Database Development – CW2

Module Code: 7CS082

Submitted By: 100540673

Table of Contents

1 Introduction

The Student Flight Management system has been developed for the airline business that would serve various purposes such as to help the business to run more efficiently in order to increase the revenue, allow managers and employees to make better decisions, allows the business to stay organized and keep track of information quickly accessible. A well-designed database is vital to any company or organization. This application has been designed in a way to be simple to use for all the customers. In the first part of the report the system was developed and implemented using MySQL as the back end. Individual authentication for the admin and customers enables more comprehensive way of the design. The purpose of choosing MS Access as the front-end is it enhances flexibility, and an excellent option that can connect with various data sources easily. Furthermore, Access server allows other databases to connect with unlimited database sizes - considering this would benefit the future growth of the business to store large number of data. This report shall elaborate the connection process between MS Access and MySQL, user interface design, operations of important features of the application are discussed and the implemented trigger procedure in the database of the system is explained.

2 Justification of MySQL

The potential reason for choosing MySQL database is because it's an open source and the company updates new features very often and considering some of the significant aspects in mind that would greatly support the business in its future growth.

- It is compatible with many operating systems such as UNIX, LINUX, Windows, Mac etc.
- Unlike other DBMS, MySQL supports various interfaces like JDBC, ODBC and other scripting languages in order to connect with the application
- The master slave replication technology of MySQL ensures high availability of database in case of failure in master database. The backup technology available in MySQL achieves full recovery of data (Ping et al, 2014).

3 Connection mechanism

To demonstrate the connection process, the WAMPSERVER 64 has been installed in the machine. Once the WAMP server is started, open the command prompt copy the path of MYSQL 8.0.21 from the bin folder then mysql will be initiated then enter the username as root and password then mysql gets connected. The database named as flightmanagement_system has been created in MySQL. In the report 1, from the raw data of the airline company there were 7 entities identified and further they are grouped as different tables with attributes containing the relevant information about each entity

which are staff, airplanes, flight and passengers. For instance, the staff table contains the information about all the staffs and the pilot's eligibility of planes they are allowed to fly. All the entities are identified, normalized and different tables were created associating the relationship between each other. The below figure shows the tables within the flightmanagement_system.

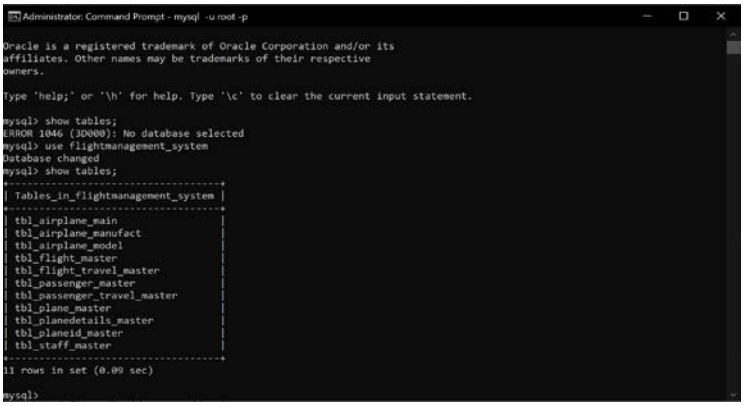
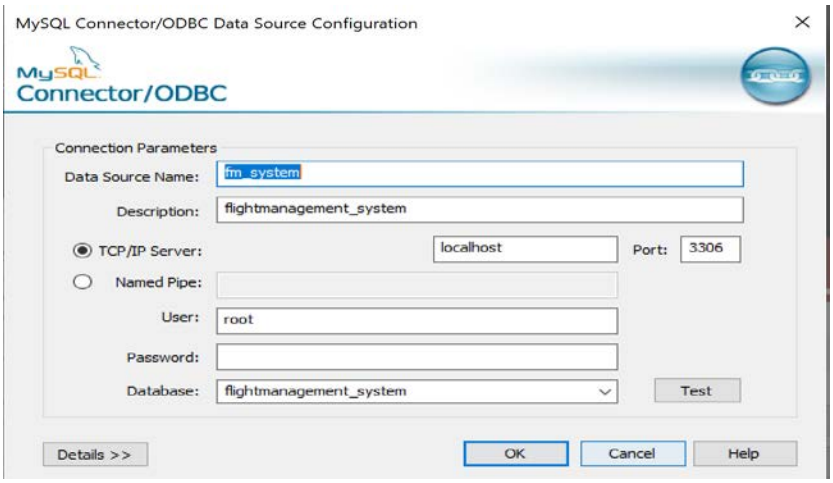


Fig 1: Tables created in flightmanagement_system

In order to connect the tables with the front-end application, the Open Database Connectivity (ODBC) that permits interoperability between MS Access and MySQL has been successfully established. The step by step procedure for connection is as follows.

- Step 1: Download MySQL connector/J based on the type of operating system in the machine and visual C++ redistributable package for visual studio 2016
- Step 2: Follow the steps and install both drivers in the machine
- Step 3: Open ODBC data source -> User DSN -> Create New Data Source -> select MySQL ODBC 5.3 Unicode Driver -> click Finish
- Step 4: In MySQL Connector/ODBC Data Source Configuration wizard -> under Data Source Name -> fm_system
- The following figure shows the entries to be filled in the ODBC Data Source Connection wizard

4



- Step 5: The created User Data Source appears in the User DSN tab. Select fm_system and click OK.
- Step 6: Open MS Access -> create a blank database -> select External Data -> choose Link to the data source by creating a linked table -> click OK.
- Step 7: Select Data source -> select Machine data Source -> select fm_system -> press OK
- Step 8: Link Tables -> Choose flightmanagement_system in order to link the database tables and click OK.

All the tables under the flightmanagement_system database from MySQL has been imported to MS Access successfully.

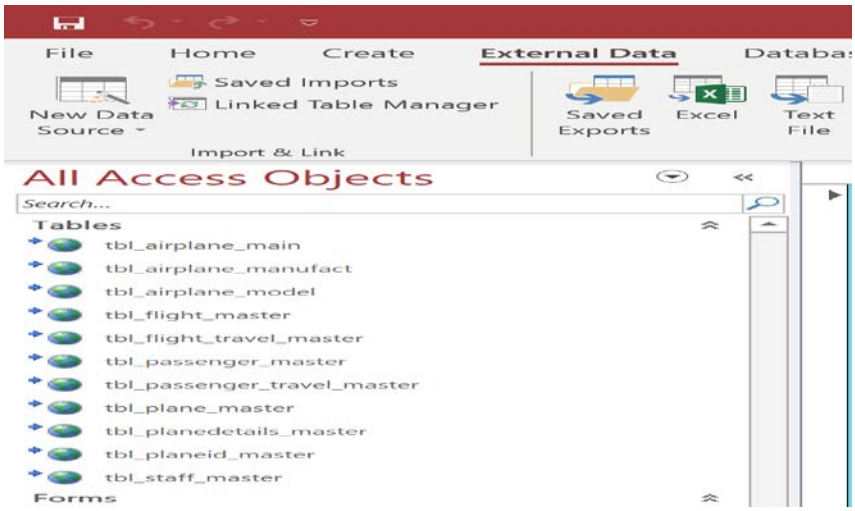


Fig 2: Tables imported in MS Access

The below table shows the MS Access view of imported staff_master table and its attributes.

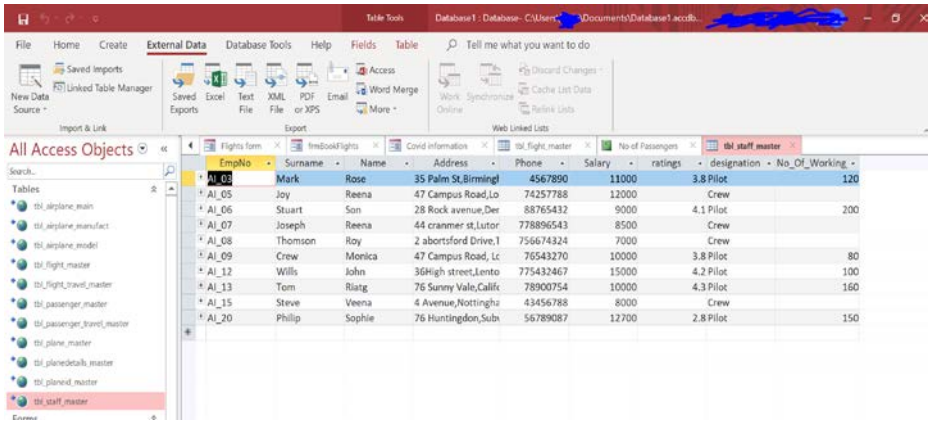


Fig 3: Staff table and its attributes

Once the connection has made, then relationships has been created between each table in MS Access. The relationships are created in a way that the tables are linked to other tables in accordance to the primary key and foreign key assigned when the tables were created.

4 Entity Relationship Diagram

As designed in the report 1, an ER diagram representing the relationship between each table in the database is encountered.

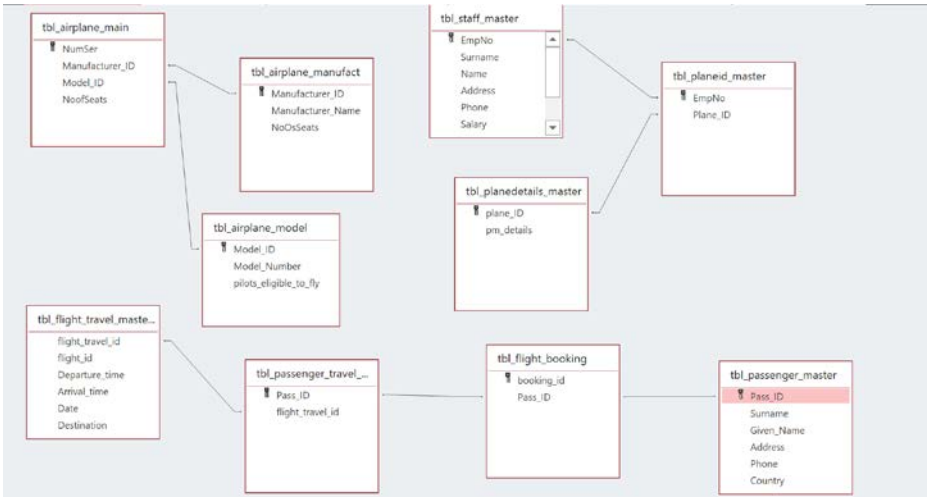
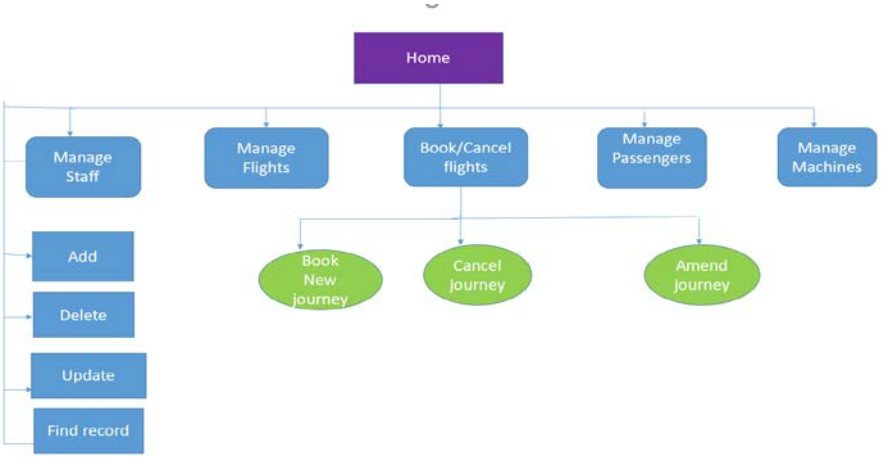


Fig 4: ER Diagram

5 System Design

5.1 Navigation map of the system



The above figure describes the navigation on how the system works and the User interface has been designed based on that.

5.2 User Interface design

In MS Access, a bound form connects directly to the data source from the table or query that can be typically used to perform all operations within the data. The system has been developed with comprehensive features to provide efficient access to the users and the business. The forms have been designed to be easy of use and provides customization with variety of features. In order to create form,

Select the required table from the navigation pane -> select Create tab -> choose Form

This application comprises of 7 forms that navigates to each other. The following figures shows the user interface design of Student Flight Management System.

Fig 5: Home Page of Students Flight Management System

When the Click here button under Covid 19 is clicked, displays the current update about travel restrictions are provided as a guideline to the business. The below figure shows the page information.

Fig 6: Travel Updates

Fig 7: Manage Staff

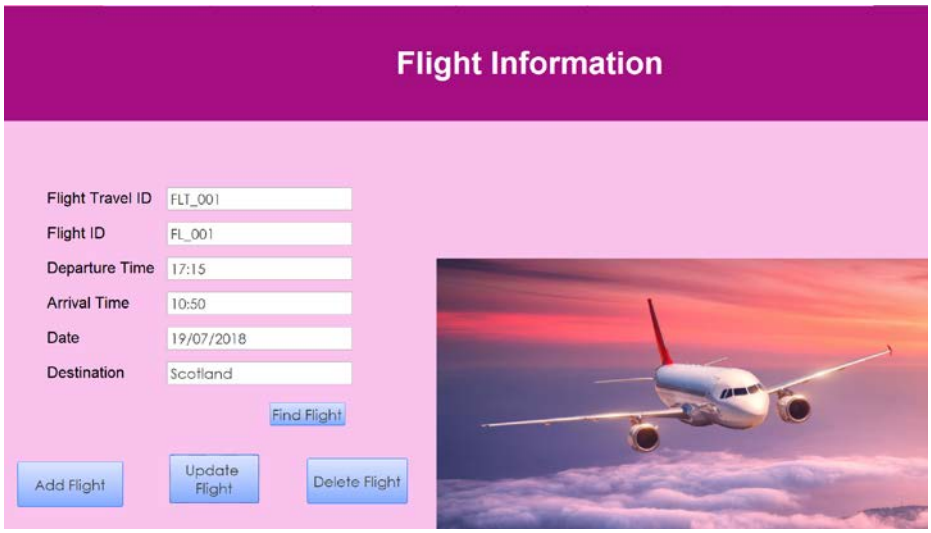


Fig 8: Manage Flights

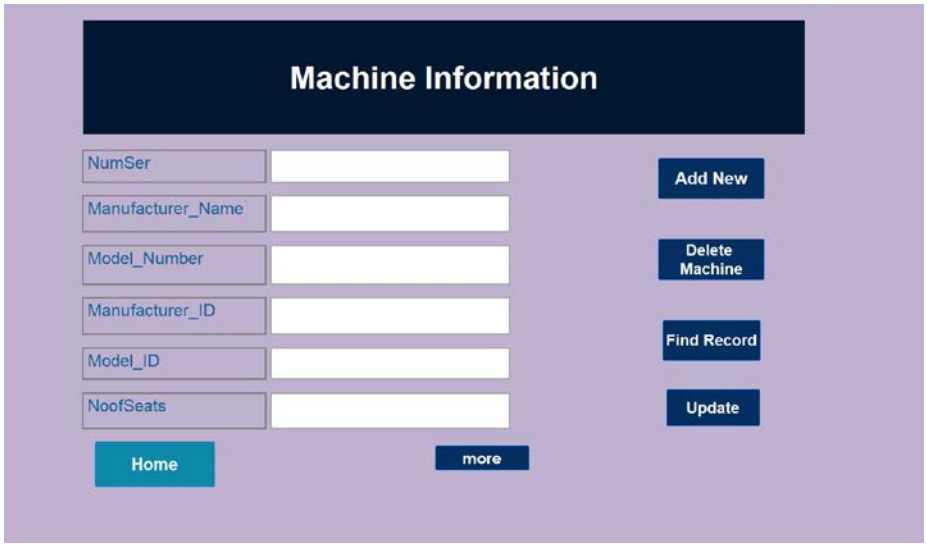


Fig 9: Manage Machines

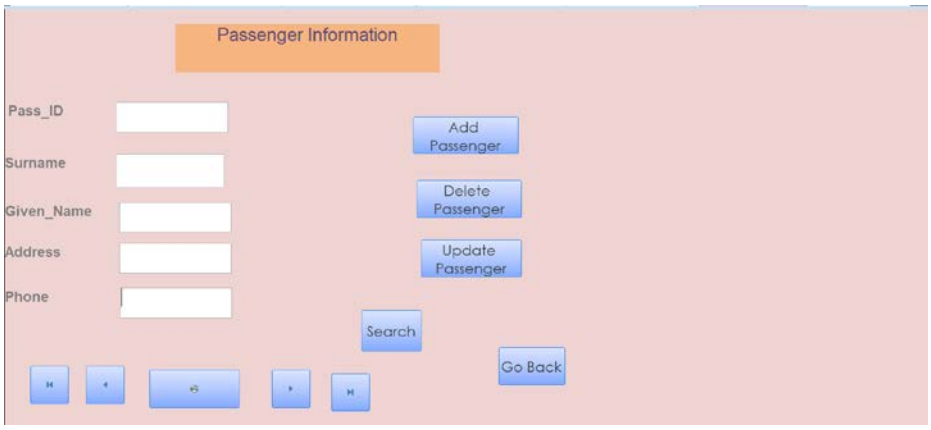


Fig 10: Manage Passengers

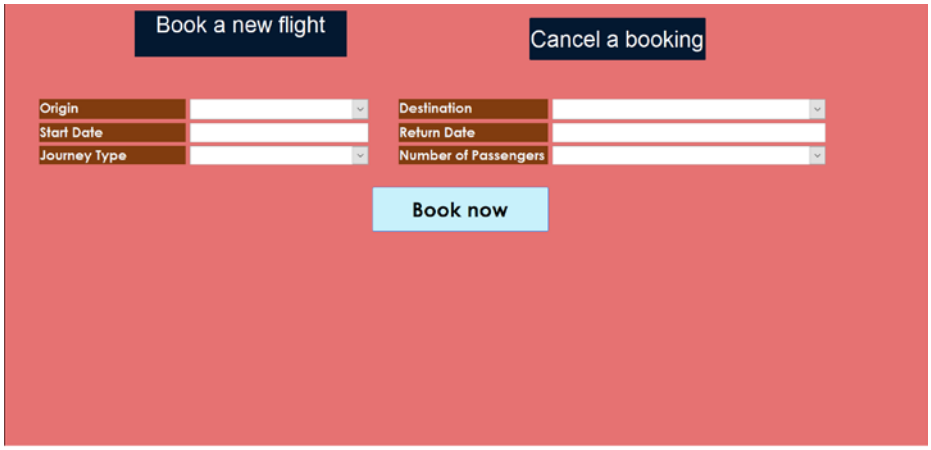
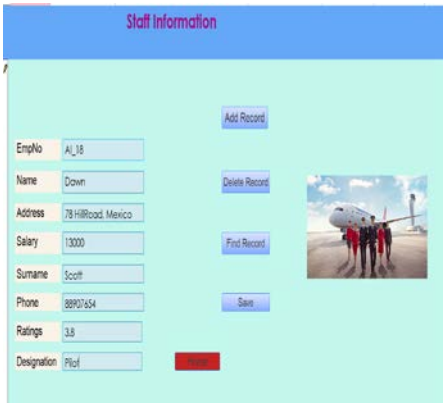


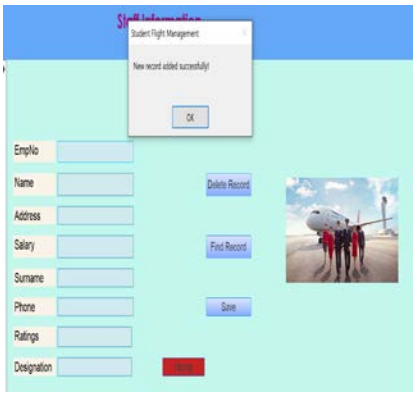
Fig 11: Book/Cancel Flights

5.3 Description of the system

i. Manage Staff -> add new staff

- When the admin wants to add a new staff, in the staff information page the required data should be given and when the add record button is clicked then the new staff record will be added in the database.



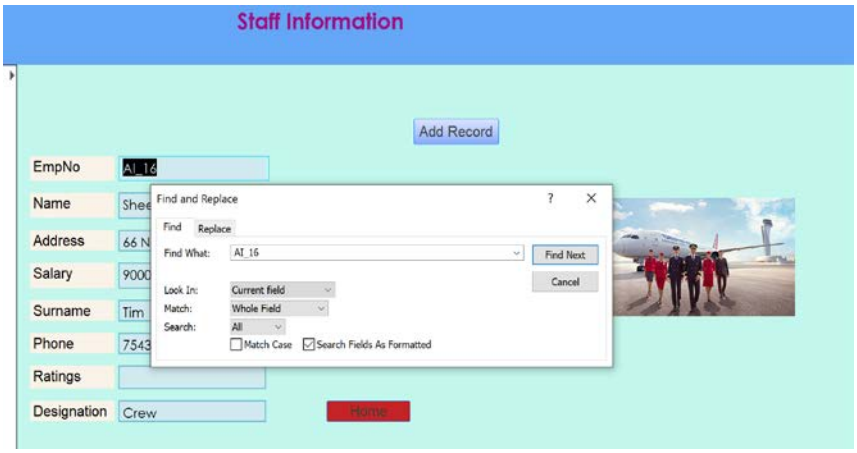


EmpNo	Surname	Name	Address	Phone	Salary	ratings	designation	No_Of_Working
1234	ffhj	yfjf	45 hh	54467899	2233	2.2	pilot	78
Al	Mark		35 Palm St,Birmingha	94567890	11000	3.8	Pilot	120
Al_05	Joy	Reena	47 Campus Road,Londo	74257788	12000		Crew	
Al_06	Stuart	Son	28 Rock avenue,Derby	88765432	9000	4.1	Pilot	200
Al_07	Joseph	Reena	44 cranmer st,Luton	78896543	8500		Crew	
Al_08	Thomson	Roy	2 abortsford Drive,T	56674324	7000		Crew	
Al_09	Crew	Monica	47 Campus Road, Lond	76543270	10000	3.8	Pilot	80
Al_11	Stock	Tiger	23 Rope Walk,Toronto	67789087	8000	3.4	Pilot	
Al_12	Wills	John	36High street,Lenton	75432467	15000	4.2	Pilot	100
Al_13	Tom	Riatg	76 Sunny Vale,Califo	78900754	10000	2.9	Pilot	160
Al_15	Steve	Veena	4 Avenue,Nottingham	43456788	8000		Crew	
Al_16	Tim	Sheela	66 North St, Gao	75432123	9000		Crew	
Al_17	Palli	Monish	11 Bridge St,Derby	65678907	6800		Crew	
Al_18	Scott	Dawn	78 HillRoad, Mexico	88907654	13000	3.8	Pilot	
Al_20	Philip	Sophie	76 Huntingdon,Subway	56789087	12700	3.4	Pilot	150
Al_21	Prabhu	Wag	9King Street,London	99865324	5000	2.8	Pilot	75

Database view of newly added record

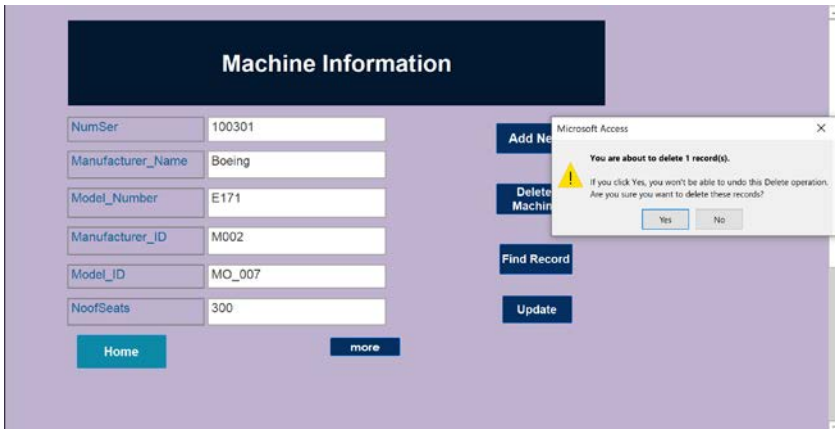
ii. Manage Staff -> Find Record

- When an admin encounters to find a specific record from the database, then find record button should be clicked next a po-up window appears to enter the EmpNo of the staff. When the EmpNo is submitted, the requested staff record will be retrieved from the database.



iii. Manage Machines -> Delete machine

- When the user intends to delete a record in the machines table which is named in my database as airplane, the delete button should be clicked to delete the required record then the appropriate record will be deleted in the database.

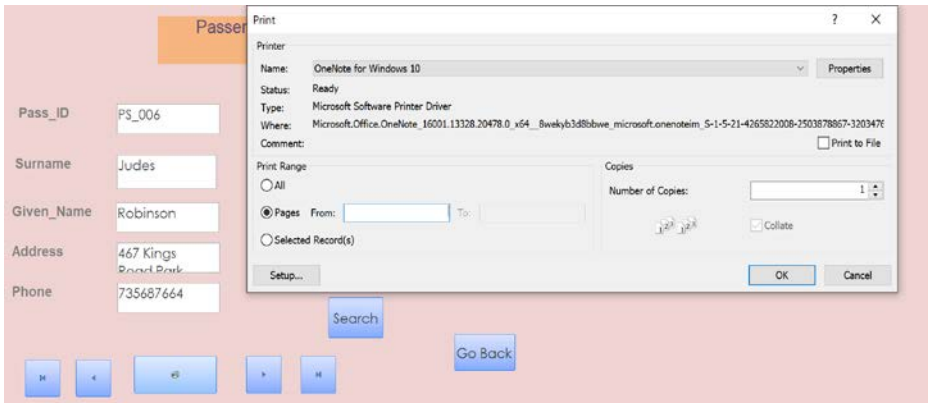


NumSer	Manufacturer_ID	Model_ID	NoofSeats
100302	M003	MO_011	350
100303	M003	MO_012	25
100402	M004	MO_015	300
100403	M004	MO_016	700
100501	M005	MO_018	25
100502	M005	MO_019	95
100503	M005	MO_020	220
100504	M005	MO_021	300

The database view of deleted record

iv. Manage Passengers -> Print page

- When a passenger wishes to print the page the print option from the passenger form allows to do it.



v. Book / Cancel Flight -> Book a new journey

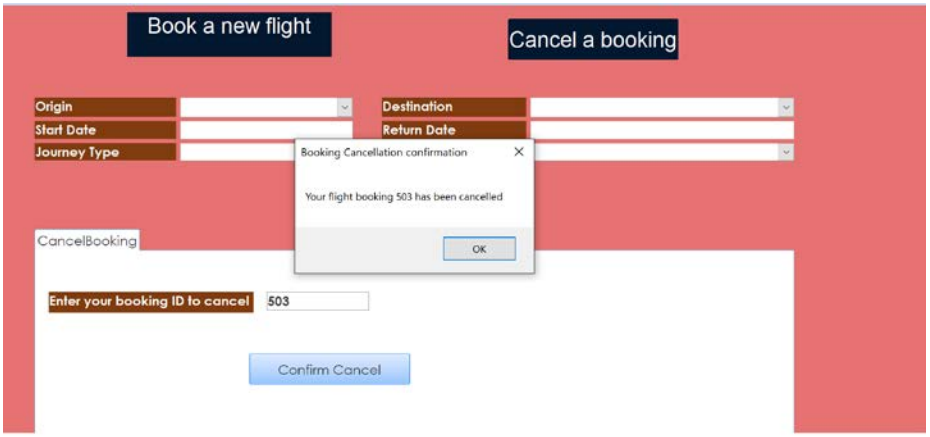
- When the admin wants to book for a new flight, after entering the travelling details, the Book Now button should be pressed then the page enables the user to enter the name and age of the passengers and click on Book Flight, the new passenger information will be updated into tbl_passenger_master

Book flight button vb.net code

```
Private Sub Command291_Click()

    Dim conn As ADODB.Connection
    Dim rs As ADODB.Recordset
    Dim fld As ADODB.Field
    Dim lastvalue As String


    Set conn = New ADODB.Connection

    Dim sql As String
    conn.ConnectionString = "Driver={MySQL ODBC 8.0 Unicode Driver};Server=localhost;Database=flightmanagement_system;Uid=root;

    conn.Open


    Dim Origin, Destin, JournTy As String
    Dim NoOfPassengers As Integer
    Dim FromDate, ReturnDate As Date

    Set rs = New ADODB.Recordset

    conn.Execute ("Insert into tbl_passenger_master(Given_Name, Surname) values ('" & Text179.Value & "','" & Text192.Value &

    rs.Open "Select Pass_ID  from tbl_passenger_master order by Pass_ID Desc limit 1", conn
    For Each fld In rs.Fields
    lastvalue = fld.Value

    Next
    rs.MoveNext
    rs.Close


    MsgBox "Your flight booking is confirmed", vbOKOnly, "Flight Booking Confirmation"

    Command434.SetFocus

End Sub
```

vi. Cancel Booking

- When the admin wants to cancel a booking that has been made, then cancel a booking on the add passengers page should be clicked. Then displayed with the booking ID to cancel field -> when the booking id is entered the specific booking will be cancelled in the database.



booking_id	Pass_ID
502	108
500	110
504	110
505	112
506	113

The database view of cancelled booking id of the passenger.

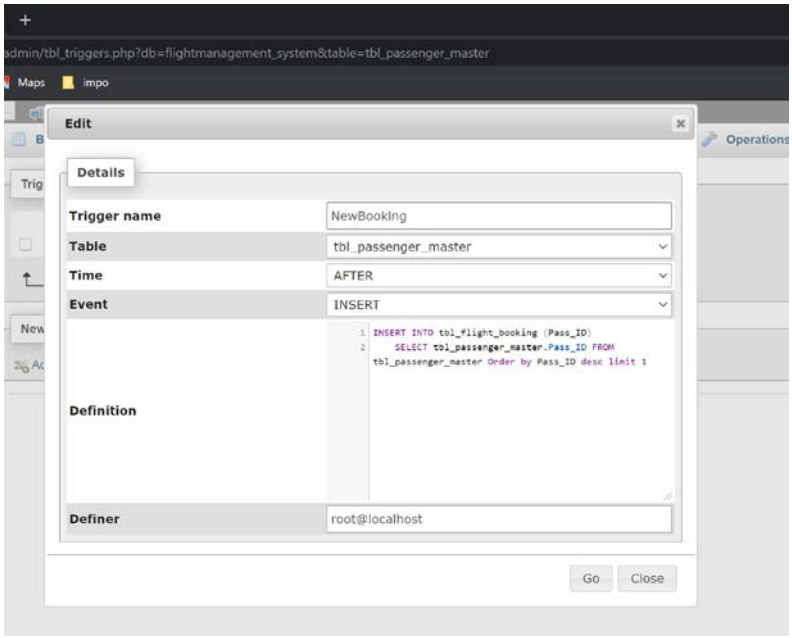
Confirm Cancel button.vb code

5.4 Trigger Procedure

Through the flight booking form, the flight information that customer wishes to fly is selected along with travel dates, travel type and number of passengers. On entering the passenger(s) details in the page, the confirmation button inserts the relevant data into tbl_passenger_master table. In this instance, an auto incremented Pass_ID is created for the new record. On such trigger, the newly created Pass_ID from tbl_passenger_master is inserted into another table tbl_flight_booking through foreign reference key Pass_ID. This occurrence is achieved through triggers directly defined in MySQL

```
DROP  TRIGGER IF EXISTS `NewBooking`;
CREATE DEFINER=`root`@`localhost` TRIGGER `NewBooking` AFTER INSERT ON
`tbl_passenger_master`
FOR EACH ROW
```

```
INSERT INTO tbl_flight_booking (Pass_ID) SELECT tbl_passenger_master.
Pass_ID FROM tbl_passenger_master Order by Pass_ID desc limit 1;
```



6 Report Generation

Creating an effective database system is crucial for any business, like wise generating reports for the designed database allows the business to view the summary of information, easy for printing, produces clear and attractive view on the data, highlights all the major facts and trends.MS Access produces sophisticated ready to use reports in which the data can be retrieved from one or more tables and queries. The motive of creating reports is to let the business admins to take decisions, helps to achieve goals of the business by analyzing the current status, useful to produce business information during conferences, helps to analyze in making changes over the business process management. The reports in MS Access can be created in either selecting the table choosing report wizard and customizing the required field from various tables or using queries.

The reports for this application have been created using the report wizard. Reports are generated for the following conditions.

a) No of passengers by flight

No of Passengers

NoOfPassengers	Flight_Number
233	FL_008
321	AI 161
189	JA 0567
325	JA 0567
210	AI 161
300	TI A256
147	TI A256
387	AI 323
177	ER 2019
300	ER 1098
222	AF 1007
400	ER 1098
288	AI 161
411	ER 2019
290	AI 161

b) List of company destinations and their schedule

flights schedule

Departure_time	Arrival_time	Date	Destination	Flight_Number	Origin
17:15	10:50	19/07/2018	Scotland	FL_008	California
12:15	03:05	30/05/2017	Singapore	AI 161	India
19:05	16:00	06/10/2019	Malaysia	JA 0567	UAE
20:05	23:05	12/08/2018	India	JA 0567	Malaysia
04:05	21:03	11/10/2019	Boston	AI 161	China
12:03	07:03	15/03/2015	Thailand	TI A256	Singapore
10:05	13:55	20/04/2017	Mauritius	TI A256	Singapore
01:03	17:05	20/06/2016	Singapore	AI 323	India
02:01	08:15	17/10/2014	London	ER 2019	California
08:05	12:45	12/01/2009	Boston	ER 1098	London
14:15	20:02	22/07/2011	Canada	AF 1007	Boston
12:03	16:01	10/03/2018	London	ER 1098	Scotland
01:15	07:02	02/04/2020	Chennai	AI 161	Boston
12:03	18:05	05/06/2017	Germany	ER 2019	London

c) Number of working hours of all pilots

Working Hours for all pilots

Name	Surname	No_Of_Working_hours	designation
Dawn	Scott		Pilot
John	Wills	100	Pilot
Jones	Mark	120	Pilot
Monica	Crew	80	Pilot
Monish	Palli		Crew
Reena	Joseph		Crew
Reena	Joy		Crew
Riatg	Tom	160	Pilot
Roy	Thomson		Crew
Sheela	Tim		Crew
Son	Stuart	200	Pilot
Sophie	Philip	150	Pilot
Tiger	Stock		Pilot
Veena	Steve		Crew
Wag	Prabhu	75	Pilot

7 Conclusion

To conclude, a well-designed efficient system has built for the business and the data are organized using normalization, describing the relations between tables through ER diagrams and the queried using MySQL- connected the front-end and backend using the Open Database Connectivity in order to build a complete working system of the business. Furthermore, reports have been generated for analysis and improvement of potential and future development.

8 References

1. Ping, Y., Hong-Wei, H. and Nan, Z. (2015a). BIG-IP logout page. [online] ieeexplore-ieee-org.ezproxy.derby.ac.uk. Available at: https://ieeexplore-ieee-org.ezproxy.derby.ac.uk/document/7053638 [Accessed 18 Dec. 2020].