Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology

(*An Autonomous Institute affiliated to Savitribai Phule Pune University*)

Course Project Report

Course: ET3024

Object Oriented Programming

(A.Y. 2019-20 – Sem 2)

Department of Electronics &Telecommunication Engineering

Title

Railway Reservation System in C++

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Objective :

To implement Railway Reservation System in C++ based on Object Oriented Programming.

Introduction :

This report presents the implemented C++ program as well as structure of Railway Reservation System based on OOP and the analysis of results. We are using linked list as data structure for programming.

OOP - Object-oriented programming is now the demanding technique in the coder community. Along with the user-friendly approach, exponential data mining gave birth to challenges for big data handling. 'C' as the primitive computer language, focuses more on procedural approach simplifying primary ways for problem-solving. Basically, it consists of writing computer understandable list of instructions that are organized as functions. It is much easier to access data. However, OOP treats data as a more sensitive element throughout the chain and does not allow it to flow freely around. Looking a bit inside, it all consists of small classes and objects just like microscopic cells in leaves. It may vary in size, shape but nothing will be outside a single cell. Mutually all are private, protected to each other, but as required content can be shared to respective cells, here classes. This uniqueness is the major motivating factor for topic selection. Data structures are designed such that they characterize the objects.

Railway Reservation System -

The Railway Reservation System facilitates the passengers to enquire about the trains available on the basis of source and destination, Booking and Cancellation of tickets, enquire about the status of the booked ticket, etc. It is the computerized system of reserving the seats of train seats in advanced. The project based on OOP will enable the user to book trains, reserve seats, cancel booking, print ticket, etc. and the administrator to add trains, edit the list, etc.

Transactions should occur without loss of data, memory leaks and malfunctions. OOP is the best suite for such problems. As new data and functions can be easily added, dynamic systems are built upon this concept all over the world. Every tiny little system can be viewed as an 'objected-oriented viewed' system and split further until you find nothing but objects.

Theory :

Majorly the system consists of two broad levels and three including minor level inheritance. The base class, moderator access class, and passenger access class. As we know in reality there are various levels of administration.

The ‘Base class’ is the first and topmost level of inheritance which stores the data. Security care is taken while inheriting the data. ‘Moderator class’ indicated roles of moderator in the administration who have access to the details of trains and their modifications. Whereas the ‘Passenger class’ represents a passenger, is another class in the second level of inheritance. ‘Trains’ is the other class which stores all the details of the trains.

```
6   class base_class{
7   private:
8       int priority;
9       char name[50];
10      int age;
11      char gender;
12      int num_of_seats;
13      int train_num;
14      float charges;
15
16  };
```

Base Class

```
31  class moderator : public base_class{
32  public:
33      void create_trains();
34      void add_train();
35      void delete_train();
36      friend passenger();
37      friend trains;
38  };
```

Moderator Class

The base class consists of all personal data and should be kept private for the rest people. It includes details of passengers and their reservation priorities. As listed, the name signifies the name of the registree. Age, gender is also considered to implement reservation categories of registree. The number of seats shows how much seats users want to book. Train number points towards the train for which registration is to be done. Lastly, Charges calculate how much amount the seat takes for the travel. Priority is set for the reservation people like women and aged people. The Passengers class includes all the functions which are dedicated to operations for passengers. ‘Reservation’ function helps registree to book the train. They have to provide the details as mentioned above. ‘registration_cancel’ function cancels the already booked ticket. ‘check_vacancy’ function checks the vacancy and alerts the user if out if seats. ‘display_passenger_list’ function helps to display the details of passengers whereas,

'view_train_Details' function displays current details of all trains. 'printticket' prints the personalized ticket of a passenger.

Moderator class includes details of trains. An object of this class can delete or add trains. Also, the timings can be changed because of delay in arrival or departure. The Moderator class has access to all data of passengers as well as its own. However, it is not true the other way. A friend class concept is used here. Trains class includes details of trains- train number which is the private key, train name, starting place and ending place, charges, and timing of arrival. Everyone has access to trains but edit access is only for moderator.

The program is implemented using Linked List, a linear data structure, in which the elements are not stored at contiguous memory locations. The elements in a linked list are linked using pointers. It consists of a collection of nodes which together represents a sequence.

Some of the concepts used in the system :

- Inheritance - a process in which one object acquires all the properties and behaviors of its parent object automatically. In such way, you can reuse, extend or modify the attributes and behaviors which are defined in other class.
- Function Overloading - allows us to have more than one function having same name but different parameter list
- New Operator : it allocates the memory to variable or object during run time

Functions the system can do : Book a ticket, Cancel booking, display status, view vacancy, print ticket, view train details for passengers. Add train, delete train, view passenger details, change timings for operator.

All elements of a system should be smoothly interacting with each other. OOP helps us link these actions, link the objects from different classes, reuse the code, reduce the code length and making the system dynamic, i.e. easily upgradable and maintainable.

Programming Language : C++

Code :

Link for the code :

https://drive.google.com/open?id=1xXud1JwdJrNErLOLDQSPwd9AgIQEUYVc

Demonstration link :

https://drive.google.com/open?id=11CeK9JuWC8HvGX536EZknoyX1wUtin-R

Results :

Tr.No	Name	Destinations	Charges	Time
1001	Banglore Rajdhani Express	New Delhi To Banglore	Rs.4500	9am
1002	Chennai Express	Mumbai To Chennai	Rs.3200	12pm
1003	Dehradun Shatabdi Express	New Delhi To Dehradun	Rs.2500	4.30am
1004	Duronto Express	Jaipur To Mumbai	Rs.4000	10.45pm
1005	Patna Express	New Delhi To Patna	Rs.2700	7am
1006	Jan Shatabdi Express	Mumbai To Aurangabad	Rs.1800	2.30pm
1007	Mumbai Rajdhani Express	New Delhi To Mumbai	Rs.5500	1.35am
1008	Puri Surat Express	Puri To Surat	Rs.2000	4pm
1009	Trivandrum Express	Chennai To Trivandrum	Rs.4000	6.25am
1010	Kolkata Express	Mumbai To Kolkata	Rs.5000	8.15pm

```
 Enter the name of passenger to print ticket:
Aditya

Aditya
--------------------
        TICKET
--------------------

Name:                       Aditya
Number Of Seats:            2
Train Number:               1001
Train:                      Banglore Rajdhani Express
Destination:                New Delhi To Banglore
Departure:                  9am
Total chages :              9000
```

```
                    **********************************

                            REGISTRATION MENU

                    **********************************

                        Enter the Name :- Sagar Potnis

                        Enter the Age :- 20

                        Enter the Gender (M/F) :- M

                    **********************************
-------------------------------------------------------------------------------------------------
Tr.No   Name                        Destinations                Charges         Time
-------------------------------------------------------------------------------------------------
1001    Banglore Rajdhani Express   New Delhi To Banglore       Rs.4500         9am
1002    Chennai Express             Mumbai To Chennai           Rs.3200         12pm
1003    Dehradun Shatabdi Express   New Delhi To Dehradun       Rs.2500         4.30am
1004    Duronto Express             Jaipur To Mumbai            Rs.4000         10.45pm
1005    Patna Express               New Delhi To Patna          Rs.2700         7am
1006    Jan Shatabdi Express        Mumbai To Aurangabad        Rs.1800         2.30pm
1007    Mumbai Rajdhani Express     New Delhi To Mumbai         Rs.5500         1.35am
1008    Puri Surat Express          Puri To Surat               Rs.2000         4pm
1009    Trivandrum Express          Chennai To Trivandrum       Rs.4900         6.25am
1010    Kolkata Express             Mumbai To Kolkata           Rs.5000         8.15pm

       Enter train number : 1004

Train:                  Duronto Express
Destination:            Jaipur To Mumbai
Departure:              10.45pm
Enter number of seats : 2

                            REGISTATION SUCCESSFUL
```

```
                    **********************************

                            REGISTRATION MENU

                    **********************************

                        Enter the Name :- Sagar Potnis

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       Enter train number : 1004

Train:                  Duronto Express
Destination:            Jaipur To Mumbai
Departure:              10.45pm
Enter number of seats : 2

                            REGISTATION SUCCESSFUL
```

Future work :

The project can be further executed by adding additional functions like zonal train schedule, registration of user, etc. We can also create a database of trains by using any Database Management system like MySQL, connect it with the program to access it while running the program. Online system with train tracking, etc. can also be executed. IoT based system can be executed.

Conclusions:

In this project we could implement the concepts of object oriented programming in C++. We were able to develop a user-friendly Railway Reservation System enabling users as well as operator to carry out basic functions related to train reservation.