

# **Object Oriented Programming Project**

## **Submission Items:**

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|---|-------------|
| 1. Program Code with all requirements + Viva Demo | (140 marks) |
| 2. Report   | (50 marks)  |
| 3. Class Diagram (made on Microsoft Visio)        | (10 marks)  |

## **Deadline: May 10, 2023**

Report with complete explanation which provides explanation of which OOP concepts have been used for the development of the project e.g., Identify Inheritance (if any), Aggregation (if any), Association (if any), Composition (if any), constant data members. (5 marks) along with screenshots. Also make a class diagram for the scenario given below and add it into the report.

## **Submission Guidelines**

- Please note that this is an individual project.
- Make a folder, write your roll number as the folder name. Example: 22i-XXXX.
- Zip the folder that contains all your .cpp files with the same name as the folder name. Example: 20i-XXXX.zip. (Right Click folder -> Send To -> Compressed zipped folder)
- **DONOT compress the folder with .rar / .7zip extension.**
- **Report is not part of zip.**
- **Submit Class Diagram separately as well (original file + exported image).**
- If any submission does not follow the guideline will be awarded 0 marks in the project.

## **Instructions:**

- Please note that this is an individual project.
- Plagiarism will result in F-grade in this course.
- No late submission will be accepted so now is the right time to start working on it.
- Coding language: C++
- All coding standards must be followed (meaningful variable name, code comments etc.)
- Apply all validations for invalid inputs. Use Exception Handling.
- Use of Vectors and similar container is not allowed.

# NUCES Airline Flight System (NAFS)

## **Project Statement:**

Develop an application namely NUCES Airline Flight System (NAFS) for a newly established airline. NAFS is functional in five major cities of Pakistan. These cities are Islamabad, Lahore, Quetta, Peshawar, and Karachi. Each city has two airports located at the North and South. NAFS team wants to have a flight reservation system. NAFS has 10 airplanes in each city whereas a maximum of 5 can land at a time in an airport. NAFS has established a network of flights in 25 countries around the globe. Due to COVID situation some countries have travel bans. NAFS greatly value its passengers and abide by the international travelling laws. 50,000 passengers use NAFS annually. Ten Local flights and Five International flights take off from each airport daily depending on their schedule. Each plane of NAFS has a seating capacity of 50 passengers in economy class and 10 in business class. The days passengers are seated with a gap of one seat during the COVID days. The main features identified by the NAFS administration are as follows:

## **Menu: (10 marks)**

A menu is provided to navigate the full system. After completion of each step users are provided with a menu to the subsequent process and a link to main menu. Basic details about NAFS are available for every person without a login. System specific details like Flight Reservation, and Cancellation etc. are only accessible to the registered users.

## **Login and Registration: (10+10 marks)**

**Admin Panel:** NAFS has a team to manage the interaction with the system. The team members can login to change the schedule of flights. Add new routes for local and international flights. Restrict the number of passengers in a plane. Update airline inquiry details.

**Passenger Panel:** Users are the passengers that use to travel using NAFS. A new user can register in the system with a valid CNIC. An adult passenger can also register for the dependents under 18.

Registration details are stored in two Arraylist namely Admin. and Passengers. These list have Usernames and Passwords. User can also reset the password and username.

The registration process hides the password and only shows \*\*\*\*\* instead of actual entered characters. New user must re-enter the password and system verify any typing mistake. Password must be 8 characters long and use of minimum one special character, uppercase, lowercase, and numeric digit is must. The passenger account is only created if a valid 13-digit CNIC is provided and CNIC must not be repeated in existing record. Otherwise, appropriate messages should be generated to notify the users. Users provide their basic identification details to register.

A registered user is also asked to provide account details for payments and transactions. Account details are verified through a non-member function “VerifyFinancialDetail” by a Finance Department of NAFS.

### **Flight Schedule: (10+10 marks)**

Maintain a complete schedule of flights for each airplane, covering the following details:

- A plane can either travel locally or internationally in a single day.
- The number of hours required to complete a flight journey must be recorded.
- Arrival and Departure Time should be displayed for each flight.
- Current available seats regularly updated should be displayed in the information panel.
- A local flight is of short duration and a plane can have multiple journeys per day with a gap of 2 hours.

There must not be any clash between timings and maximum airplanes that can be at an airport as described earlier. Both registered and un-registered users can search for schedule details with customized keywords.

### **Passengers: (10 marks)**

Passengers have a valid Passport. Passport can be Local or Foreign. Passport must have a stamp of VISA for travelling. For a local journey VISA is not required but for international trips VISA is a must. A passenger can register and login to the system. Details of the passenger can also be updated. Passenger can view the detail of most visited country with an estimate of travelling cost on NAFS.

### **Booking: (20 marks)**

Passengers book a flight by providing and considering the following information:

- Selecting the country and destination airport details.
- Reserving a seat by considering the current available seats and schedule of flights.
- Route details for direct and indirect flights.
- Costs are provided for each available flight by overloaded stream operator.

Any user can search the available flights and timing details. Only a registered passenger can reserve a seat. Passengers can update their details. Change their scheduled flight or even cancel it with a penalty of 25% actual payment. Due to COVID some flights may not be available but can be resumed. The system must allow admin to resume or block flight schedule to a specific affected country.

The payment details for each booked flight are recorded. Ticket price for all journeys is displayed to the users.

- One hour travel costs Rs.10,000 for a local flight and Rs.20,000 for international flights.
- Government deducts 5% and 10% tax on local and international flights, respectively.

### **Marks Distribution:**

1. Follow all above mentioned details of the project and must use all OOP concepts. (80 marks)

**Some bonus marks:**

3. Use of dynamic array is compulsory wherever an array is required. (2 marks)

4. Provide parameterized constructors in each class. (1 mark)

6. Provide a copy constructor to deep copy where necessary. (1 mark)

7. Program must not stop execution for logical errors instead display an appropriate message for 10 seconds and navigate to the main menu. (1 mark)

8. Use filing to store all data that needs to be stored for a longer duration. (1 mark)

9. Populate NAFS application with sufficient data before submission, to demonstrate each feature. (1 mark)

Use the below mentioned link or any other website to find details related to distances and flight durations. You may also assume yourself and provide a graph or table for it.  
[https://distancecalculator.globefeed.com/Distance\\_Between\\_Countries.asp](https://distancecalculator.globefeed.com/Distance_Between_Countries.asp)

Best Wishes!