

Project Report

NUCES Airline Flight System

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Introduction:

The purpose of the NUCES Airline Flight System (NAFS) project is to develop a flight reservation system for a newly established airline that operates in five major cities of Pakistan, namely Islamabad, Lahore, Quetta, Peshawar, and Karachi. The airline has a fleet of 10 airplanes in each city, and a maximum of 5 planes can land at an airport at a time.

NAFS provides both local and international flights, with 10 local flights and 5 international flights taking off from each airport daily, depending on their schedule. Each plane has a seating capacity of 50 passengers in economy class and 10 in business class. This project aims to provide a user-friendly flight reservation system that allows passengers to book flights and manage their reservations easily. Additionally, the project aims to optimize the airline's operations, including flight scheduling, cancellations etc.

The main features of the NAFS system include online booking reservation management, flight scheduling and compliance with international traveling laws and regulations, and reporting and analytics. These features will enable the airline to provide personalized services to its customers and make informed decisions to optimize its operations.

Overall, the NAFS project aims to develop a comprehensive flight reservation system that meets the needs of the airline and its passengers, while ensuring compliance with international traveling laws and regulations, especially during the COVID-19 pandemic.



Project Statement:

The purpose of this project is to develop an airline management system that addresses the challenges faced by newly established airlines in managing their operations, improving efficiency, and enhancing the overall customer experience. The aviation industry has witnessed significant growth in recent years, with increasing competition and complexity. However, new airlines face challenges in managing their operations, optimizing resources, and meeting customer expectations.

The airline management system will provide a centralized platform for managing various aspects of an airline's operations, including flight scheduling, inventory management, customer service, and maintenance.

The intended audience of this project is the airline industry, including new airlines, aviation professionals, and passengers. The system aims to help new airlines optimize their resources, reduce costs, and improve the overall customer experience, while also enabling aviation professionals to streamline their operations and make data-driven decisions. Passengers will benefit from improved customer service and personalized services, such as online booking, seat selection, and flight status updates.

The project is important because newly established airlines face challenges in managing their operations and competing with established airlines. The airline management system aims to provide a solution to these challenges and contribute to the growth and sustainability of the aviation industry.

The benefits of the airline management system for the intended audience include increased efficiency, improved customer experience, and optimized resource utilization. It will also provide a platform for new airlines to compete with established airlines and contribute to the growth and sustainability of the aviation industry. Additionally, the system will help aviation professionals streamline their operations and make data-driven decisions, improving overall safety and efficiency.

Methodology:

I did this project Individually. The programming language used is C++.The methodology used in developing this system is Object-Oriented Programming (OOP). OOP is a programming paradigm that focuses on creating objects that encapsulate data and behavior. In this approach, objects are used to represent real-world entities, and they interact with each other to accomplish tasks.

In the development of NAFS, OOP concepts were used to design and implement the different components of the system. Some of the key OOP concepts used in NAFS include:

Abstraction: This concept involves identifying the essential characteristics of an object and ignoring the irrelevant details. In NAFS, abstraction was used to define the essential characteristics of a flight, such as its origin, destination, departure time, and seating capacity, while ignoring other details that are not relevant to the system.

Encapsulation: This concept involves grouping related data and behavior into a single unit called a class. In NAFS, encapsulation was used to define classes for flights, airports, airplanes, passengers, data and online data. Each class encapsulates the data and behavior associated with the corresponding entity.

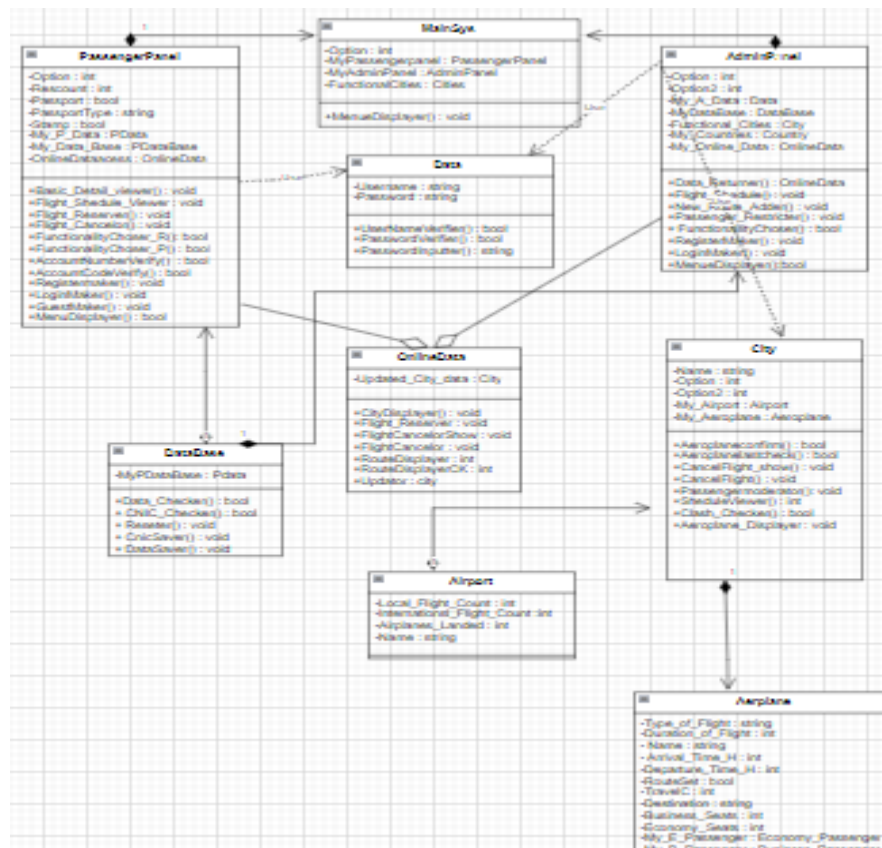
Inheritance: This concept involves creating new classes by inheriting the properties and behavior of existing classes. In NAFS, inheritance was used to create subclasses of the airplane class, such as the economy class passenger and business class passenger, which inherit the properties and behavior of the passenger class. Passenger Data Class inherits from Data class.

By using **OOP** concepts, the development team was able to design a system that is modular, extensible, and easy to maintain. The use of classes and objects allowed for a more natural representation of the real-world entities, and the separation of concerns made it easier to test and debug the system. Overall, OOP was a suitable methodology for the development of NAFS, given its complexity and the need for a robust and scalable solution.

Implementation:

I first made three classes: Main System, Admin Panel and Passenger Panel. Then I did the Composition of Admin Panel and the Passenger panel with the Main System.

Then through a function Menu Displayer of Main System I gave the user an option to select Passenger Panel or Admin Panel and then called the Menu Displayer of respective class according to the user selection.



Console

```

Welcome to NUCES Airline Flight System

1. Admin Panel      2. Passenger Panel      3. Exit

```

Selection 1:

I called the menu Displayer of Admin Panel and after that I registered or Login the admin through the member function of this class named as Register Maker or Login Maker. After successful Login or Registration the Functionality Chooser of Admin Class is called which shows a list of tasks which can be performed by the user.

```

You have Registered Successfully

What you want to do
1. Maintain and update Flight Shedule
2. Add New Routes
3. Restrict the Number of Passengers
4. Update airline Inquiry Details
5. Reset Password or Username
6. Go Back

```

Selection 2:

This will call the menu display of the class Passenger panel and after Registration or Login you can see the Menu for Registered users displayed through the function Functionaility_ChoserR

```
What you want to do
1. View Basic Details about NAFS
2. View Flight Shedule Detail
3. Reserve Flight
4. Cancel Flight
5. Reset Password or Username
6. Go Back
█
```

If you don't want to register you can continue as a guest from which you can access a Restricted menu through the function Functionaility_ChoserP.

```
You have Continued as Guest
What you want to do
1. View Basic Details about NAFS
2. View Flight Shedule Detail
3. Go Back
█
```

Concepts Used:

I used the Concept of Association multiple times in my Project. My different classes have different types of relations with each other.

In my City class I have done Composition of Airport and Aeroplane class

```
class City
{
    string Name;
    static int Count;
    int option, option2;
    Airport *My_Airport = new Airport[2];
    Aeroplane *My_Aeroplane = new Aeroplane[10];
}
```

In my Aeroplane class I have done the Composition of Passenger Class with my Aeroplane class.

```
class Aeroplane
{
    string Type_of_Flight;

    int Duration_of_Flight;
    string Name;
    static int counter;
    int Arrival_timeH, Arrival_timeM, Departure_timeH, Departure_timeM;
    bool RouteSet;

    long long int TravelC;
    string Destination;

    int Business_Seats, Economy_Seats;
    const int LocalFCostE, InternationalFCostE;
    const int LocalFCostB, InternationalFCostB;

    Economy_Passenger *My_E_Passenger = new Economy_Passenger[50];
    Business_Passenger *My_B_Passenger = new Business_Passenger[10];
}
```


I have implemented the concept of Aggregation in my Online Data class with Passenger class.

```
case 2:
    /* A Loop to continue displaying Passenger Panel until the user press back
    while (check)
    {
        check = MyPassengerPanel.MenuDisplay(MyOnlineData);
        system("cls");
    }
    break;
```

I have used the concept of Inheritance multiple times in my Project.

I have Inherited Passenger Data i.e PData from the class Data and Passenger Database that is PDataBase from class DataBase.

```
///  
A Class to hold Passenger Data Inherited from Class Data  
class PData : public Data  
{  
    string CNIC;  
    string CardNo, Securitycode;
```

```
class PDataBase : public DataBase  
{  
    PData *MyPDataBase;
```

The Concept of Composition is also seen here.

I have Implemented Inheritance in the Passenger module where Economy Passenger and Business Passenger is inheriting from Passenger class.

```
class Economy_Passenger:public Passenger
```

Conclusion:

The development of the NUCES Airline Flight System (NAFS) will bring a number of positive outcomes for both the airline and its passengers. These include:

With the NAFS system in place, the airline will be able to streamline its operations and improve efficiency across the board. Enhanced customer experience: The system will provide passengers with a more user-friendly experience, including seamless booking and seat selection processes, and real-time flight status updates. Improved communication: The system will allow for seamless communication between passengers and airline staff, which can help to improve the overall travel experience. Increased revenue: By providing a more efficient and customer-friendly service, NAFS may be able to attract more passengers and generate increased revenue.

Overall, the NAFS system represents an important investment for the newly established airline, and is likely to bring a number of benefits for both the airline and its passengers. While there are limitations to the system, and room for future development and improvement.

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