20123505 Introduction to Database System - Case Study

**Case 2 – Flight Reservations**

**Business needs**

* Record confirmed passenger reservation everyday
* Check the VIP status of different passenger to provide different special privileges, such as lounge, priority boarding and welcome drink
* Check the Food Allergies status of different passenger to prevent providing allergic meal to passenger and inform flight kitchens to prepare appropriate food
* List the Special Assistance status of different passenger to provide advanced action, such as prepare one more seats for assistance dog, pay attention to passenger who have medical device
* List the Special Requests status of different passenger on their flight to provide advanced action, such as provide child meal and vegetarian meal to passenger, prepare one more seats for wheel chair, provide advanced action to over-sized luggages and overweight luggages
* Provide the status summary including which flight is the most popular during a week

**Database Design**

Six Table and One Logical View

**Table FLIGHT**  
Basic information of each flight,

Flight\_No is primary key and provide the number of each flight

Flight\_FromCity and Flight\_DepartureTime provide departure time and city

Flight\_ToCity and Flight\_ArrivalTime provide arrival time and city

Flight\_TotalTime provide total time of each flight

Flight\_TotalSeats provide total seats of each flight

**Table PASSENGER**  
Basic information of each passenger,

Passenger\_No is primary key

Passenger\_FirstName and Passenger\_LastName provide the first name and last name of each passenger

Passenger\_Gender provide the gender of each passenger

VIP\_Code is a foreign key to link with table VIP to provide the level of VIP and special privileges

Passenger\_PassportNumber provide the passport number of each passenger

Passenger\_Nationality provide the nationality of each passenger

Passenger\_Birthday provide the birthday of each passenger

Passenger\_PhoneNumber provide the phone number of each passenger

Passenger\_Email provide the email of each passenger

Passenger\_AssistanceDog include a value either YES or No to determines the special need of assistance dog

FoodAllergies\_Code is a foreign key to link with table FOODALLERGIES and provide information of food allergies on each passenger

Passenger\_MedicalDevice include a value either YES or No to provide the special need to passenger who have medical device

**Table CLASS**  
Basic information of each cabin,

Class\_Code is primary key and provide the alphabet represent different cabin

Class\_Cabin provide different cabin

**Table VIP**  
Basic information of each VIP level,

VIP\_Code is primary key and represent different VIP level

VIP\_Lounge include a value either YES or No to determines the permission of entry the lounge on the airport

VIP\_PriorityBoarding include a value either YES or No to determines the order of priority boarding between VIP and non-VIP

VIP\_WelcomeDrink include a value either YES or No to provide the welcome drink to the VIP of ‘Gold’ level

**Table FOODALLERGIES**  
Basic information of different food allergies,

FoodAllergies\_Code is primary key and provide the special code to represent different allergic food

FoodAllergies\_Food include different allergic food

**Table INVOICE**  
Basic information of different invoice of different passenger,

Invoice\_No is primary key and represent different number of invoice

Invoice\_Date is the date of the flight

Flight\_No is a foreign key and link to the primary key “Flight\_No” of table FLIGHT and state the flight number which passenger will take

Passenger\_No is a foreign key and link to the primary key “Passenger\_No” of table PASSENGER in order to state the information of each passenger

Class\_Code is a foreign key and link to the primary key “Class\_Code” of table CLASS in order to state the class

Invoice\_SeatRow provide the row of seat of each passenger on the flight

Invoice\_SeatNo provide the no of seat of each passenger on the flight

Invoice\_ChildMeal include a value either YES or No to determines the child meal of each passenger

Invoice\_VegetarianMeal include a value either YES or No to determines the vegetarian meal of each passenger

Invoice\_WheelChairs include a value either YES or No to determines the special need of wheel chairs

Invoice\_OverSizedLuggages include a value either YES or No to show the over sized luggages on each passenger

Invoice\_OverWeightLuggages include a value either YES or No to determines the overweight luggages on each passenger

**ER Diagram**

|  |
| --- |
| FK2  FK3  FK2  PK Flight\_No  have  Belong  have  have  Belong  PK Class\_Code  **FLIGHT**  Passenger\_FirstName  Passenger\_LastName  Passenger\_Gender  VIP\_Code  Passenger\_PassportNumber  Passenger\_Nationality  Passenger\_Birthday  Passenger\_PhoneNumber  Passenger\_Email  Passenger\_AssistanceDog  FoodAllergies\_Code  Passenger\_MedicalDevice  VIP\_Lounge VIP\_PriorityBoarding  VIP\_WelcomeDrink  **VIP**  PK VIP\_Code  PK FoodAllergies\_Code  **FOODALLERGIES**  FoodAllergies\_Food  FK1  PK Passenger\_No  FK1  Class\_Cabin  **CLASS**  PK Invoice\_No  **PASSENGER**  **INVOICE**  Invoice\_Date  Flight\_No  Passenger\_No  Class\_Code  Invoice\_SeatRow  Invoice\_SeatNo  Invoice\_ChildMeal  Invoice\_VegetarianMeal  Invoice\_WheelChairs  Invoice\_OverSizedLuggages  Invoice\_OverWeightLuggages  Flight\_FromCity  Flight\_ToCity  Flight\_DepartureTime  Flight\_ArrivalTime  Flight\_TotalTime  Flight\_TotalSeats |

Initial setup: Table PASSENGER: Basic information of each passenger

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自動產生的描述

Table FLIGHT: Basic information of each flight

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自動產生的描述

Table CLASS: Basic information of each cabin

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自動產生的描述

Table VIP: Basic information of each VIP level

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自動產生的描述

Table FOODALLERGIES: Basic information of different food allergies

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自動產生的描述

Data entry by end-user:

INVOICE: Flight number, Seat row and number and different special requests

一張含有 文字, 電腦, 電子用品, 螢幕擷取畫面 的圖片

自動產生的描述

**Logic View POPULARFLIGHT**

CREATE VIEW POPULARFLIGHT AS

SELECT Flight\_No, COUNT(Flight\_No) AS MOSTPOPULAR

FROM INVOICE

GROUP BY Flight\_No

ORDER BY MOSTPOPULAR DESC;

Sample results:

一張含有 文字 的圖片

自動產生的描述

The most popular flight is CFX75, second popular flight are CFX52 and CFX45

**Test Result**

1. **List each special requests during a week on different flight:**
2. **Child meal:**

select INVOICE.Flight\_No, INVOICE.Invoice\_Date, INVOICE.Passenger\_No, INVOICE.Invoice\_No, INVOICE.Invoice\_SeatRow, INVOICE.Invoice\_SeatNo,

PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, INVOICE.Invoice\_ChildMeal

from INVOICE, PASSENGER

where Invoice\_ChildMeal like "YES" and INVOICE.Passenger\_No = PASSENGER.Passenger\_No;

Sample Results:

**一張含有 文字, 監視器, 螢幕擷取畫面, 黑色 的圖片

自動產生的描述**

1. **Vegetarian Meal:**

select INVOICE.Flight\_No, INVOICE.Invoice\_Date, INVOICE.Passenger\_No, INVOICE.Invoice\_No, INVOICE.Invoice\_SeatRow, INVOICE.Invoice\_SeatNo,

PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, INVOICE.Invoice\_VegetarianMeal

from INVOICE, PASSENGER

where Invoice\_VegetarianMeal like "YES" and INVOICE.Passenger\_No = PASSENGER.Passenger\_No;

Sample Results:

**一張含有 文字, 監視器, 螢幕擷取畫面, 黑色 的圖片

自動產生的描述**

1. **Use of wheel chairs:**

select INVOICE.Flight\_No, INVOICE.Invoice\_Date, INVOICE.Passenger\_No, INVOICE.Invoice\_No, INVOICE.Invoice\_SeatRow, INVOICE.Invoice\_SeatNo,

PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, INVOICE.Invoice\_WheelChairs

from INVOICE, PASSENGER

where Invoice\_WheelChairs like "YES" and INVOICE.Passenger\_No = PASSENGER.Passenger\_No;

Sample Results:

**一張含有 文字, 監視器, 螢幕擷取畫面, 黑色 的圖片

自動產生的描述**

1. **Over-sized Luggages:**

select INVOICE.Flight\_No, INVOICE.Invoice\_Date, INVOICE.Passenger\_No, INVOICE.Invoice\_No, INVOICE.Invoice\_SeatRow, INVOICE.Invoice\_SeatNo,

PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, INVOICE.Invoice\_OverSizedLuggages

from INVOICE, PASSENGER

where Invoice\_OverSizedLuggages like "YES" and INVOICE.Passenger\_No = PASSENGER.Passenger\_No;

Sample Results:

**一張含有 文字 的圖片

自動產生的描述**

1. **Overweight Luggages:**

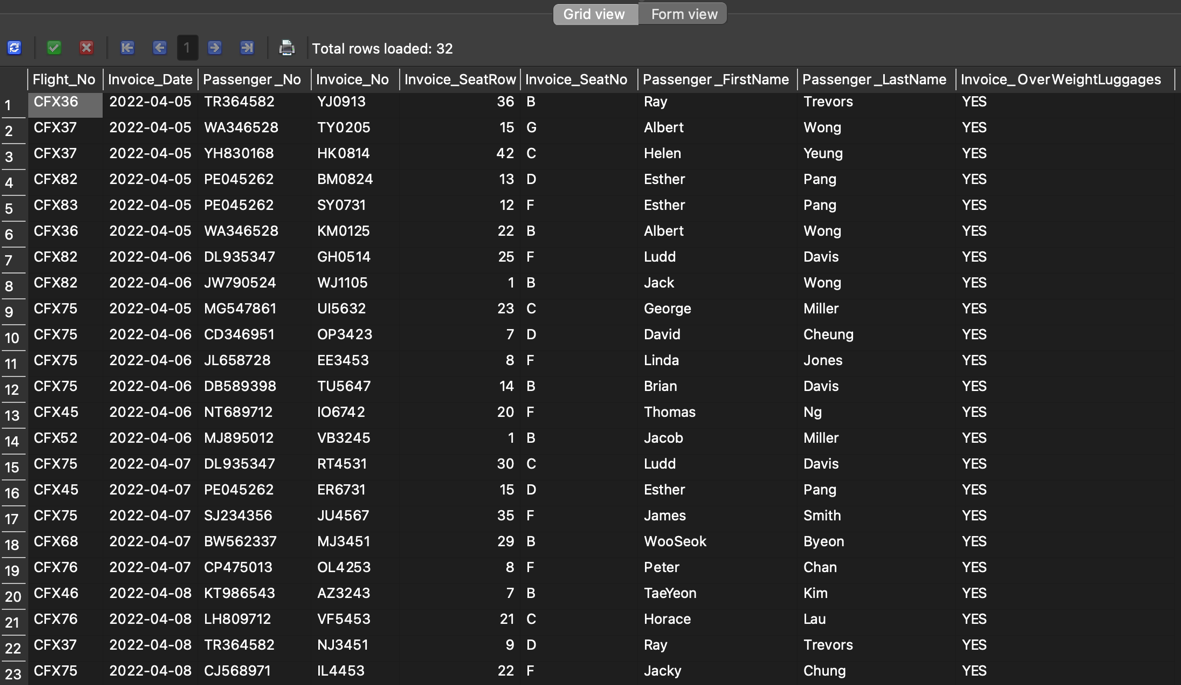
select INVOICE.Flight\_No, INVOICE.Invoice\_Date, INVOICE.Passenger\_No, INVOICE.Invoice\_No, INVOICE.Invoice\_SeatRow, INVOICE.Invoice\_SeatNo,

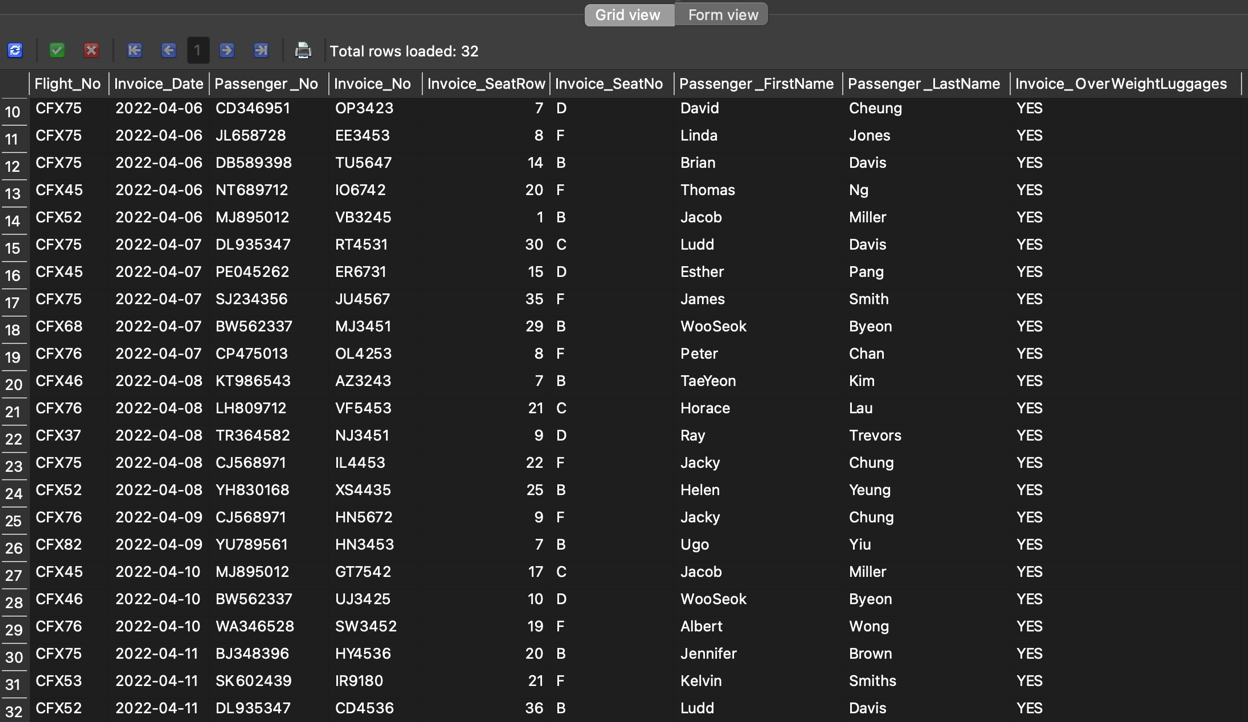
PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, INVOICE.Invoice\_OverWeightLuggages

from INVOICE, PASSENGER

where Invoice\_OverWeightLuggages like "YES" and INVOICE.Passenger\_No = PASSENGER.Passenger\_No;

Sample Results:



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**“Overweight Luggages” is the most requested during a week on flight reservation**

**2. List the most popular row and seat that customer chosen**

**i. most popular row:**

select INVOICE.Invoice\_SeatRow, INVOICE.Class\_Code, count(INVOICE.Invoice\_SeatRow) as MostPopularRow

from INVOICE

GROUP BY INVOICE.Invoice\_SeatRow

ORDER BY MostPopularRow DESC;

Sample Results:

一張含有 文字, 螢幕擷取畫面, 電腦 的圖片

自動產生的描述

The most popular row is Row 1 and Row 9.

**ii. most popular seat:**

select INVOICE.Invoice\_SeatNo, INVOICE.Class\_Code, count(INVOICE.Invoice\_SeatNo) as MostPopularNo

from INVOICE

GROUP BY INVOICE.Invoice\_SeatNo

ORDER BY MostPopularNo DESC;

Sample Results:

**一張含有 文字 的圖片

自動產生的描述**

The most popular seat number is seat B.

**3. List all passenger on the most popular flight(CFX75) in a week and its VIP special service**

select INVOICE.Flight\_No, INVOICE.Passenger\_No, PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, PASSENGER.VIP\_Code,

VIP.VIP\_Lounge, VIP.VIP\_PriorityBoarding, VIP.VIP\_WelcomeDrink

from INVOICE, PASSENGER, VIP

where INVOICE.Flight\_No like "CFX75" and INVOICE.Passenger\_No = PASSENGER.Passenger\_No and PASSENGER.VIP\_Code = VIP.VIP\_Code;

Sample Results:

**一張含有 文字, 監視器, 螢幕擷取畫面, 黑色 的圖片

自動產生的描述**

All of the passenger on the most popular flight both have “Priority Boarding”.

**4. List the total people of different food allergies**

select PASSENGER.FoodAllergies\_Code, COUNT(PASSENGER.FoodAllergies\_Code) as MostAllergiesFoodOnOurPassenger

from PASSENGER

GROUP BY PASSENGER.FoodAllergies\_Code

ORDER BY MostAllergiesFoodOnOurPassenger DESC;

Sample Results:

一張含有 文字 的圖片

自動產生的描述

“0” mean passenger don’t have food allergies and most of passengers don’t have food allergies but there are at least 3 passengers have milk allergy.

**5. List all passenger who need to pay attention and tack care to them, such as medical device and assistance dog**

**i. medical device**

select INVOICE.Invoice\_Date, INVOICE.Flight\_No, INVOICE.Passenger\_No, INVOICE.Invoice\_SeatRow ,INVOICE.Invoice\_SeatNo,

PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, PASSENGER.Passenger\_Gender, PASSENGER.Passenger\_MedicalDevice

from PASSENGER, INVOICE

where INVOICE.Passenger\_No = PASSENGER.Passenger\_No and PASSENGER.Passenger\_MedicalDevice like "%yes%" ;

Sample Results:

**一張含有 文字, 監視器, 螢幕擷取畫面, 螢幕 的圖片

自動產生的描述**

**ii. assistance dog**

select INVOICE.Invoice\_Date, INVOICE.Flight\_No, INVOICE.Passenger\_No, INVOICE.Invoice\_SeatRow ,INVOICE.Invoice\_SeatNo,

PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, PASSENGER.Passenger\_Gender, PASSENGER.Passenger\_AssistanceDog

from PASSENGER, INVOICE

where INVOICE.Passenger\_No = PASSENGER.Passenger\_No and PASSENGER.Passenger\_AssistanceDog like "%yes%" ;

Sample Results:

**一張含有 文字, 監視器, 螢幕擷取畫面, 黑色 的圖片

自動產生的描述**

**6. Find the passenger who always take our company’s flight**

select INVOICE.Passenger\_No, PASSENGER.Passenger\_FirstName, PASSENGER.Passenger\_LastName, PASSENGER.Passenger\_Gender,

PASSENGER.Passenger\_Birthday, Count (INVOICE.Passenger\_No) as Most\_TakeAFlight

from INVOICE,PASSENGER

where INVOICE.Passenger\_No = PASSENGER.Passenger\_No

GROUP BY INVOICE.Passenger\_No

ORDER BY Most\_TakeAFlight DESC;

Sample Results:

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自動產生的描述**

“Albert Wong” is always take our company’s flight during a week which company can ask him about flight’s service and why he choose our flights for improve our service and flight

**7. List all the passenger information who take flight on 2022/4/5 using LEFT OUTER JOIN**

select invoice.Invoice\_No, invoice.Flight\_No,

invoice.Invoice\_Date, invoice.Passenger\_No, Passenger.Passenger\_FirstName, Passenger.Passenger\_LastName,

Passenger.Passenger\_Gender, Passenger.Passenger\_PhoneNumber, Passenger.Passenger\_Email

FROM invoice LEFT OUTER JOIN Passenger

on invoice.Passenger\_No = Passenger.Passenger\_No

where invoice.Invoice\_Date = "2022-04-05" ;

Sample Results:

**一張含有 文字 的圖片

自動產生的描述**

**Assumptions and Limitations**

* **All passengers have their flight during a period (2022/04/05 to 2022/04/11)**
* **If first time user booked a flight ticket on our flight reservations, it will become the basic VIP level – bronze level and record it on the database**
* **How Passenger use our Flight Reservations**
  + **Passenger will enter their information, such as name, gender, passport number, their VIP code and select their special needs (Assistance Dog, Food Allergies, Medical Device)**
  + **Then Passenger will choose their flight, Cabin, Seat Row and number, also select their special request (Child Meal, Vegetarian Meal, Use of wheel chairs, Over-sized Luggages, Overweight Luggages)**
  + **Above steps must not contain blank information and must not skip each step**
* **If a passenger didn’t choose their flight, database will only save his/her information and will not have his/her own invoice**
* **If a flight was cancelled due to different cause and deleted on table FLIGHT, flight number on table INVOICE will be error and be confusing as they are no corresponding foreign key on table FLIGHT**
* **If a passenger have food allergies that do not include in table “FOODALLERGIES”, it will not record it as the flight reservations only allow passenger choose the allergy food and they can’t type it on the flight reservations. It neglect the real situation of different people.**

**Conclusion**

**This design basically supports the stated requirements. In future, this design should be enhanced to cater for:**

* **Passenger not entering some unimportant information**
* **Summary on passenger who have not use our flight reservation system in a year**
* **Summary on passenger who always use our flight reservation system in a year**
* **Summary on passenger who always requests different special requests in a year**
* **Summary on gold VIP level passenger and which flight is the most taken among gold VIP level passenger**
* **Summary on how passenger choose the cabin under different situation, such as total flight time, destinations**
* **Not enforcing passenger become a bronze level VIP after they use our flight reservation system, system can add a Non-VIP on VIP code**
* **System also can add a visitors function. Under the visitors function, visitors can browse our system to check the time or destination of flight without entering personal information and becoming a VIP**
* **Allow passenger enter their allergy food which is not include in our list to protect the health of passenger and flight company**
* **Allow passenger enter their special requests in a comment box which is not include in the part of special requests or add more new special requests, such as require a window seats or aisle seats, require to seat with his/her family member, passenger with wheelchair or with children require to priority boarding, require an emergency exit row seat to have more space, require a seat which is far away from toilet or close to the kitchen**