level	cabin attendant	<input type="checkbox"/>
45	Izzulhakim Mcclanahan	600	Mid Level	cabin attendant	<input type="checkbox"/>
46	Walker Booker	1000	Entry Level	pilot	<input type="checkbox"/>
47	Felix Yanes	600	Mid Level	cabin attendant	<input type="checkbox"/>
49	Nya Jorgenson	600	Mid Level	cabin attendant	<input type="checkbox"/>
50	Yann Timmerman	1500	Senior Level	pilot	<input type="checkbox"/>

At the bottom of the interface, there are status indicators: Day: 4, Planes: 1, Airports: 2, Employees: 5, Flights: 1, Tickets: 140, Bank Outgoing: 10600, Crews Outgoing: 4450, and Money: \$870660. A 'NEXT DAY' button is also present.

B – Dismiss Employee

Like the hire employee table, except here you can only see the employees currently working in your company. Employees are listed by their specialities as well and filtering is also available the same way as on hire employee section. To dismiss an employee, you need to click on the dismiss button at the rightmost section of the table.

The screenshot shows the 'Dismiss Employee' section of the Devairlines application. On the left, there is a search form with fields for Name, Experience (set to 'Entry Level'), and Profession (set to 'Cabin Attendant'). Below the form are 'Submit' and 'Clear Filter' buttons. On the right, there is a table titled 'Dismiss Employee' with columns: ID, Name, Salary, Experience, Profession, and Dismissal. The table contains five rows of employee data. At the bottom of the page, there is a footer with various statistics: Day: 4, Planes: 1, Airports: 2, Employees: 5, Flights: 1, Tickets: 140, Bank Outgoing: 19600, Crews Outgoing: 4450, and Money: \$870660. A 'NEXT DAY' button is located at the bottom right of the main content area.

ID	Name	Salary	Experience	Profession	Dismissal
38	Quyen Vlasak	600	Mid Level	cabin attendant	<input type="checkbox"/>
39	Wanda Underwood	1250	Mid Level	pilot	<input type="checkbox"/>
40	Ajda Somer	500	Entry Level	cabin attendant	<input type="checkbox"/>
41	Nyah Yamada	600	Mid Level	cabin attendant	<input type="checkbox"/>
48	Tisha Stinson	1500	Senior Level	pilot	<input type="checkbox"/>

C – Show Employee

The screenshot shows the 'Show Employee' section of the Devairlines application. The layout is identical to the 'Dismiss Employee' section, featuring a search form on the left and a table of employees on the right. The table displays the same five employees as the previous screenshot. The footer at the bottom of the page includes the same statistics: Day: 4, Planes: 1, Airports: 2, Employees: 5, Flights: 1, Tickets: 140, Bank Outgoing: 19600, Crews Outgoing: 4450, and Money: \$870660. A 'NEXT DAY' button is located at the bottom right.

ID	Name	Salary	Experience	Profession	Dismissal
38	Quyen Vlasak	700	Mid Level	cabin attendant	<input type="checkbox"/>
39	Wanda Underwood	700	Mid Level	pilot	<input type="checkbox"/>
40	Ajda Somer	700	Entry Level	cabin attendant	<input type="checkbox"/>
41	Nyah Yamada	700	Mid Level	cabin attendant	<input type="checkbox"/>
48	Tisha Stinson	700	Senior Level	pilot	<input type="checkbox"/>

This table is same as the dismiss employee table except there is no additional button for dismissing. This section is only for viewing your employees. This way, you can see what employees you need and plan the future of your company.

Employee table structure:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	employee_id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	username	varchar(100)	utf8mb4_general_ci		No	admin			Change Drop More
3	ssn	int(11)			No	None			Change Drop More
4	profession	varchar(30)	utf8mb4_general_ci		No	None			Change Drop More
5	flight_count	int(11)			No	None			Change Drop More
6	status	varchar(100)	utf8mb4_general_ci		No	free	free / onflight		Change Drop More

Example employee table:

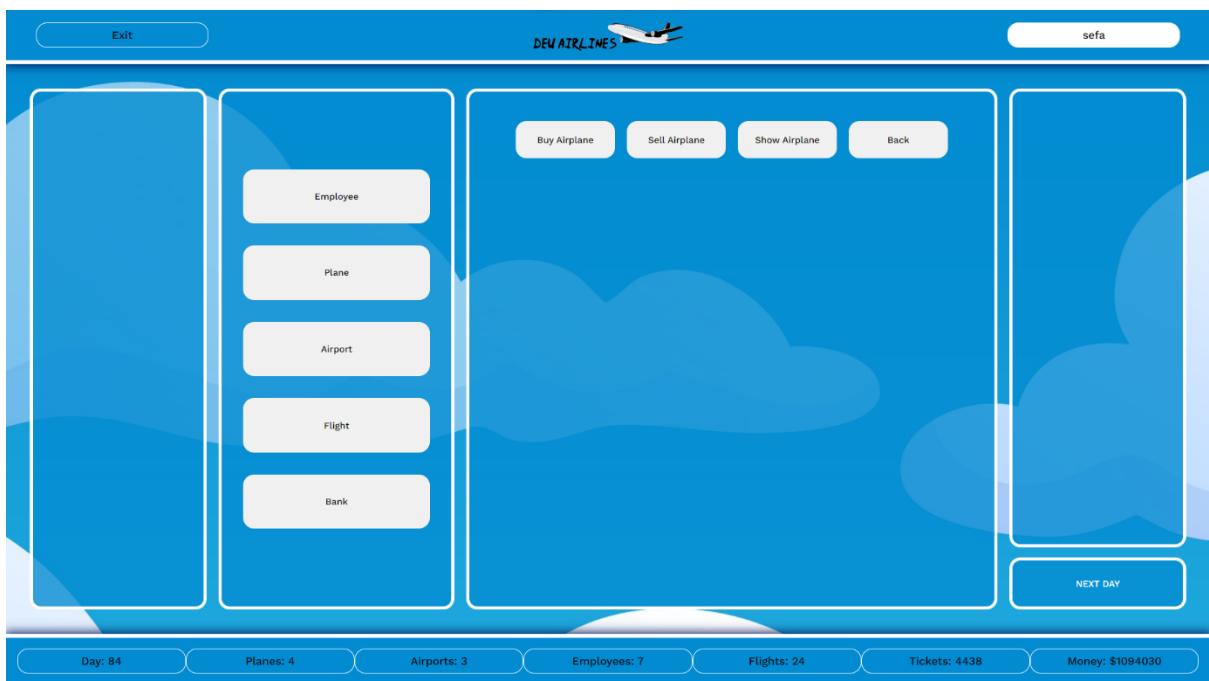
	Edit Copy Delete	employee_id	username	ssn	profession	flight_count	status free / onflight
		20000	admin	23037	pilot	248	free
		19992	admin	39565	pilot	787	free
		19989	admin	16867	pilot	664	free
		19984	admin	25089	pilot	559	free
		19981	admin	10613	pilot	633	free
		19979	admin	12978	pilot	763	free
		19978	admin	16464	pilot	944	free
		19975	admin	23293	pilot	236	free
		19974	admin	7652	pilot	115	free
		19969	admin	7323	pilot	555	free
		19966	admin	25058	pilot	504	free
		19965	admin	41159	pilot	688	free
		19964	admin	44557	pilot	457	free
		19961	admin	10010	pilot	263	free
		19957	admin	39089	pilot	74	free
		19956	admin	25616	pilot	442	free
		19954	admin	5886	pilot	683	free
		19950	admin	31354	pilot	564	free
		19949	admin	36829	pilot	967	free
		19947	admin	19192	pilot	47	free
		19937	admin	14995	pilot	83	free

Person table example:

		ssn	name	lastname	phone_number	mail	birth_date	gender	flight_status
		ssn	name	lastname	phone_number	mail	birth_date	gender	flight_status
<input type="checkbox"/>	 Edit	 Copy	 Delete	1 Vencel	Day	1562 6135 4086	0 1994-06-30	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	2 Paulo	Garner	0343 6511 0569	0 1998-07-11	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	3 Teagan	Ojeda	8623 3697 4519	0 1986-07-01	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	4 Anastasia	Austin	6227 9707 6039	0 1943-04-15	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	5 Nellie	Abbott	4481 0227 7981	0 1970-12-06	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	6 Barbara	Lawrence	5628 4486 5463	0 2016-05-10	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	7 Hazar	Tecer	1511 1710 1231	0 1948-10-02	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	8 Reha	Ulukaya	8590 0225 4808	0 1945-09-20	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	9 Regan	Levy	0254 3430 6099	0 1955-11-14	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	10 Cankut	Birol	4476 5019 4743	0 1969-10-04	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	11 Sunullah	Yerli	4549 7718 6906	0 2016-01-16	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	12 Malte	Neuman	3386 8751 2721	0 1996-12-17	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	13 Dzvynyslava	Xie	4401 3511 2091	0 1980-02-08	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	14 Willow	Buggs	9653 2974 8210	0 1971-03-02	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	15 Yvette	Barron	4541 4744 9078	0 1985-05-21	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	16 Varda	Elbert	5204 7329 7204	0 2005-08-16	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	17 Biray	Sapmaz	6631 7094 3097	0 2013-07-26	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	18 Uthman	Osman	9429 7662 8187	0 1977-04-26	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	19 Reilly	Wilkes	9311 4180 5281	0 2004-06-15	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	20 Wanda	Nally	0944 0967 2724	0 1931-03-03	1	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	21 Muslih	Soykan	2882 1876 8238	0 2022-07-02	0	0
<input type="checkbox"/>	 Edit	 Copy	 Delete	22 Jannifer	Farrow	0884 9920 6617	0 2004-01-27	1	0

2- PLANE BUTTON

Planes are the essential elements of the flights. No plane means no flight. As an airline company, expanding your hangar is one of the main purposes of the game. There are three different types of planes with different capacities, prices and maintenance fees. Choose them according to what you plan to do. When you click on the “Planes” button, you will be represented with three other options inside the big panel.



A – Buy Airplane

In this tab, you will see a list of planes available in our database. The planes have five attributes: ID, type, price, capacity and maintenance fee. You can filter them according to their types, and your desired price gap. If you want to add one of those planes in your fleet, all you need to do is clicking on the “Buy” button. When you buy a plane, the transaction will be shown on the right panel by the plane’s ID.

The screenshot shows the 'Buy Airplane' section of the DEU AIRLINES application. At the top, there are four buttons: 'Buy Airplane', 'Sell Airplane', 'Show Airplane', and 'Back'. Below these are two columns of filters. The left column contains a 'Type:' dropdown with three options: 'DEU-AIRLINES-A200', 'DEU-AIRLINES-A300', and 'DEU-AIRLINES-A400'. It also has 'Submit' and 'Clear Filter' buttons. The right column displays a table of available planes:

ID	Type	Price	Capacity	Flight Count	Buy
23	DEU-AIRLINES-A200	969600	200	76	<input type="checkbox"/>
31	DEU-AIRLINES-A200	968400	200	79	<input type="checkbox"/>
10	DEU-AIRLINES-A300	1987130	300	33	<input type="checkbox"/>
12	DEU-AIRLINES-A300	2000000	300	0	<input type="checkbox"/>
17	DEU-AIRLINES-A300	1996880	300	8	<input type="checkbox"/>
20	DEU-AIRLINES-A300	1980500	300	50	<input type="checkbox"/>
21	DEU-AIRLINES-A300	1865450	300	345	<input type="checkbox"/>
25	DEU-AIRLINES-A300	1883000	300	300	<input type="checkbox"/>
29	DEU-AIRLINES-A300	1727000	300	700	<input type="checkbox"/>

At the bottom, there is a 'NEXT DAY' button and a footer bar with various statistics: Day: 4, Planes: 1, Airports: 2, Employees: 5, Flights: 140, Tickets: 140, Bank Outgoing: 10600, Crews Outgoing: 4450, Money: \$870660.

B – Sell Airplane

Here, you can see a list of planes that your company has. If you want to sell a plane of yours, you can do so by clicking on the “sell” button. Filters are also available here to narrow down the list of your planes to those that have your desired properties.

The screenshot shows a user interface for managing aircraft. At the top, there are buttons for 'Buy Airplane', 'Sell Airplane', 'Show Airplane', and 'Back'. Below these is a table with columns: ID, Type, Price, Capacity, Flight Count, and Sell. A single row is visible, showing ID 14, Type DEU-AIRLINES-A200, Price 975200, Capacity 200, Flight Count 62, and a checked 'Sell' checkbox. On the left, there's a sidebar with a 'Type:' section containing three checkboxes for 'DEU-AIRLINES-A200', 'DEU-AIRLINES-A300', and 'DEU-AIRLINES-A400', and two buttons: 'Submit' and 'Clear Filter'. On the right, there's a 'NEXT DAY' button. At the bottom, there are summary statistics: Day: 4, Planes: 1, Airports: 2, Employees: 5, Flights: 1, Tickets: 140, Bank Outgoing: 19500, Crews Outgoing: 4450, and Money: \$870660.

ID	Type	Price	Capacity	Flight Count	Sell
14	DEU-AIRLINES-A200	975200	200	62	<input checked="" type="checkbox"/>

Day: 4 Planes: 1 Airports: 2 Employees: 5 Flights: 1 Tickets: 140 Bank Outgoing: 19500 Crews Outgoing: 4450 Money: \$870660

C – Show Airplane

Show airplane works as the same as “show employee” section that we talked about before. If you want to monitor your planes without doing any transaction, this tab is where you should head to. Thus, you can observe what planes you lack and add some new planes to your purchase list on the future.

The screenshot shows the 'Show Airplane' tab within the DEV AIRLINES application. The interface is divided into several sections:

- Left Panel:** A large blue area containing three filter buttons: "DEU-AIRLINES-A200", "DEU-AIRLINES-A300", and "DEU-AIRLINES-A400". Below these are two buttons: "Submit" and "Clear Filter".
- Header:** Includes "Exit", the "DEV AIRLINES" logo, and the user name "ozan".
- Top Bar:** Buttons for "Buy Airplane", "Sell Airplane", "Show Airplane" (which is active), and "Back".
- Data Table:** A table showing a single row of plane information:

ID	Type	Price	Capacity	Flight Count
14	DEU-AIRLINES-A200	975200	200	62
- Right Panel:** A large blue area with a "NEXT DAY" button at the bottom.
- Bottom Navigation:** A series of status indicators: Day: 4, Planes: 1, Airports: 2, Employees: 5, Flights: 1, Tickets: 140, Bank Outgoing: 19800, Crews Outgoing: 4450, and Money: \$870660.

Plane type table:

		model_name	a_class_capacity	b_class_capacity	maintaining_fee	price
<input type="checkbox"/>	Edit Copy Delete	DEU-AIRLINES-A200	10	190	50000	1000000
<input type="checkbox"/>	Edit Copy Delete	DEU-AIRLINES-A300	20	280	100000	2000000
<input type="checkbox"/>	Edit Copy Delete	DEU-AIRLINES-A400	30	370	150000	3000000

Plane table structure:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 model_name	varchar(100)	utf8mb4_general_ci		No	None		Change	Drop More
<input type="checkbox"/>	2 a_class_capacity	int(11)			No	None		Change	Drop More
<input type="checkbox"/>	3 b_class_capacity	int(11)			No	None		Change	Drop More
<input type="checkbox"/>	4 maintaining_fee	int(11)			No	None		Change	Drop More
<input type="checkbox"/>	5 price	int(11)			No	None		Change	Drop More

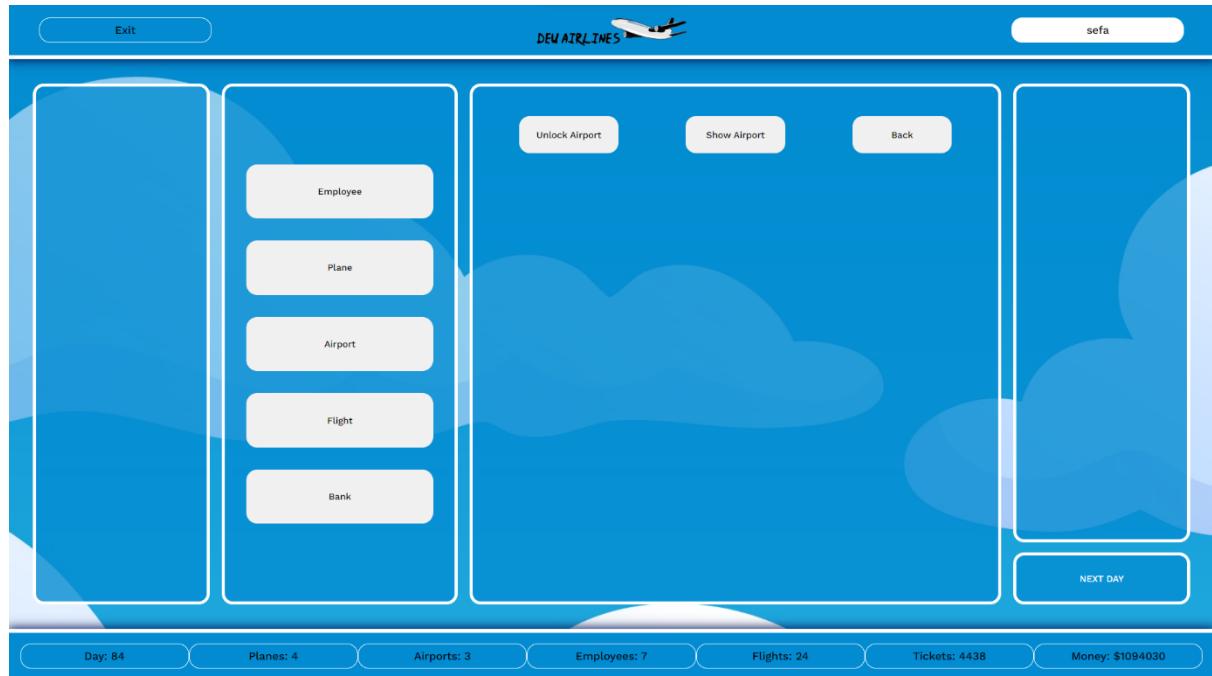
Example plane table:

		plane_id	username	model_name	flight_count	status free / onflight
<input type="checkbox"/>	Edit Copy Delete	2	sefa	DEU-AIRLINES-A200	156	free
<input type="checkbox"/>	Edit Copy Delete	4	admin	DEU-AIRLINES-A400	345	free
<input type="checkbox"/>	Edit Copy Delete	9	admin	DEU-AIRLINES-A400	123	free
<input type="checkbox"/>	Edit Copy Delete	10	admin	DEU-AIRLINES-A300	33	free
<input type="checkbox"/>	Edit Copy Delete	11	admin	DEU-AIRLINES-A200	60	free
<input type="checkbox"/>	Edit Copy Delete	12	admin	DEU-AIRLINES-A300	0	free
<input type="checkbox"/>	Edit Copy Delete	13	admin	DEU-AIRLINES-A400	980	free
<input type="checkbox"/>	Edit Copy Delete	14	admin	DEU-AIRLINES-A200	61	free
<input type="checkbox"/>	Edit Copy Delete	16	sefa	DEU-AIRLINES-A200	99	free
<input type="checkbox"/>	Edit Copy Delete	17	admin	DEU-AIRLINES-A300	8	free
<input type="checkbox"/>	Edit Copy Delete	18	admin	DEU-AIRLINES-A400	800	free
<input type="checkbox"/>	Edit Copy Delete	19	admin	DEU-AIRLINES-A400	3	free
<input type="checkbox"/>	Edit Copy Delete	20	admin	DEU-AIRLINES-A300	50	free
<input type="checkbox"/>	Edit Copy Delete	21	admin	DEU-AIRLINES-A300	345	free
<input type="checkbox"/>	Edit Copy Delete	22	admin	DEU-AIRLINES-A400	500	free
<input type="checkbox"/>	Edit Copy Delete	23	admin	DEU-AIRLINES-A200	76	free
<input type="checkbox"/>	Edit Copy Delete	25	admin	DEU-AIRLINES-A300	300	free
<input type="checkbox"/>	Edit Copy Delete	27	admin	DEU-AIRLINES-A400	345	free
<input type="checkbox"/>	Edit Copy Delete	28	admin	DEU-AIRLINES-A400	0	free
<input type="checkbox"/>	Edit Copy Delete	29	admin	DEU-AIRLINES-A300	700	free
<input type="checkbox"/>	Edit Copy Delete	30	admin	DEU-AIRLINES-A300	600	free
<input checked="" type="checkbox"/>	Edit Copy Delete	31	admin	DEU-AIRLINES-A200	79	free

3- AIRPORT BUTTON

The airports are another key element of the game. As a player you need to unlock an airport by paying its unlocking fee to be able to assign a flight to that location. Unlocking airports is another way of progressing in the game. The more you have of them, the more locations you can reach. Don't forget to have at least two airports since you can't take off from and land on the same airport.

There are two things you can do after clicking on "Airport" button.



A – Unlock Airport

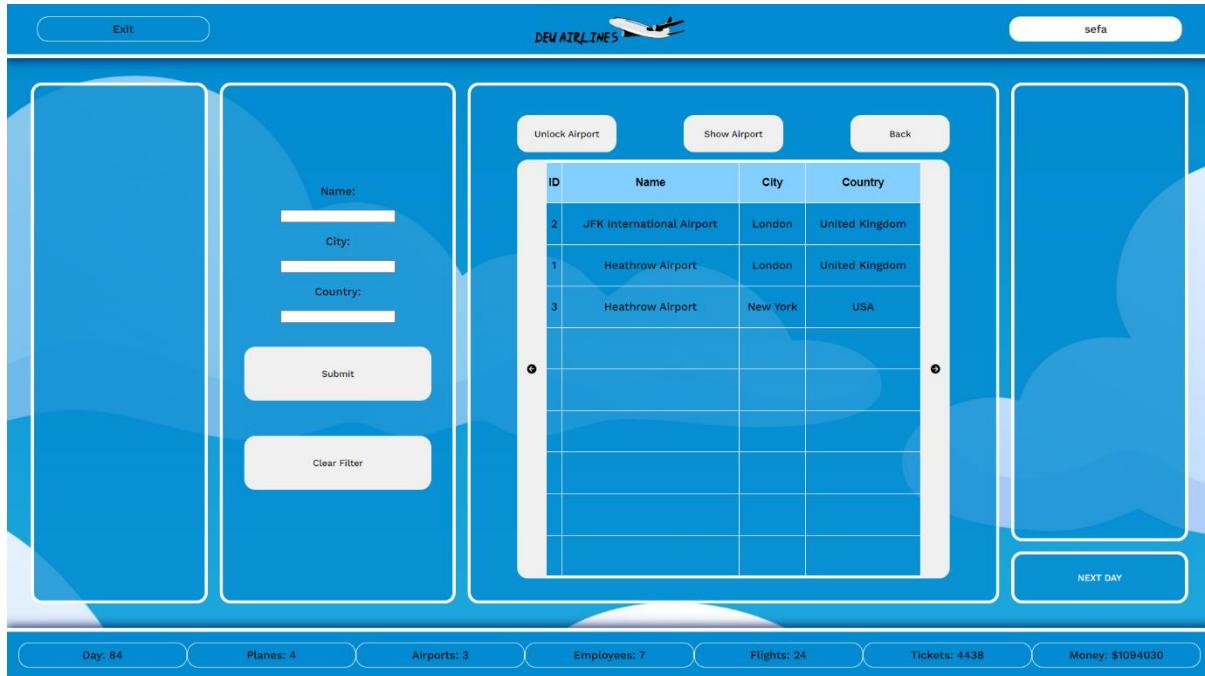
On this tab, you will see a table containing all the locked airports existing in our database listed by their ID, name, located city and country and their fee to unlock. You can filter them according to the name of the airport or by its location as city and country. All you have to do to unlock an airport is to click on the “unlock” button. Thus, the airport will be added to your company’s unlocked airport table. All the airports requires the same amount of payment to be unlocked.

The screenshot shows the DevAirlines software interface. At the top, there are buttons for 'Exit', the DevAirlines logo, and 'sefa'. On the left, there are two input fields for 'Name:' and 'City:', a 'Submit' button, and a 'Clear Filter' button. In the center, there is a table titled 'Unlock Airport' with columns for ID, Name, City, Country, Unlocking Fee, and an 'Unlock' button. The table lists 12 airports. On the right, there is a 'NEXT DAY' button. At the bottom, there are status indicators: Day: 84, Planes: 4, Airports: 3, Employees: 7, Flights: 24, Tickets: 4438, and Money: \$1094030.

ID	Name	City	Country	Unlocking Fee	Unlock
4	Dubai International Airport	Dubai	United Arab Emirates	1000000	<input type="checkbox"/>
5	Los Angeles International Airport	Los Angeles	USA	1000000	<input type="checkbox"/>
6	O Hare International Airport	Chicago	USA	1000000	<input type="checkbox"/>
7	Beijing Capital International Airport	Beijing	China	1000000	<input type="checkbox"/>
8	Narita International Airport	Tokyo	Japan	1000000	<input type="checkbox"/>
9	Charles de Gaulle Airport	Paris	France	1000000	<input type="checkbox"/>
10	Frankfurt Airport	Frankfurt	Germany	1000000	<input type="checkbox"/>
11	Amsterdam Airport Schiphol	Amsterdam	Netherlands	1000000	<input type="checkbox"/>
12	Incheon International Airport	Seoul	South Korea	1000000	<input type="checkbox"/>

B – Show Airport

This section is only to view your unlocked airports in your company. You can see which airports you have unlocked so far and also filter them by their name and location information.



Airport table structure:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	airport_id	🔑 int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	name	varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
3	country	varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
4	city	varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
5	unlocking_fee	int(11)			No	None			Change Drop More

Unlocked airport table structure

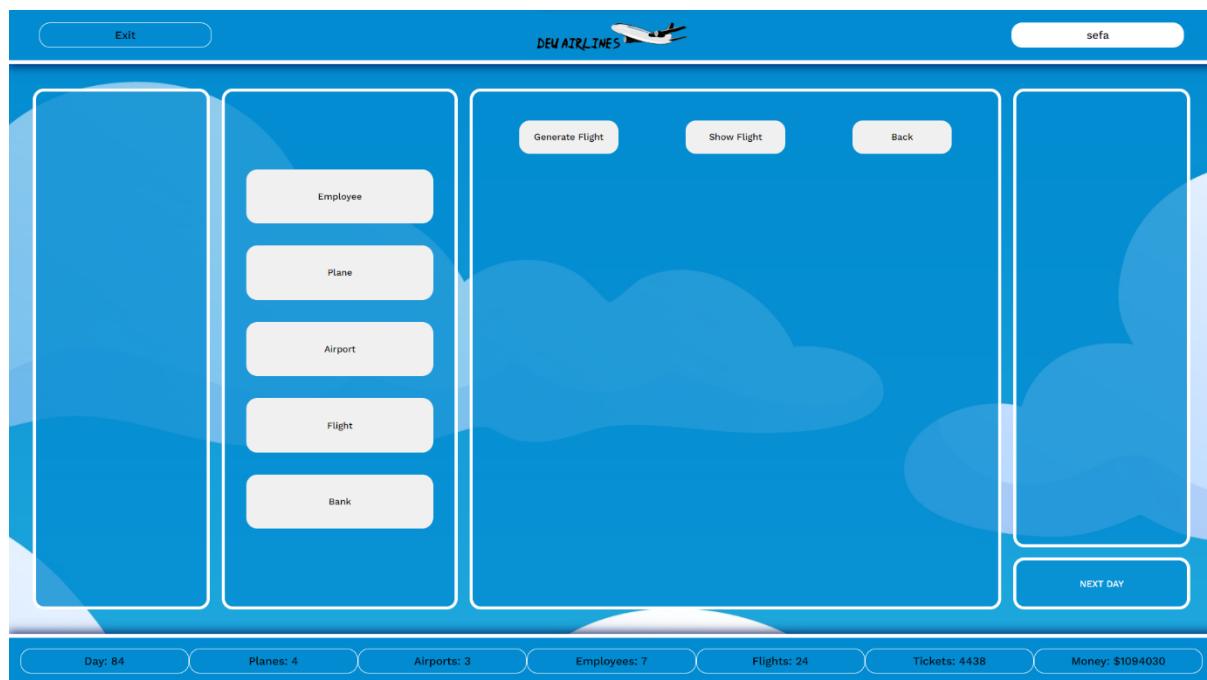
#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	own_id	🔑 int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	username	🔑 varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
3	airport_id	🔑 int(11)			No	None			Change Drop More

Example airport table:

		airport_id	name	country	city	unlocking_fee
		Edit	Copy	Delete		
<input type="checkbox"/>		1	Heathrow Airport	United Kingdom	London	1000000
<input type="checkbox"/>		2	JFK International Airport	United Kingdom	London	1000000
<input type="checkbox"/>		3	Heathrow Airport	USA	New York	1000000
<input type="checkbox"/>		4	Dubai International Airport	United Arab Emirates	Dubai	1000000
<input type="checkbox"/>		5	Los Angeles International Airport	USA	Los Angeles	1000000
<input type="checkbox"/>		6	O Hare International Airport	USA	Chicago	1000000
<input type="checkbox"/>		7	Beijing Capital International Airport	China	Beijing	1000000
<input type="checkbox"/>		8	Narita International Airport	Japan	Tokyo	1000000
<input type="checkbox"/>		9	Charles de Gaulle Airport	France	Paris	1000000
<input type="checkbox"/>		10	Frankfurt Airport	Germany	Frankfurt	1000000
<input type="checkbox"/>		11	Amsterdam Airport Schiphol	Netherlands	Amsterdam	1000000
<input type="checkbox"/>		12	Incheon International Airport	South Korea	Seoul	1000000
<input type="checkbox"/>		13	Adnan Menderes Airport	Turkey	Izmir	1000000
<input type="checkbox"/>		14	Samsun Carsamba Airport	Turkey	Samsun	1000000
<input type="checkbox"/>		15	Ankara Esenboga Airport	Turkey	Ankara	1000000
<input type="checkbox"/>		16	Antalya Airport	Turkey	Antalya	1000000

4- FLIGHT

Now let's talk about the actual part of the game: flights. Flights are the main purpose of your company and main way of making money. To generate a flight, you need pilots, cabin attendants, a plane, an airport to take off from and an airport to land on. So, all those employees you hired, planes you bought and airports you unlocked were for generating flights. Once you click on the "Flight" button, you will see two options inside:

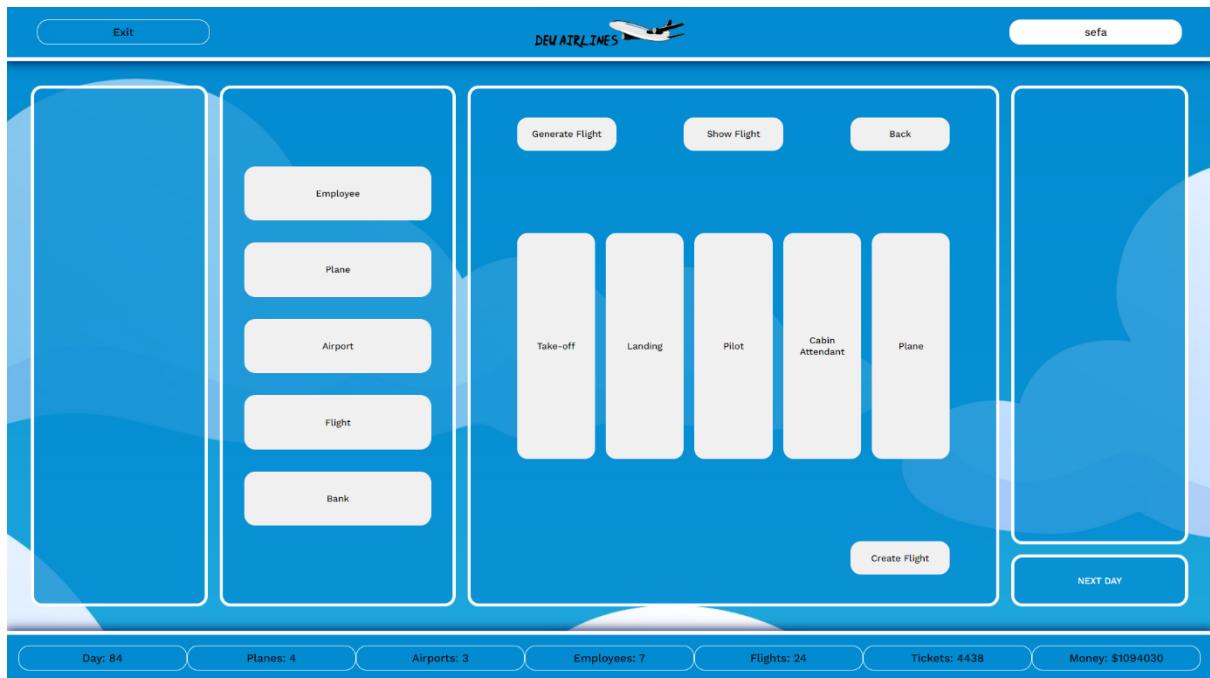


A – Generate Flight

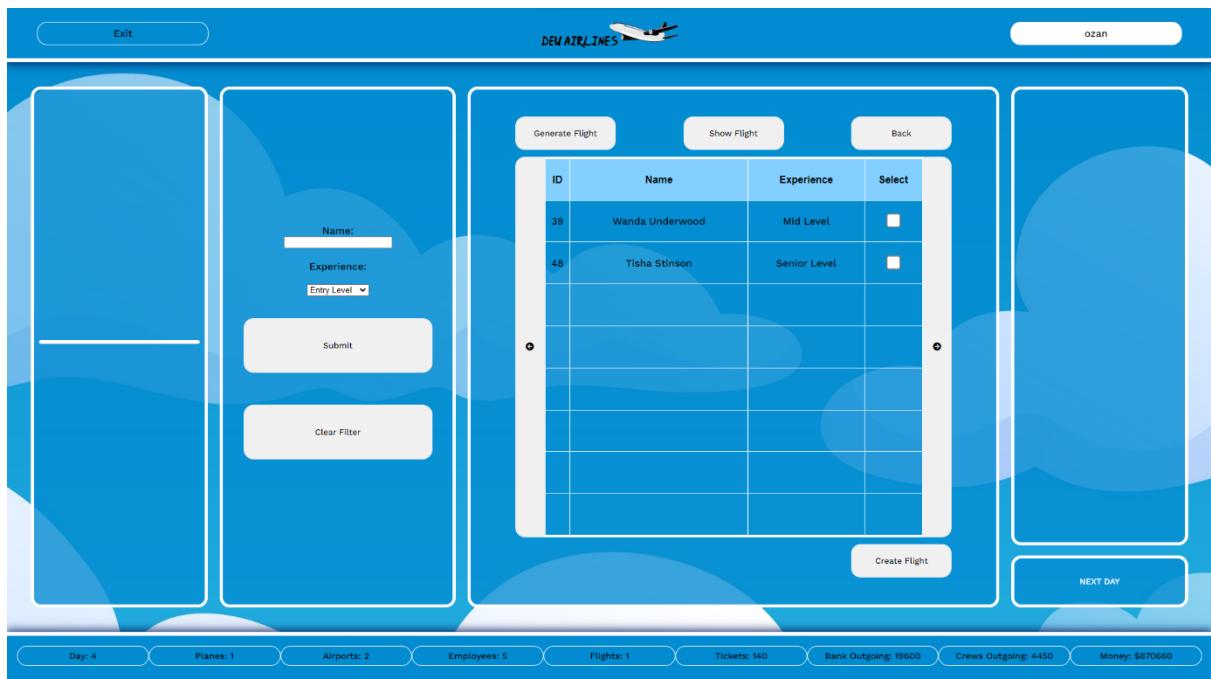
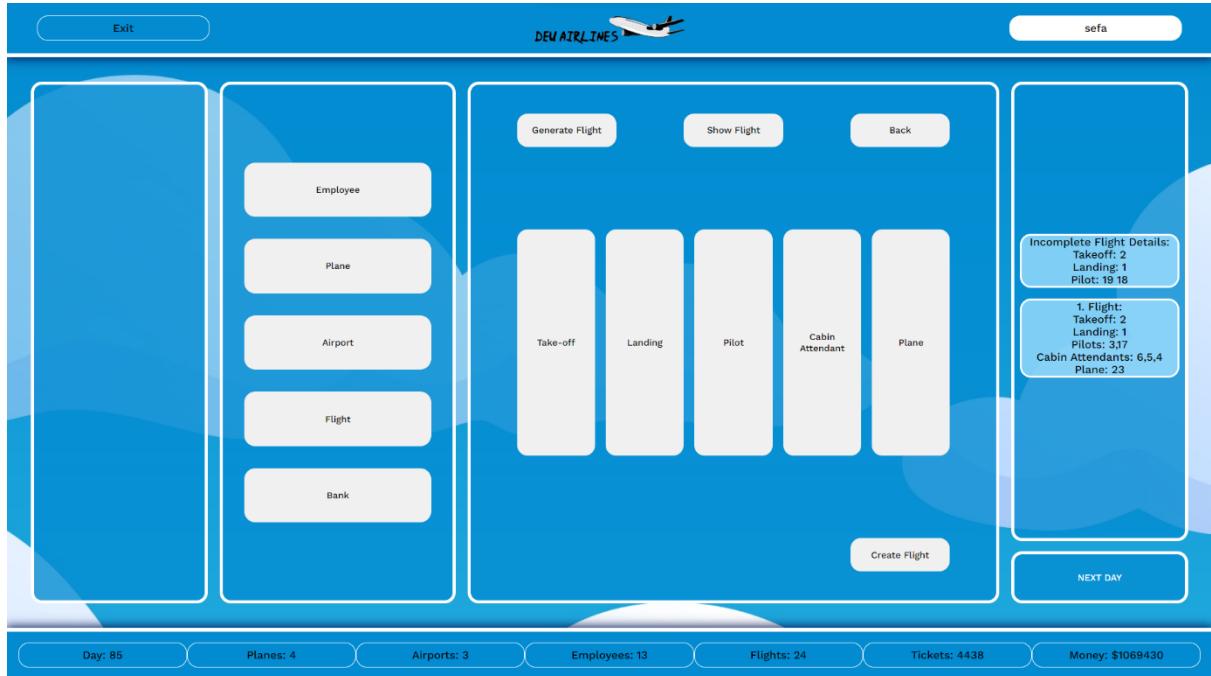
Upon clicking on that button, you will be presented with five new options. In “take-off” and “landing” you choose from which airport your flight going to take off and to which airport it will land on.

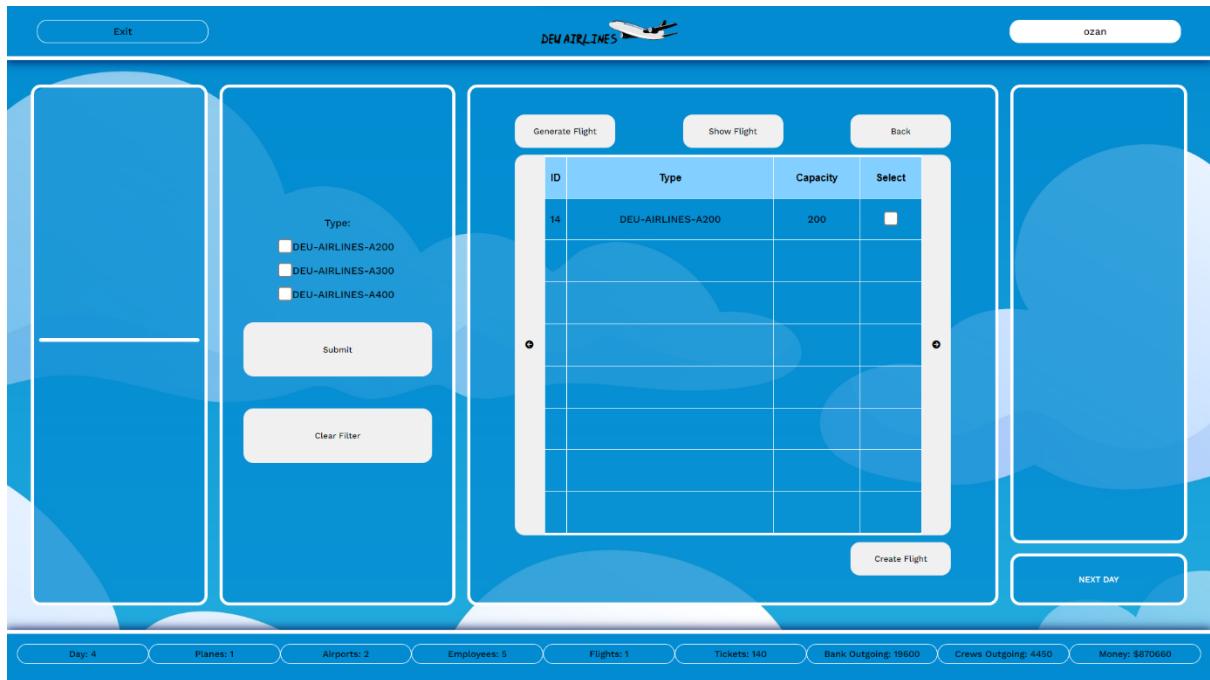
“Pilot” and “Cabin Attendant” are to choose which pilots and cabin attendants will be on that flight. You can assign minimum of two up to three pilots and minimum of three up to five cabin attendants. The number of crew members and their experience levels will determine the occupancy rate of passengers for that flight.

And lastly you will choose which plane will be used on that flight.



Once you assign your airports, crew, and plane of a flight; you need to press on that “Create Flight” button to complete the generation of your flight. Before a flight is approved, it will be shown as incomplete flight on the right panel.

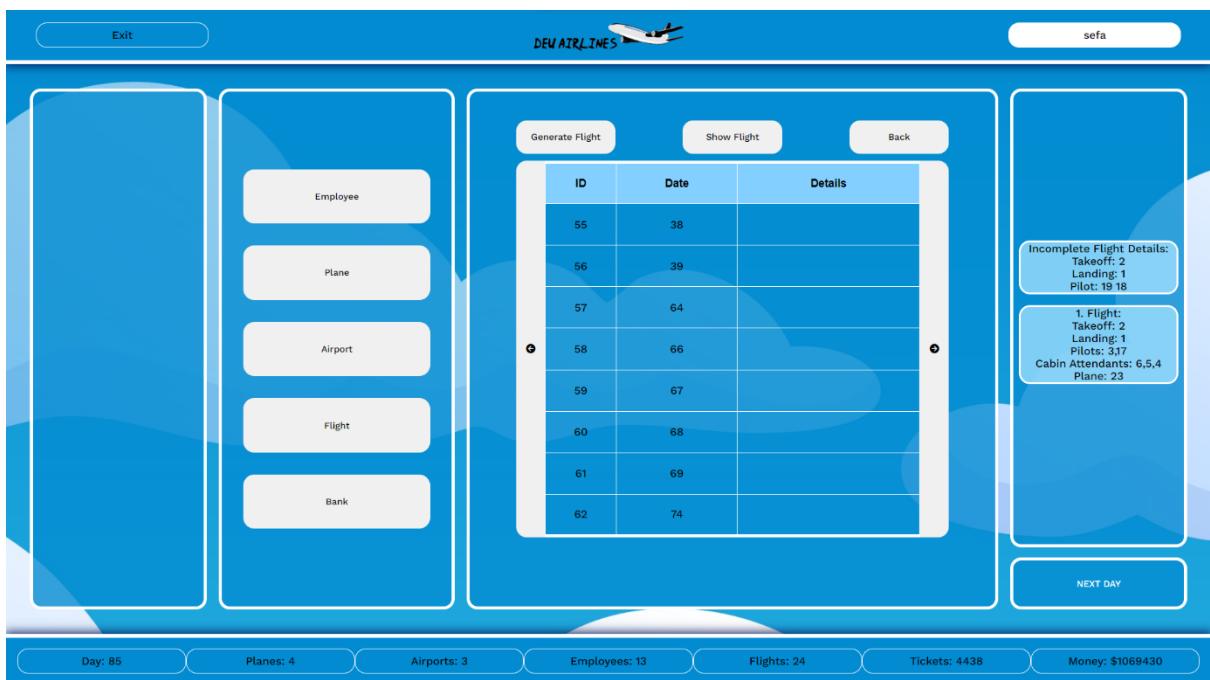




B – Show Flight

In this section, you can see the flights you have generated before. They are listed by their ID's and their dates.

The table has a button named “Details” if you wish to monitor the details of those flights. When you click that button, four new buttons will pop-up in the middle of the screen.



Route will show you the take-off and landing airports of that flight.

The screenshot shows the 'Flight' section of the DEWAIRLINES app. On the left, there's a sidebar with buttons for Employee, Plane, Airport, Flight, and Bank. The main area displays a table with two rows of flight information:

ID	Name	City	Country
2	Take-off	JFK International Airport	London
3	Landing	Heathrow Airport	United Kingdom
		New York	USA

To the right of the table, there's a box labeled 'Incomplete Flight Details:' containing the following information:

- 1. Flight:
Takeoff: 2
Landing: 1
Pilots: 3,7
Cabin Attendants: 6,5,4
Plane: 23

At the bottom of the screen, there are summary statistics: Day: 85, Planes: 4, Airports: 3, Employees: 13, Flights: 24, Tickets: 4438, and Money: \$1069430. A 'NEXT DAY' button is also present.

In crew section, you can see the pilots and cabin attendants assigned for that flight.

The screenshot shows the 'Crew' section of the DEWAIRLINES app. On the left, there's a sidebar with buttons for Employee, Plane, Airport, Flight, and Bank. The main area displays a table with the following data:

ID	Name	Profession
17	Catherine Ianni	pilot
18	Ecehan Aksakal	pilot
19	Winette Funderburk	pilot
2	Pete Ehrhardt	cabin attendant
4	Brielle Isenhour	cabin attendant
5	Elfin Bayraktutan	cabin attendant

At the bottom of the screen, there are summary statistics: Day: 85, Planes: 4, Airports: 3, Employees: 13, Flights: 24, Tickets: 4438, and Money: \$1069430. A 'NEXT DAY' button is also present.

If you wish to see the passenger list for that flight, you can simply do that by going in to “Passengers” tab.

The screenshot shows the software interface for DEU AIRLINES. At the top, there are buttons for "Exit" and "sefa". The main area has three columns. The left column contains a form for entering a name and gender, with "Male" and "Female" options and a "Submit" button. The middle column displays a table of passenger data:

ID	Name	Gender	Birth Date
233924	Dylan Lazenby	Male	1965-12-20
227394	Randa Arnold	Female	1938-07-01
278792	Jessica Palmer	Female	1955-11-08
145575	Quang Wolk	Male	1971-02-10
98937	Calista Teague	Female	2015-06-20
63021	Keller Griffith	Male	1965-09-10
119185	Sariyah Jolley	Female	1964-03-18
217409	Adalyn Dziedzic	Female	1977-01-12

The right column has a "NEXT DAY" button at the bottom. At the very bottom, there are summary statistics: Day: 85, Planes: 4, Airports: 3, Employees: 13, Flights: 24, Tickets: 4438, and Money: \$1069430.

And lastly you can see which plane you used on that flight by clicking the “Plane” button.

The screenshot shows the software interface for DEU AIRLINES. At the top, there are buttons for "Exit" and "sefa". The main area has three columns. The left column contains buttons for "Employee", "Plane", "Airport", "Flight", and "Bank". The middle column displays a table of plane data:

ID	Type	Occupancy Rate	Flight Count
11	DEU-AIRLINES-A200	100	58

The right column has a "NEXT DAY" button at the bottom. At the very bottom, there are summary statistics: Day: 85, Planes: 4, Airports: 3, Employees: 13, Flights: 24, Tickets: 4438, and Money: \$1069430.

Flight table structure:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	flight_id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	username	varchar(100)	utf8mb4_general_ci		No	None			Change Drop More
3	take_off_airport_id	int(11)			No	None			Change Drop More
4	landing_airport_id	int(11)			No	None			Change Drop More
5	pilot_1	int(11)			No	None			Change Drop More
6	pilot_2	int(11)			No	None			Change Drop More
7	pilot_3	int(11)		Yes	NULL				Change Drop More
8	cabin_attendant_1	int(11)			No	None			Change Drop More
9	cabin_attendant_2	int(11)			No	None			Change Drop More
10	cabin_attendant_3	int(11)			No	None			Change Drop More
11	cabin_attendant_4	int(11)		Yes	NULL				Change Drop More
12	cabin_attendant_5	int(11)		Yes	NULL				Change Drop More
13	plane_id	int(11)			No	None			Change Drop More
14	day	int(11)			No	None			Change Drop More

Change Drop Primary Unique Index Spatial Fullte

Print		Propose table structure	Move columns	Normalize
Add	1	column(s)	after day	<input type="button" value="Go"/>

Indexes										
Action	Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment	
Edit Rename Drop	PRIMARY	BTREE	Yes	No	flight_id	66	A	No		
Edit Rename Drop	take_off_airport	BTREE	No	No	take_off_airport_id	8	A	No		
Edit Rename Drop	username_flight	BTREE	No	No	username	2	A	No		
Edit Rename Drop	landing_airport	BTREE	No	No	landing_airport_id	6	A	No		
Edit Rename Drop	pilot_1_flight	BTREE	No	No	pilot_1	16	A	No		
Edit Rename Drop	pilot_2_flight	BTREE	No	No	pilot_2	16	A	No		
Edit Rename Drop	pilot_3_flight	BTREE	No	No	pilot_3	16	A	Yes		
Edit Rename Drop	cabin_1_flight	BTREE	No	No	cabin_attendant_1	22	A	No		

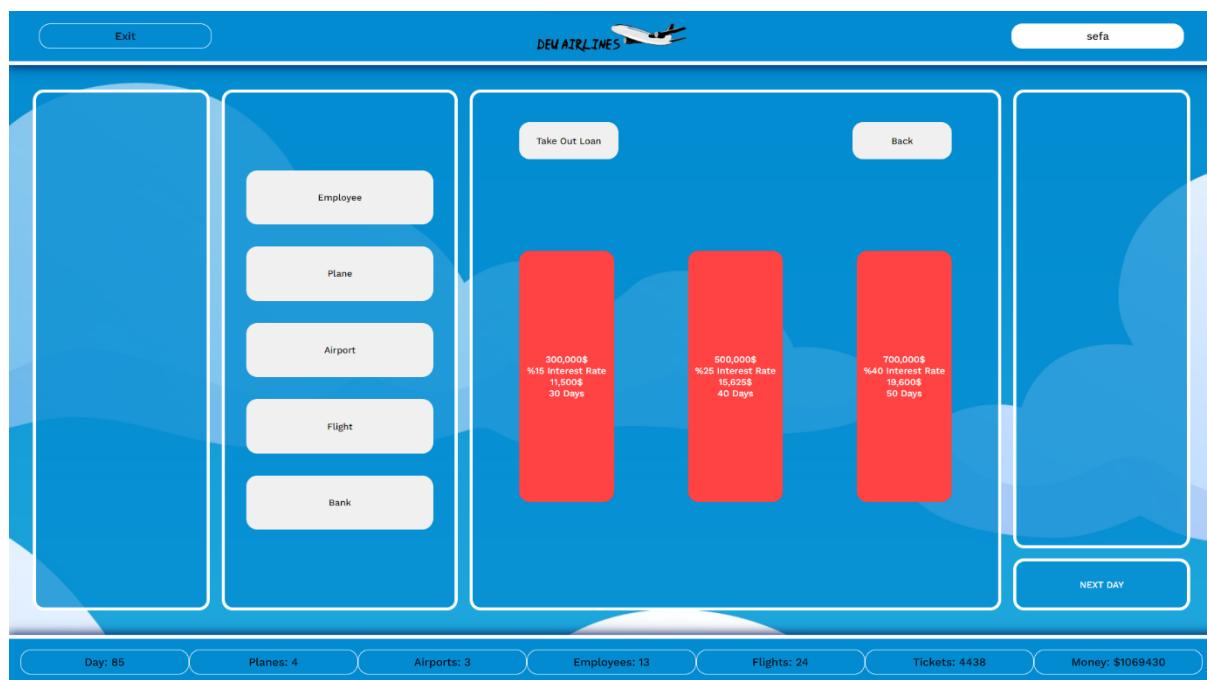
Example flight table:

	flight_id	username	take_off_airport_id	landing_airport_id	pilot_1	pilot_2	pilot_3	cabin_attendant_1	cabin_attendant_2	cabin_attendant_3	cabin_attendant_4	cabin_attendant_5	plane_id	day
<input type="checkbox"/>	55	sefa	2	3	17	18	19	5	4	2	NULL	NULL	11	38
<input type="checkbox"/>	56	sefa	2	1	3	17	NULL	6	5	4	NULL	NULL	16	39
<input type="checkbox"/>	57	sefa	3	1	18	19	23	5	4	2	6	7	31	64
<input type="checkbox"/>	58	sefa	3	1	17	18	19	6	5	7	8	9	31	66
<input type="checkbox"/>	59	sefa	1	3	17	18	19	5	6	7	8	NULL	31	67
<input type="checkbox"/>	60	sefa	3	1	17	18	NULL	6	5	4	NULL	NULL	23	68
<input type="checkbox"/>	61	sefa	2	1	3	17	18	2	4	5	NULL	NULL	31	69
<input type="checkbox"/>	62	sefa	1	2	17	3	NULL	2	4	5	NULL	NULL	31	74
<input type="checkbox"/>	63	sefa	2	1	3	17	18	2	4	5	NULL	NULL	10	75
<input type="checkbox"/>	64	sefa	2	1	23	26	37	6	7	8	NULL	NULL	16	75
<input type="checkbox"/>	65	sefa	2	1	3	17	18	2	4	5	NULL	NULL	10	75
<input type="checkbox"/>	66	sefa	2	1	17	3	18	5	4	2	NULL	NULL	10	78
<input type="checkbox"/>	67	sefa	2	1	19	23	NULL	8	7	6	9	10	31	78
<input type="checkbox"/>	68	sefa	2	1	17	3	18	5	4	2	NULL	NULL	10	78
<input type="checkbox"/>	69	sefa	2	1	17	3	18	5	4	2	NULL	NULL	10	78
<input type="checkbox"/>	70	sefa	2	1	19	23	NULL	8	7	6	9	10	31	78
<input type="checkbox"/>	71	sefa	2	1	19	23	NULL	8	7	6	9	10	31	78
<input type="checkbox"/>	72	sefa	2	1	18	17	3	7	6	5	4	2	10	79
<input type="checkbox"/>	73	sefa	2	1	19	23	26	8	9	10	11	12	16	79
<input type="checkbox"/>	74	sefa	2	1	3	17	18	2	4	5	NULL	NULL	10	81
<input type="checkbox"/>	75	sefa	2	3	19	23	26	6	7	8	9	NULL	16	81
<input type="checkbox"/>	76	sefa	2	2	3	17	18	5	2	6	7	NULL	31	82

5- BANK

Are you short on money? Do you need a hand to get your company going? The “Bank” is your savior.

You can see the available loan options by clicking “Take Out Loan” button. Here, you will be given three options to pick from. You can choose whichever option suits your needs. You can only take out one loan at a time. If a loan option is available, its color will be green, otherwise it will be red. Your repayment will be received automatically, with installment fees set every day.



Taken loan table structure:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 credit_amount	int(11)			No	None		Change Drop More	
<input type="checkbox"/>	2 interest_rate	int(11)			No	None		Change Drop More	
<input type="checkbox"/>	3 day	int(11)			No	None		Change Drop More	

Example taken loan table:

	credit_amount	interest_rate	day
<input type="checkbox"/>	300000	15	30
<input type="checkbox"/>	500000	25	40
<input type="checkbox"/>	700000	40	50

How to play – About us and Feedback



DEU AIRLINES

ABOUT US **LEARN GAME** **PLAY**

Another thing you can do in the game is to take out a loan. To do this, you need to click on the bank button and go to the "take out loan" tab. Here you can choose one of the loan options that suits you and solve your money crunch. But remember, no matter how sweet the money is, you have to pay it back.

About us:

Welcome to DEU Airlines! We are joyful that you are playing our game. We had a great time developing this game for you and enjoyed every second of it. We hope that you can enjoy the game even more than we did. Now, let us talk about ourselves rather than the game now.

Our Story

We are four humble friends in the 3rd year of computer engineering at Dokuz Eylul University. We all met each other during our previous projects or via each other's mutual friends. On the fifth semester, we grouped up for our Database Management Systems project. We discussed about how we could offer fun and relaxing time for our users. After a few different ideas we ended up with the Deu Airlines idea. That way, we could use a relational database and operate on it for fulfilling the needs of our assignment while creating a peaceful game for our beloved players.

We started with our web page design. The aim was to give it a calm and relaxing theme as well as making it easy to use for players. While doing that We looked from both developer and player perspectives. And we humbly think we've done a good job of that. Then we built our database. Every single information about the players and the game is drawn from our database to operate on. After that, we linked our database to our web page so that the buttons were functional.

Developers

Sefa Çelik	Ozan Kalkan	Hasan Balıkçı	Yağız Gökdeli
2020510078	2020510044	2021510012	2020510036
sefaacelik00@gmail.com	ozankalkan35@hotmail.com	hasanbk2@gmail.com	yagizgokdeli@gmail.com

Send Us Your Problems or Suggestions

Subject:

Message:

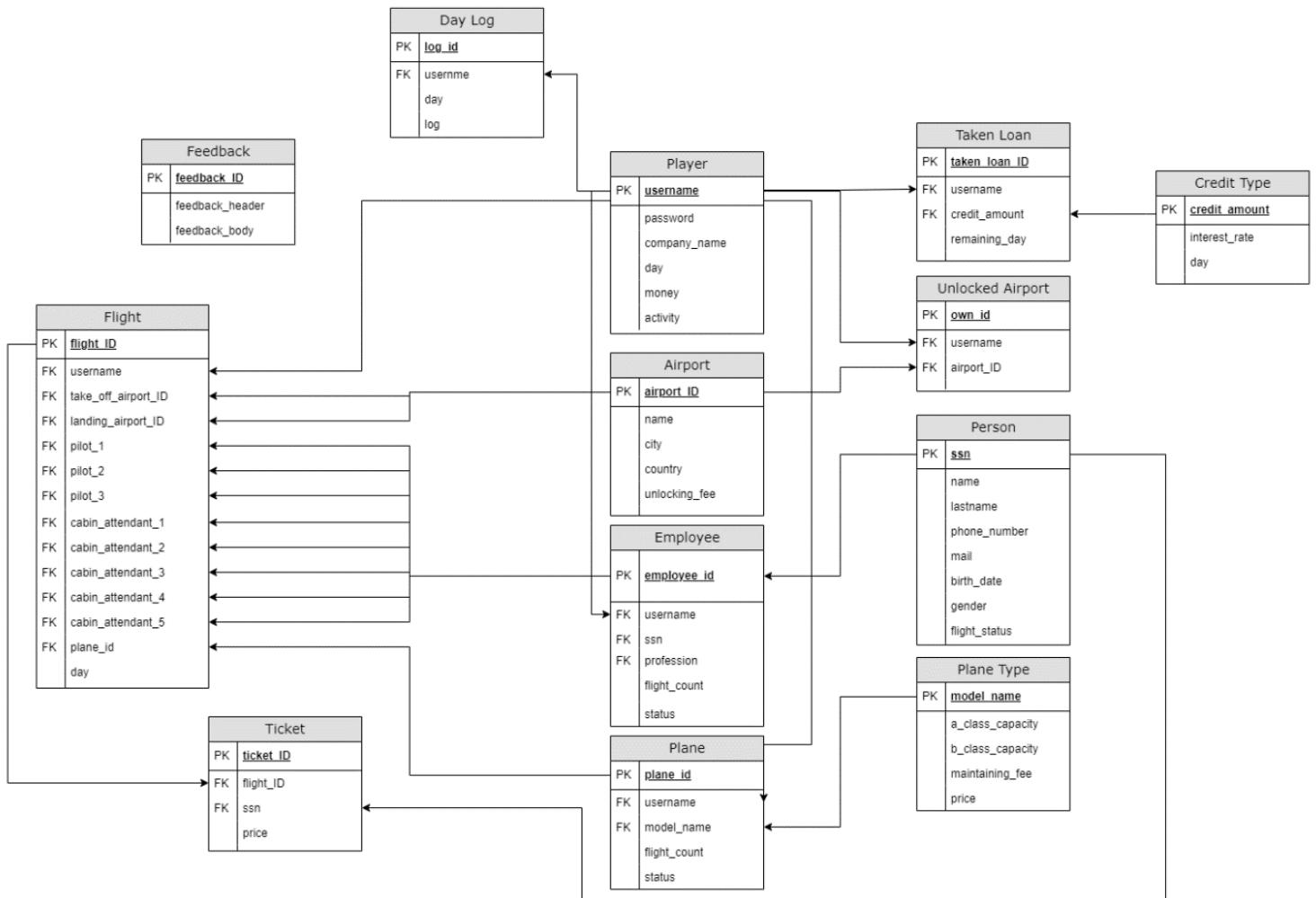
Submit

Feedback table structure:

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
<input type="checkbox"/>	1 feedback_id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
<input type="checkbox"/>	2 feedback_header	text	utf8mb4_general_ci		No	None			Change Drop More
<input type="checkbox"/>	3 feedback_body	text	utf8mb4_general_ci		No	None			Change Drop More

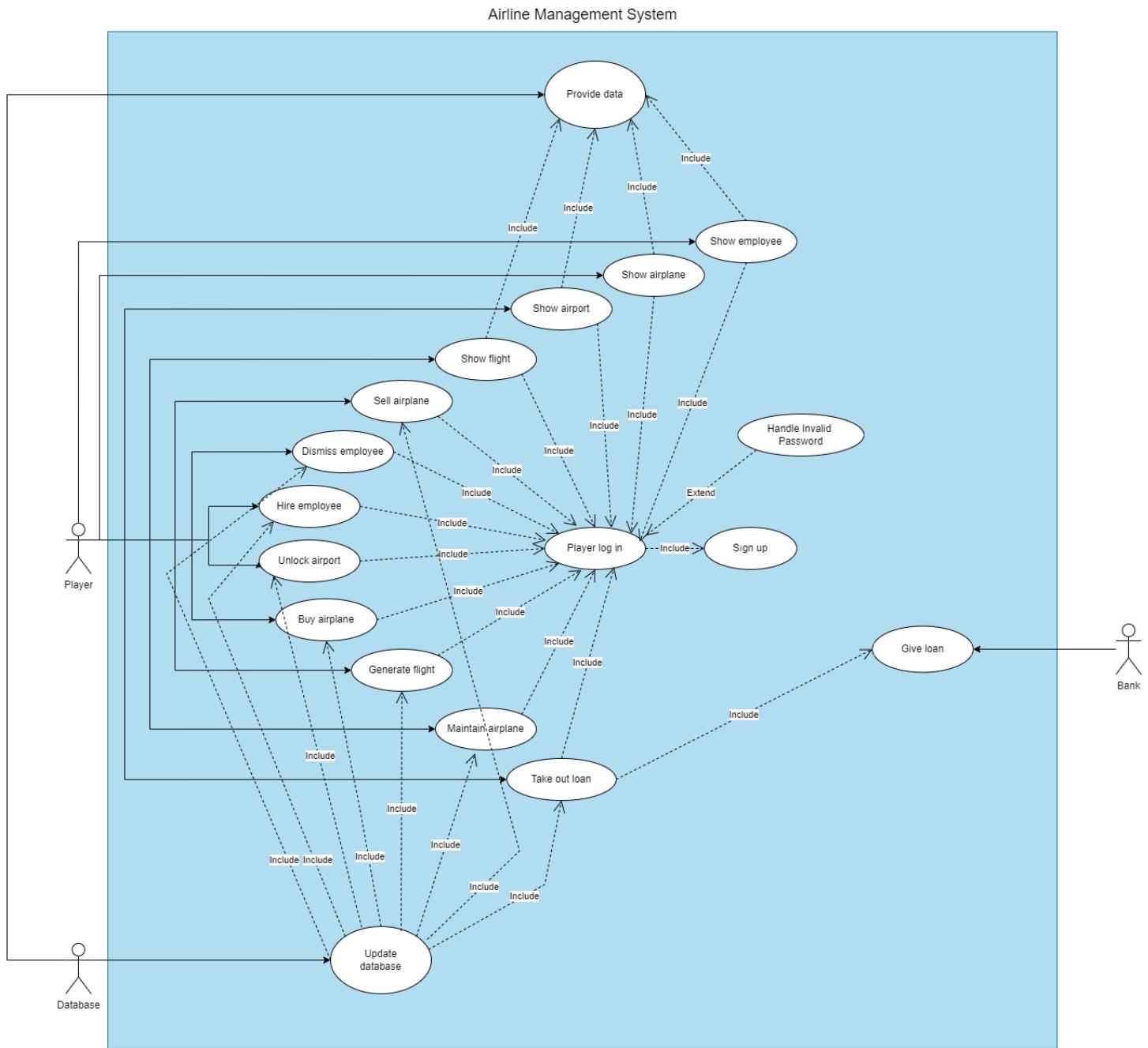
DIAGRAMS

E-R Diagram:



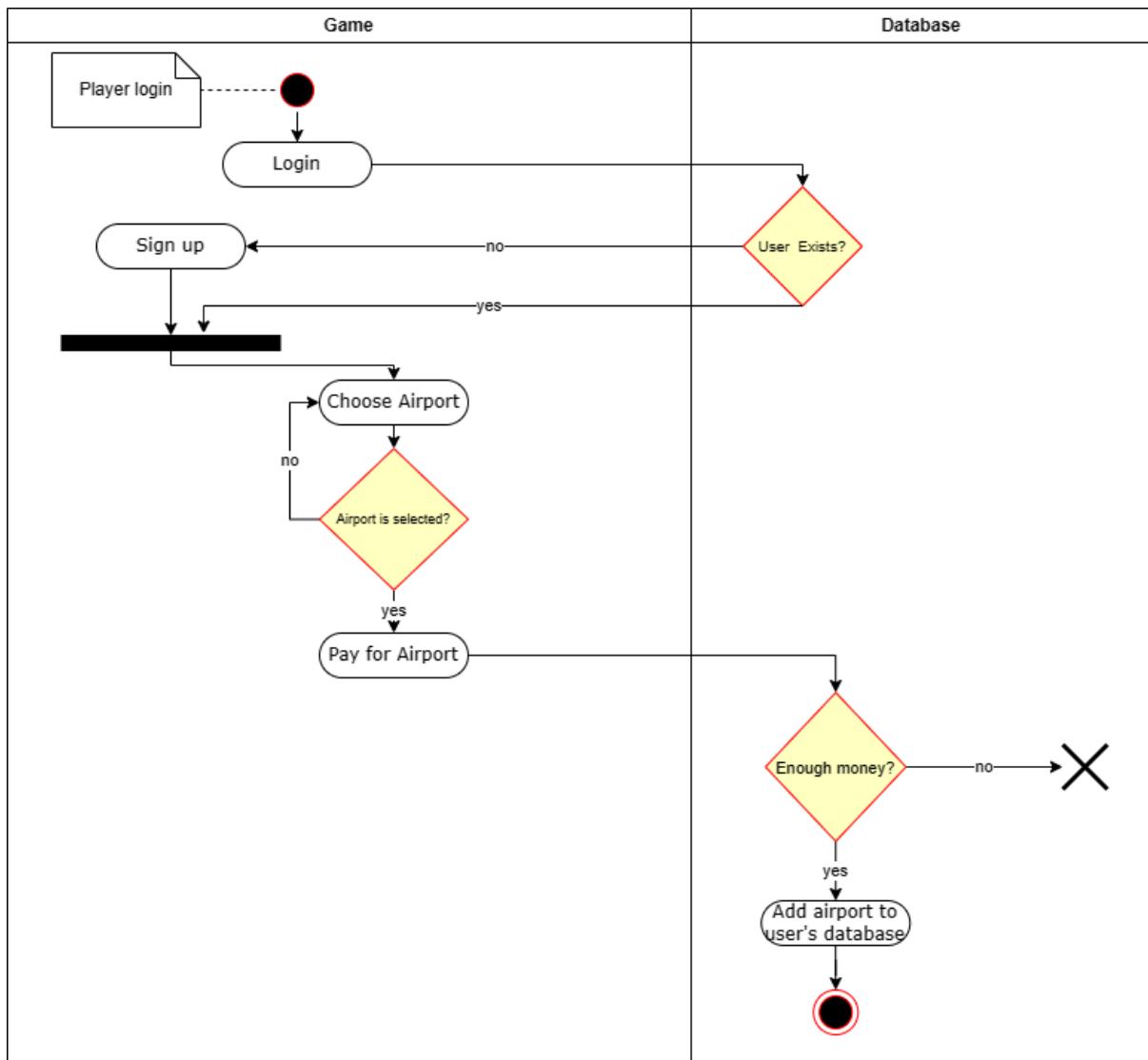
At the E-R diagram above the relationship between tables and cardinalities are shown.

Use Case Diagram:

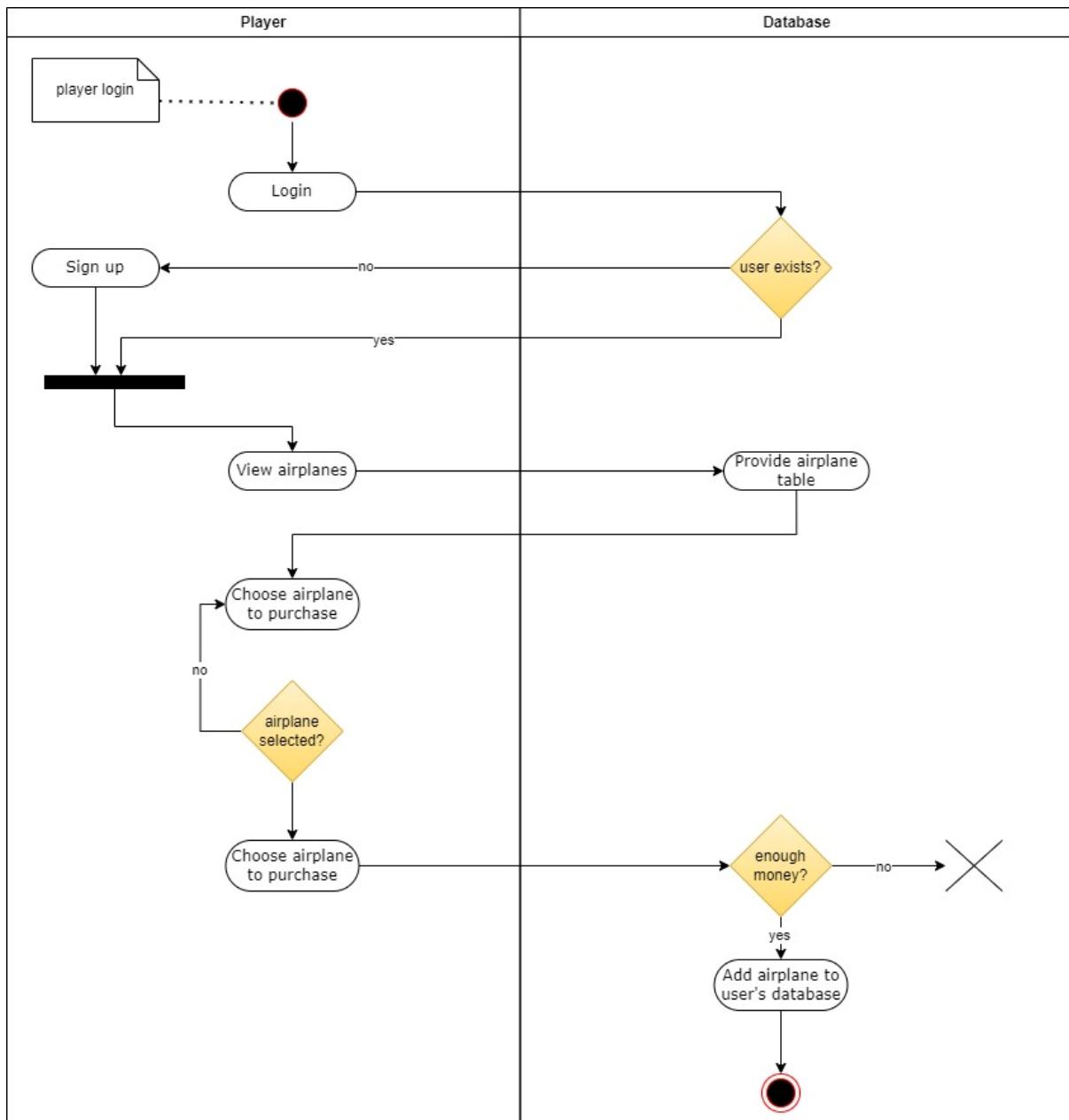


This is the use case diagram of the system above. This shows all actors and their actions of the system.

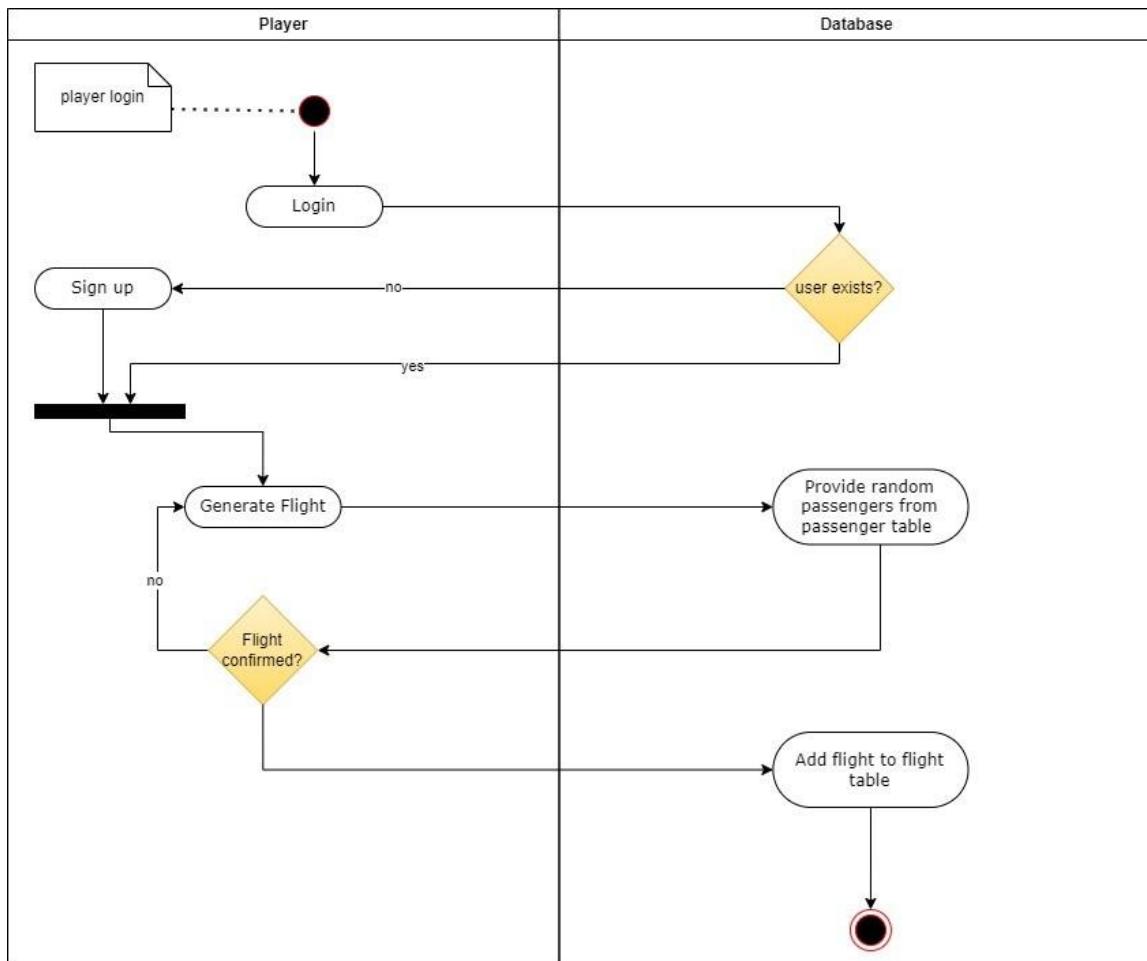
Activity Diagrams:



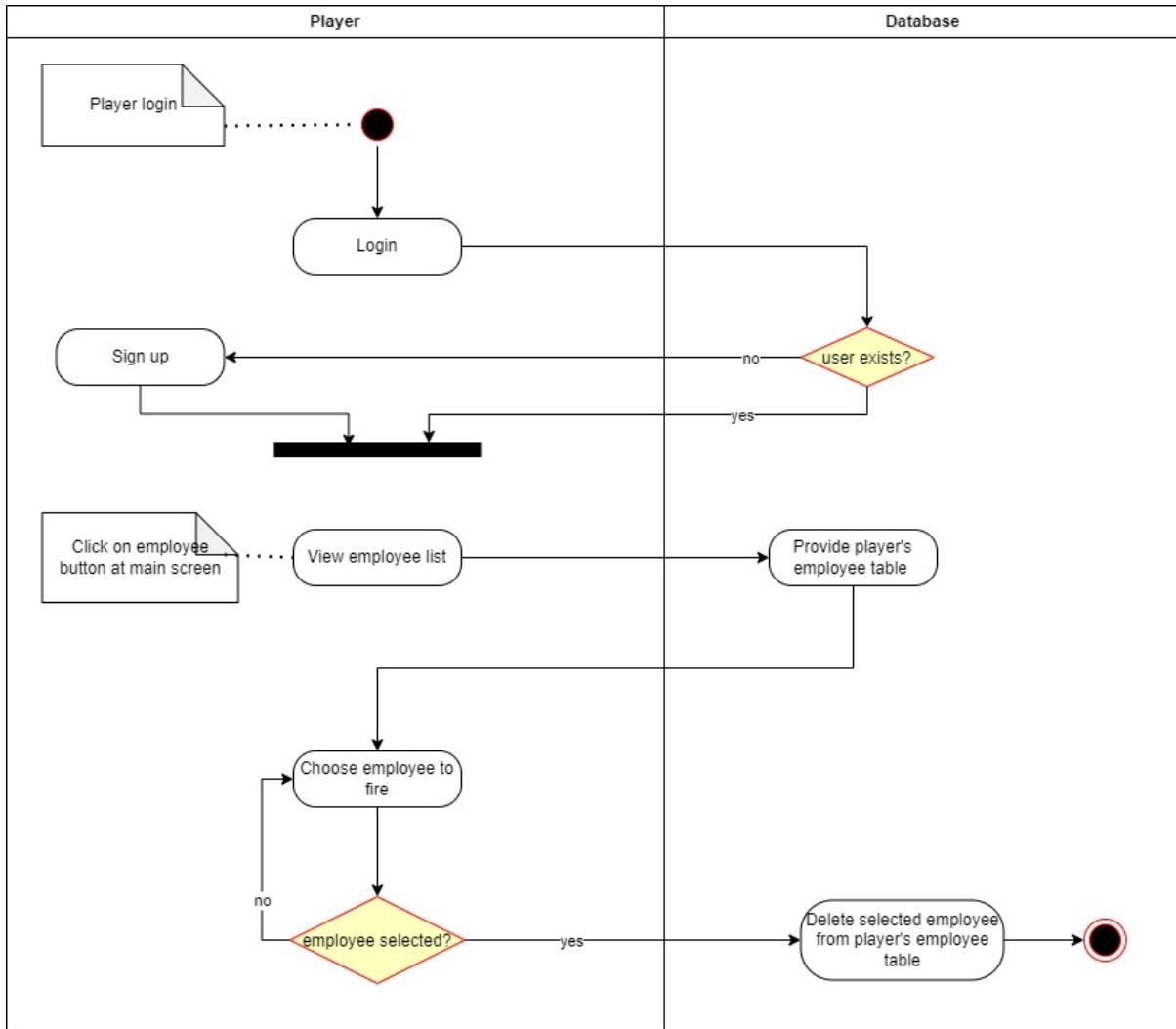
This is the activity diagram for unlocking new airports.



This is the activity diagram for purchasing an airplane.

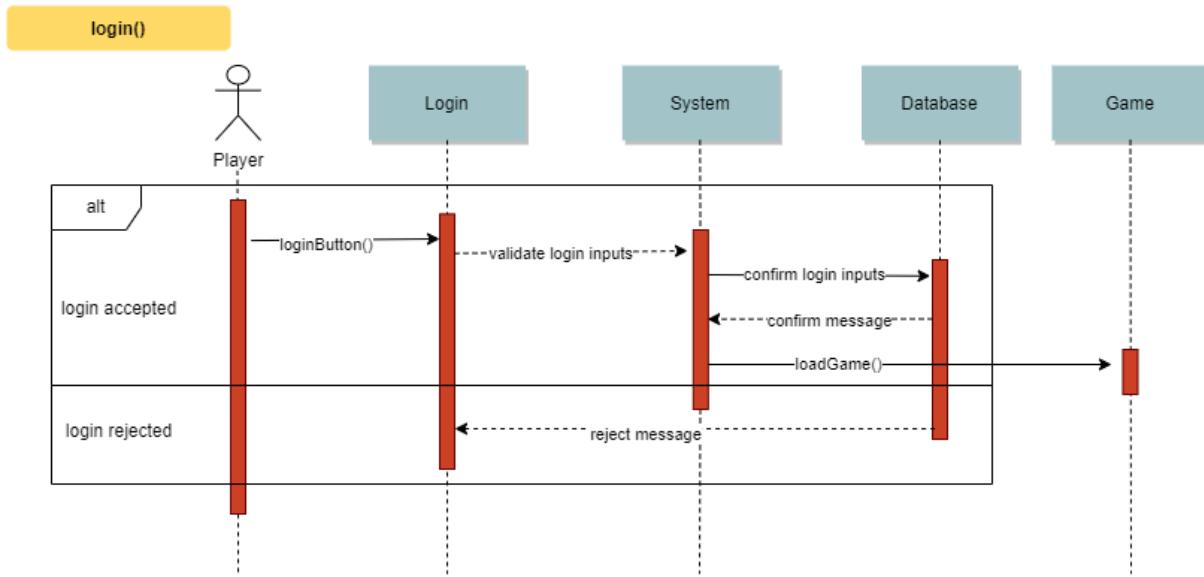


This is the activity diagram for generating flight.

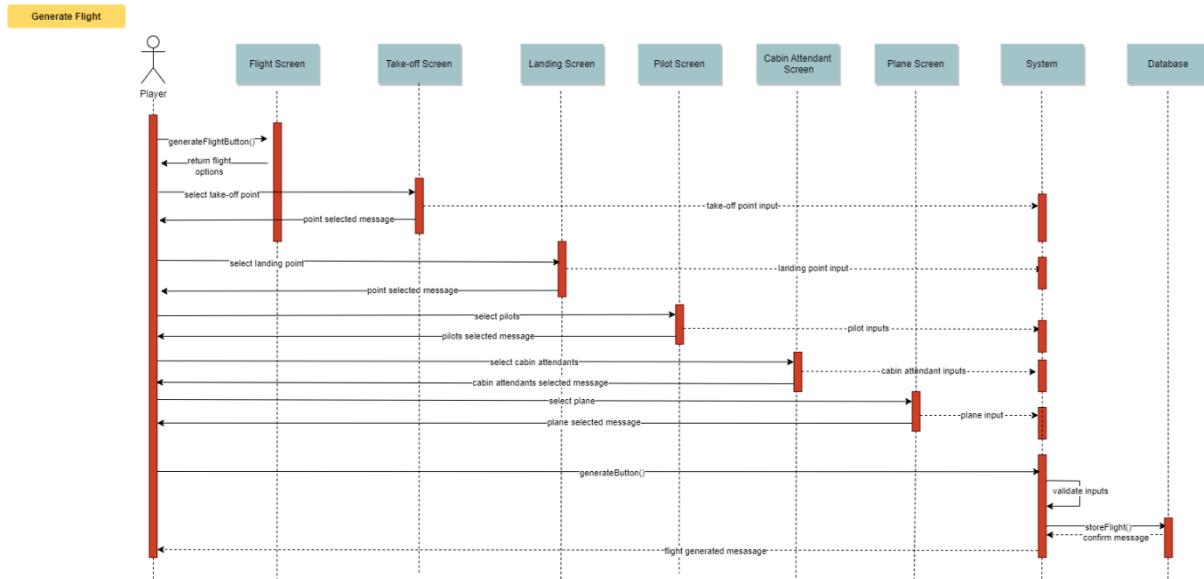


This is the activity diagram for firing employee.

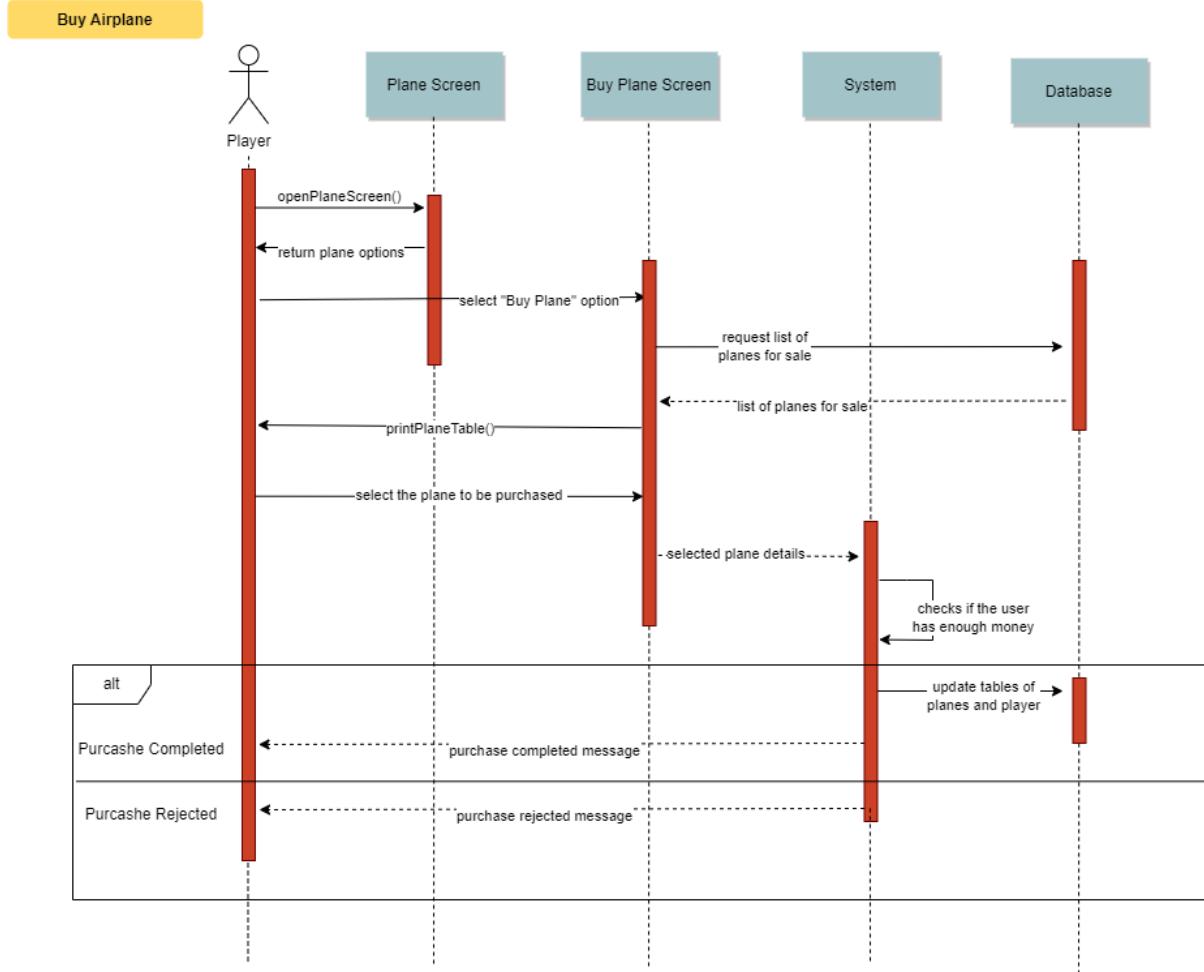
Sequence Diagrams:



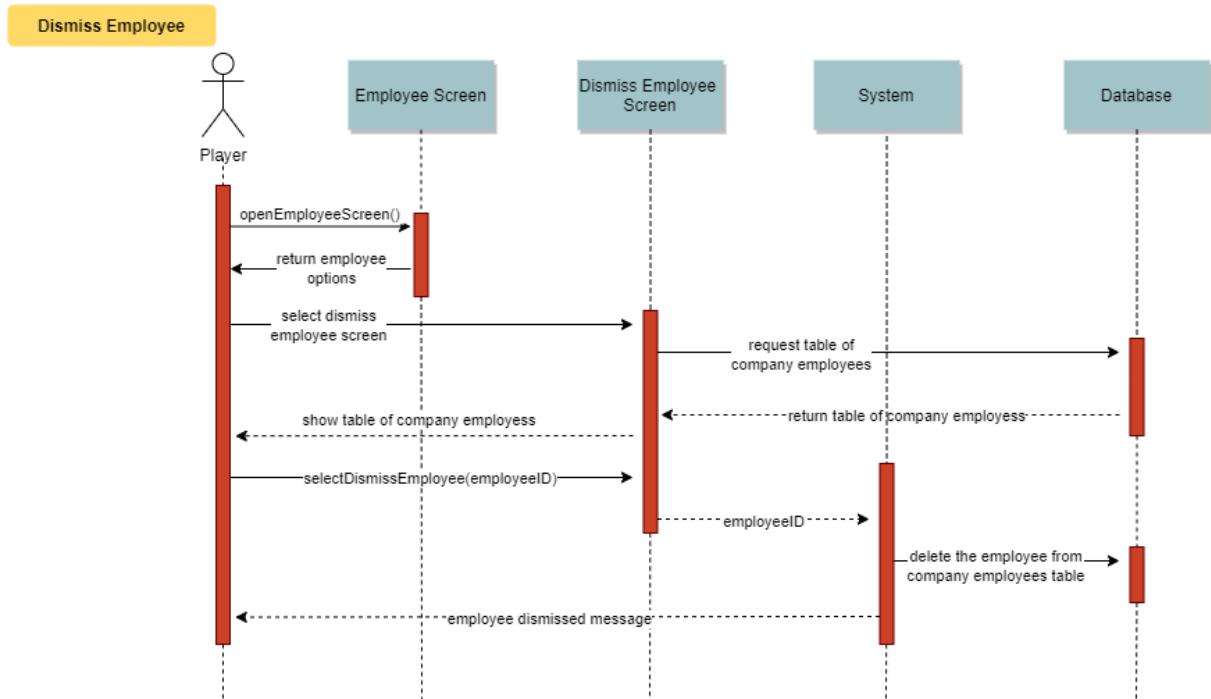
This is the sequence diagram for login activity.



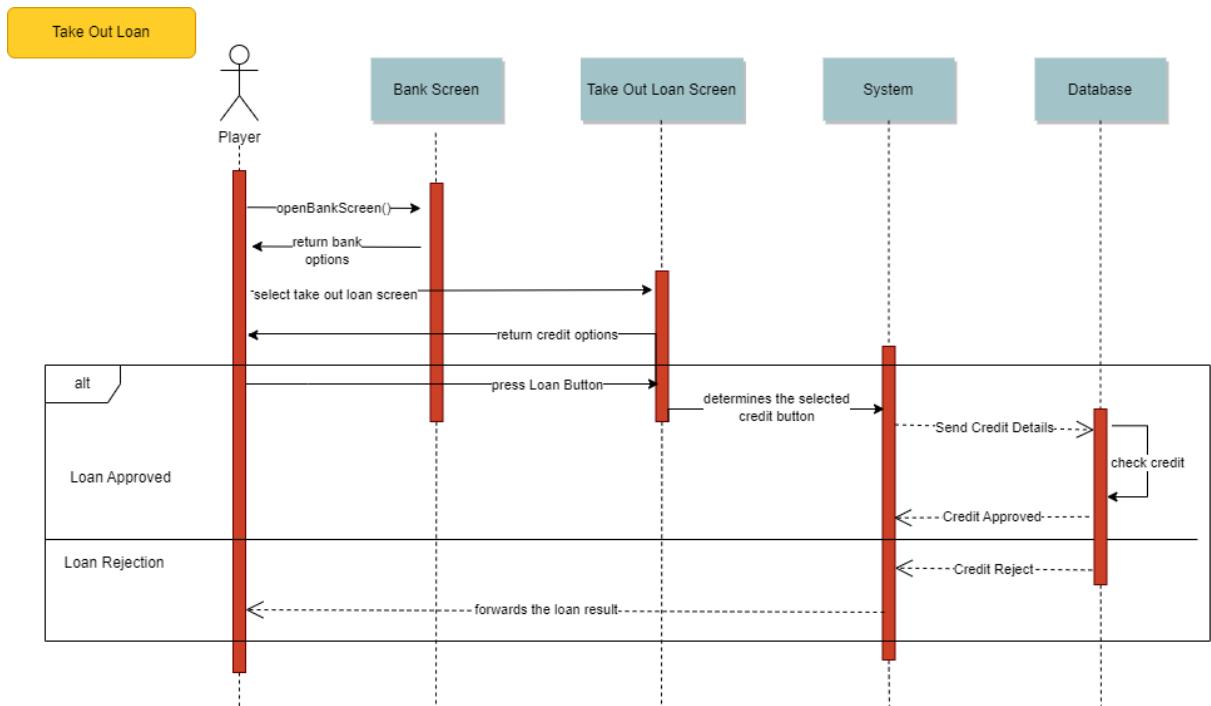
This is the sequence diagram for generating a flight.



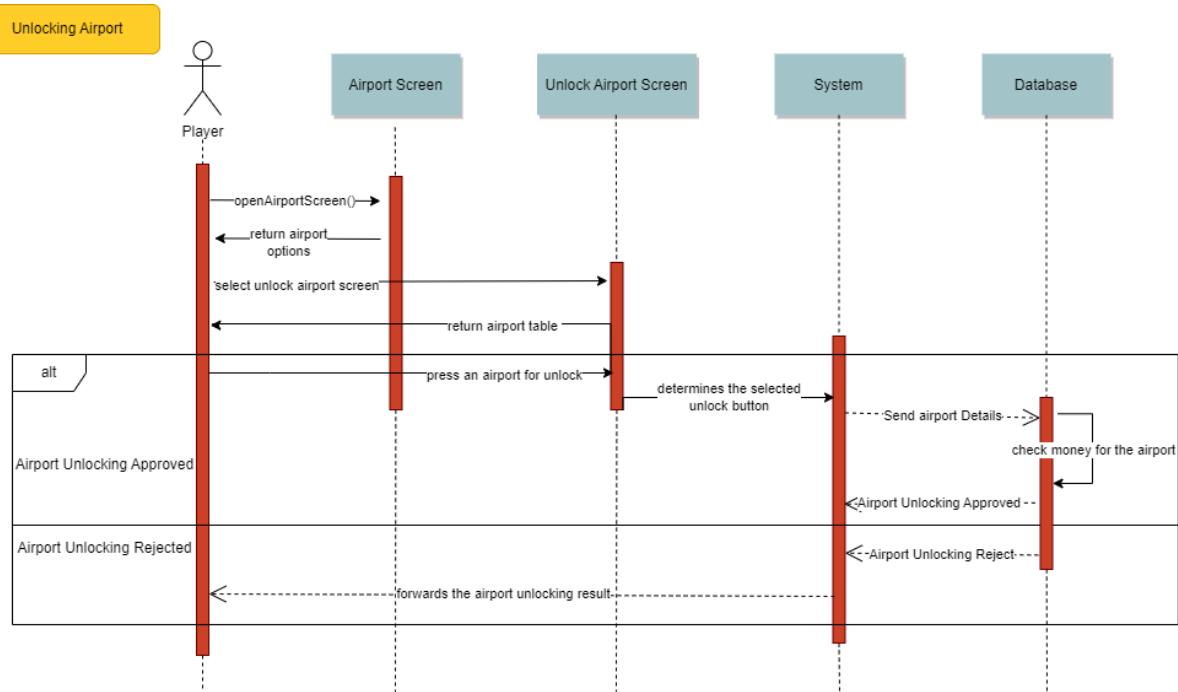
This is the sequence diagram for buying a plane.



This is the sequence diagram for dismissing an employee.

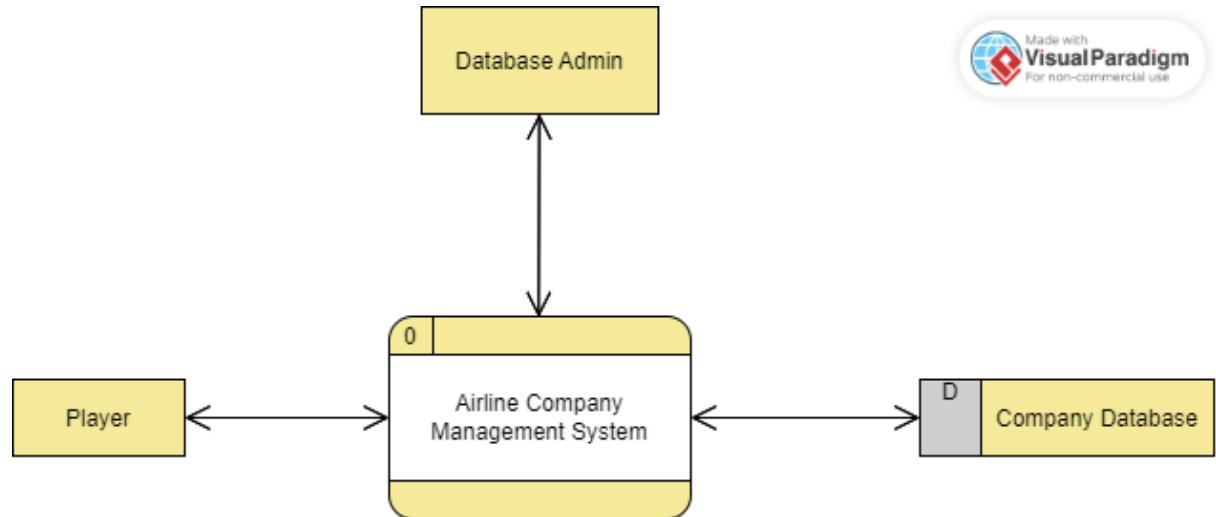


This is the sequence diagram for taking out loan.



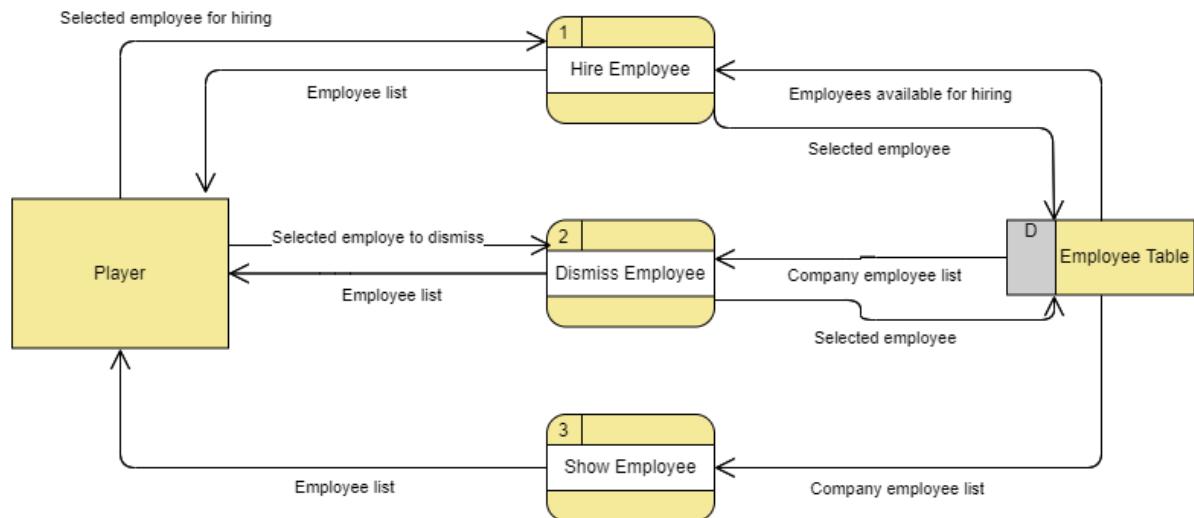
This is the sequence diagram for unlocking an airport.

Level 0 Data Flow Diagram:

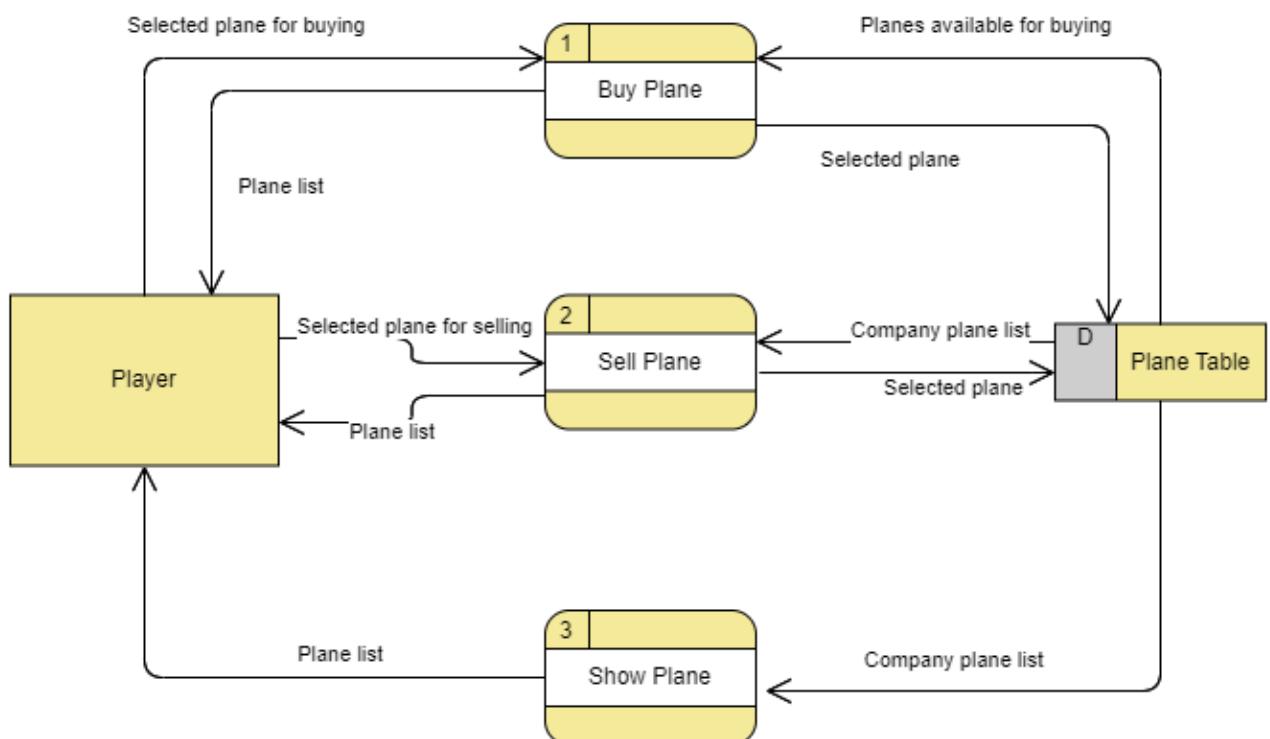


Level 1 Data Flow Diagrams:

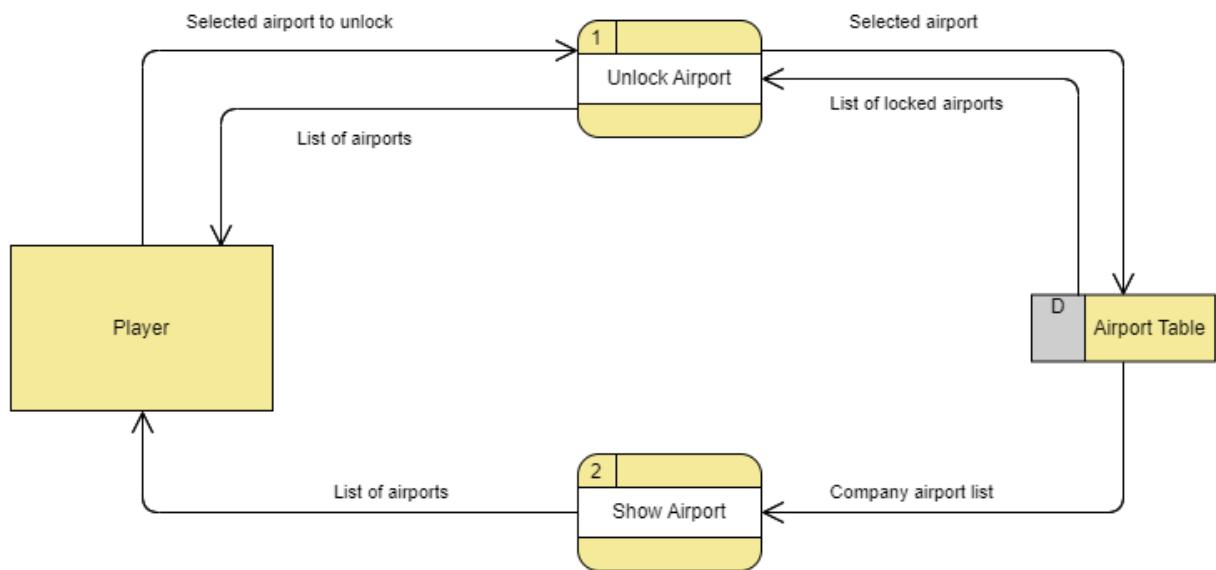
Employee Data Flow Diagram



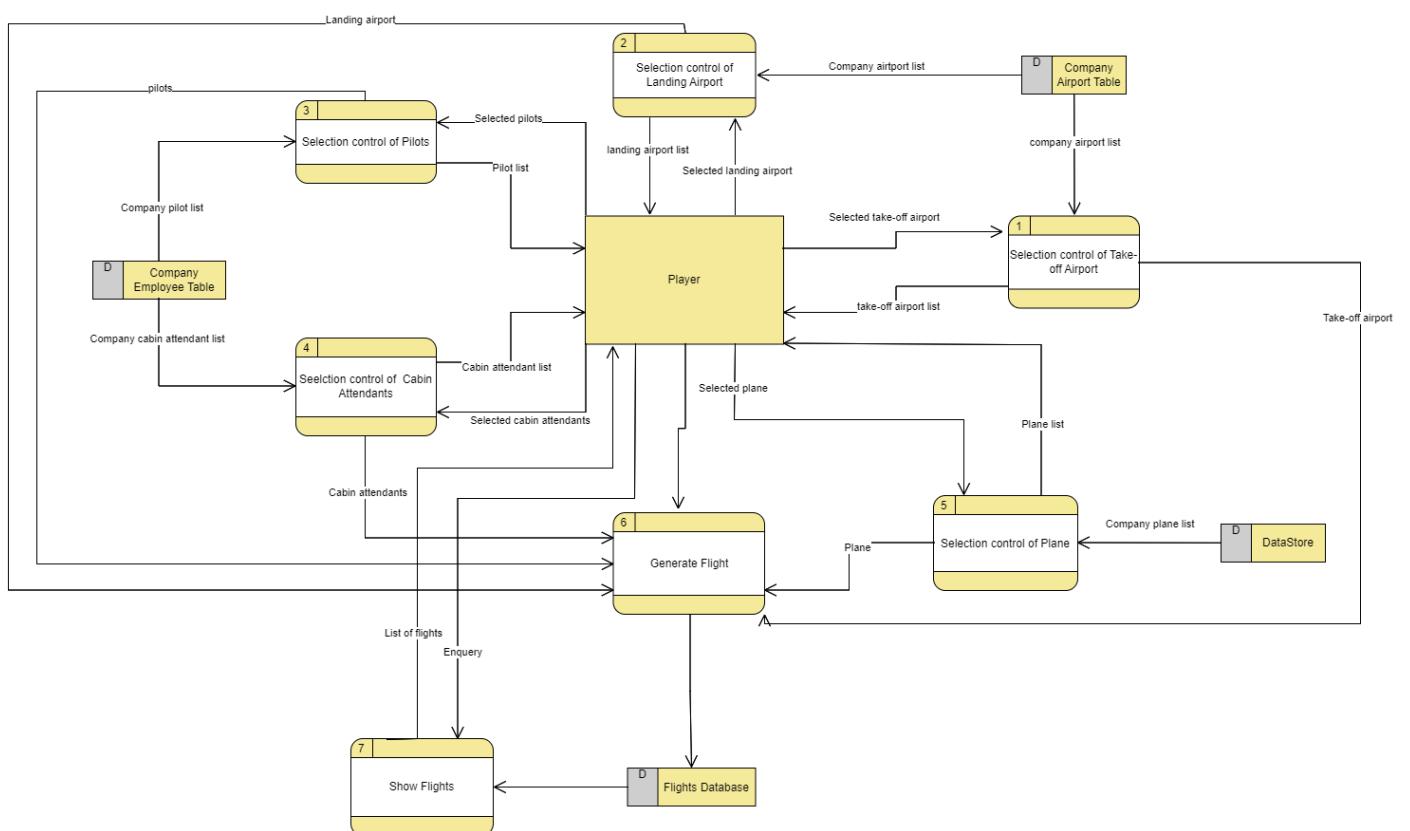
Plane Data Flow Diagram



Airport data flow diagram



Flight data flow diagram



Bank and loan data flow diagram

