



Trinity College Dublin
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CSU 34041 Information Management II

REPORT ON:

(A report on Database implementation of an Airlines reservation system)

Submitted by:-

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INTRODUCTION

As part of the Information Management module project , I have designed a database for Airline reservations systems (ARS) which are part of passenger service systems.

These are applications supporting direct contact with the passenger to make their bookings via a dedicated platform.

In the present scenario, there are multiple carriers as well as their different models in the aviation industry. The aviation industry is predicted to quadruple its growth of customers in every country and therefore there is a need for secure and efficient way of managing and booking airline tickets. With this project, I have tried to develop a prototype version of an airlines reservation systems with the use of triggers, procedures, constraints for it it work in an efficient way.

Through this project we would having the following objectives achieved and functions performed:-

- Insert user details for booking of various flights using procedural call
- Get information about transactions history of the user and details regarding his source of origin and destination
- A trigger is created which deletes all the entries from the transaction table whose date of journey was 90 days before the current date
- A view to display user information by joining 2 tables

ENTITIES

User_Details		
PK	Social_Security_Number	int
	username	varchar(50)
	first_name	varchar(50)
	last_name	varchar(50)
	dob	date
	mobile	int
	email	varchar(50)
	address	varchar(255)

flight_schedule		
PK	flight_id	varchar(10)
	day_of_week	int
	arrival	varchar(10)
	departure	varchar(10)
	Source	varchar(5)
	Destination	varchar(5)

cities		
PK	city_code	varchar(5)
	city_name	varchar(15)

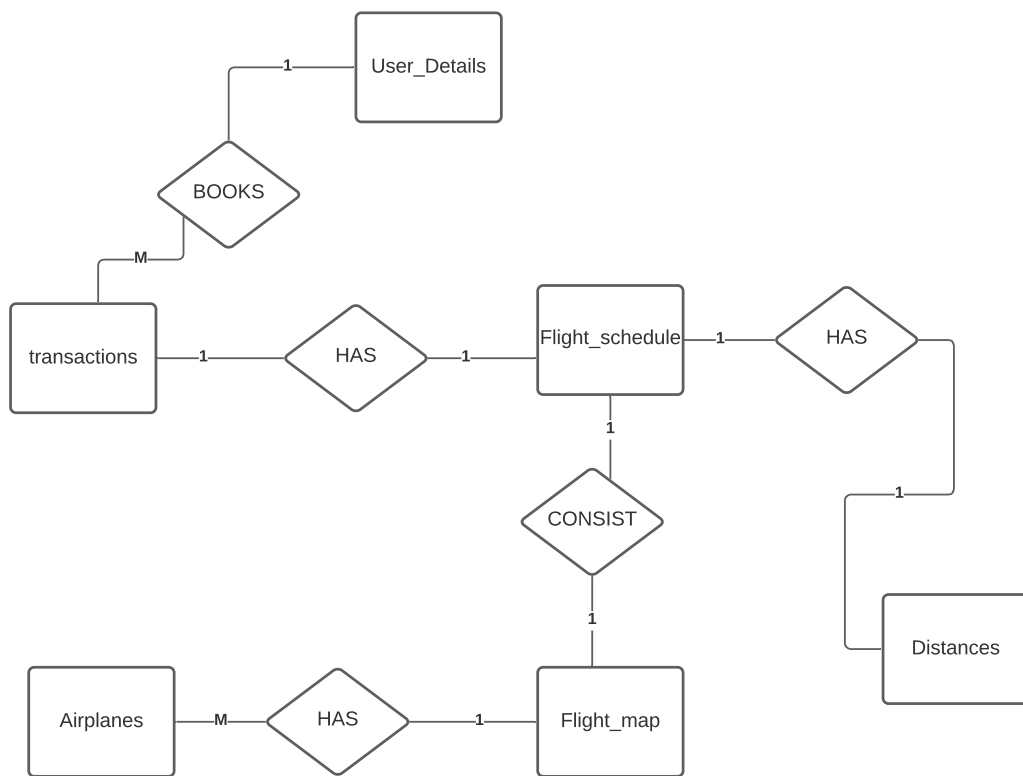
Airplanes		
PK	plane_id	varchar(10)
	Max_seats	int
	Name_of_Airline	varchar(20)

flight_map		
FK	flight_id	varchar(10)
FK	plane_id	varchar(10)

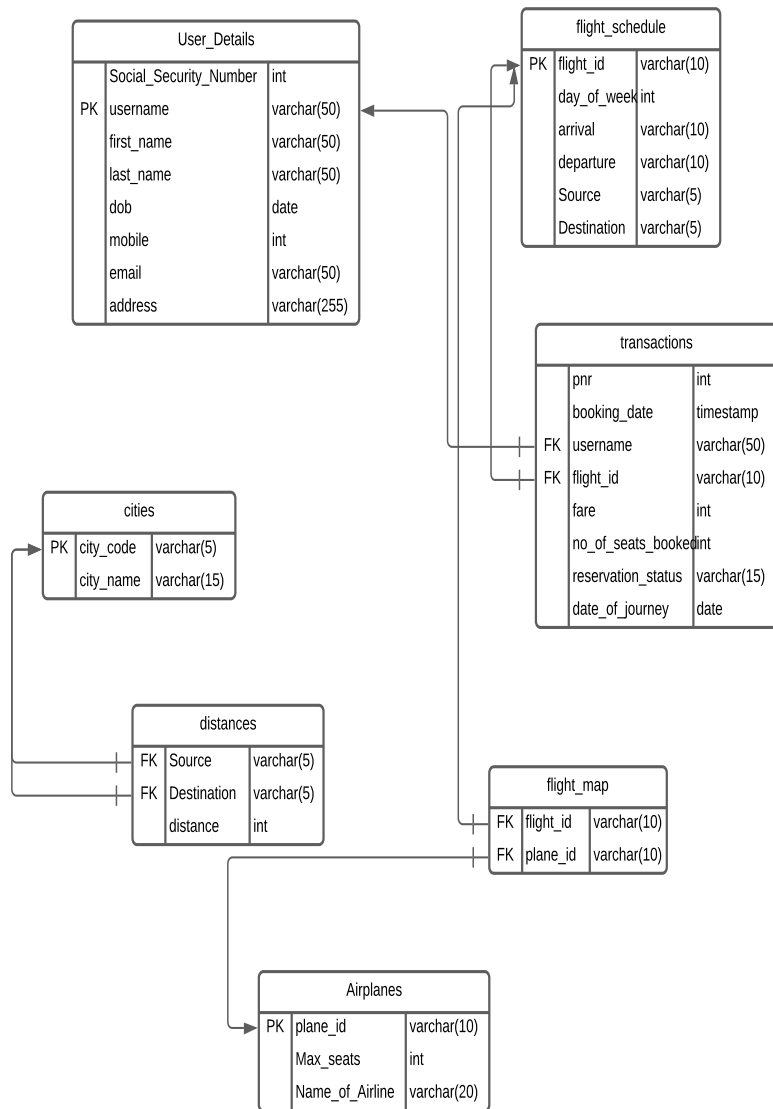
distances		
FK	Source	varchar(5)
FK	Destination	varchar(5)
	distance	int

transactions		
	pnr	int
	booking_date	timestamp
FK	username	varchar(50)
FK	flight_id	varchar(10)
	fare	int
	no_of_seats_booked	int
	reservation_status	varchar(15)
	date_of_journey	date

RELATIONSHIP DIAGRAM



RELATIONSHIP SCHEMA



PROCEDURES AND TRIGGERS

- The following procedure was created to enter the values of the user into the database

```
CREATE procedure insert_user(  
  IN SSN int(16),  
  IN un varchar(50),  
  IN fn varchar(50),  
  IN ln varchar(50),  
  IN db DATE,  
  IN mob int(15),  
  IN eml varchar(50),  
  IN adre varchar(255)  
)  
BEGIN  
  INSERT INTO User_Details values(SSN,un,fn,ln,db,mob,eml,adre);  
END $$
```

- The following trigger was created to all the entries from transactions table, whose date of journey was 90 days before current date.

```
DELIMITER $$  
CREATE TRIGGER delete_transactions AFTER INSERT ON transactions FOR EACH  
ROW  
BEGIN  
  DELETE from transactions where date_of_journey < (select sysdate-90 from dual);  
END $$
```

VIEWS

The following view was created to display the details of users from user_details table and transactions table.

```
CREATE VIEW usr_details AS  
SELECT  
  t.booking_date,  
  u.username,  
  t.flight_id,  
  t.reservation_status,  
  u.mobile  
FROM  
  User_Details AS u  
INNER JOIN  
  transactions AS t  
ON u.username = t.username;
```

NORMALIZATION

Normalization of the database is the process of arranging the data in the database.

Normalization is a systematic method to removing data duplication (repetition) and unwanted features such as addition, modification, and deletion anomalies through decomposing tables. It is a multi-step approach that places information in tabular form, eliminating redundant information from the relationship tables.

Normalization is primarily used for two reasons.

- Eliminating redundant (useless information).
- Ensuring data dependence makes responsive

All the above created tables are already in 3rd normal form.

APPENDIX

```
DROP database Flight_Reservation;
```

```
-- A database for Airlines reservation system
```

```
CREATE database Flight_Reservation;
```

```
USE Flight_Reservation;
```

```
-- Table to store user details
```

```
CREATE table User_Details(
```

```
Social_Security_Number int(16) NOT NULL UNIQUE,
```

```
username varchar(50) PRIMARY KEY NOT NULL,
```

```
first_name varchar(50) NOT NULL,
```

```
last_name varchar(50),
```

```
dob DATE,
```

```
mobile int(12), email varchar(50), address varchar(255)
```

);

-- Table for airplanes

```
CREATE table Airplanes(  
plane_id varchar(10) PRIMARY KEY NOT NULL,  
Max_seats int(3) NOT NULL,  
Name_of_Airline varchar(20) NOT NULL  
);
```

-- Table for weekly schedule of flights

```
CREATE table flight_schedule(  
flight_id varchar(10) PRIMARY KEY NOT NULL,  
day_of_week int,  
arrival varchar(10) NOT NULL,  
departure varchar(10) NOT NULL,  
Source varchar(5),  
Destination varchar(5)  
);
```

-- Mapping table between flight_id and plane_id

```
CREATE table flight_map(  
flight_id varchar(10) UNIQUE NOT NULL,  
plane_id varchar(10) NOT NULL  
);
```

```
ALTER TABLE flight_map
```



```
ADD CONSTRAINT fk_planeid
```

```
FOREIGN KEY (plane_id) REFERENCES Airplanes (plane_id);
```

```
ALTER TABLE flight_map
```

```
ADD CONSTRAINT fk_flightid
```

```
FOREIGN KEY (flight_id) REFERENCES flight_schedule (flight_id);
```

```
-- contains past records of tickets of last 90 days of date_of_journey
```

```
CREATE table transactions(
```

```
pnr int (6) UNIQUE NOT NULL,
```

```
booking_date TIMESTAMP,
```

```
username varchar(50),
```

```
flight_id varchar(10),
```

```
fare int(10),
```

```
no_of_seats_booked int(3),
```

```
reservation_status varchar(15) check (reservation_status IN ('CANCELLED','BOOKED')),
```

```
date_of_journey DATE NOT NULL
```

```
);
```

```
-- flight_id should be present in flight_schedule
```

```
ALTER TABLE transactions
```

```
ADD CONSTRAINT fk_flightid2 FOREIGN KEY (flight_id) REFERENCES  
flight_schedule(flight_id);
```

```
ALTER TABLE transactions
```

```
ADD CONSTRAINT fk_uname FOREIGN KEY (username) REFERENCES
User_Details(username);
```

```
-- list of all the cities
```

```
CREATE table cities(
city_code varchar(5) PRIMARY KEY NOT NULL,
city_name varchar(15) NOT NULL
);
```

```
-- table to store distance between 2 cities
```

```
CREATE table distances (
Source varchar(5) NOT NULL,
Destination varchar(5) NOT NULL,
distance int (7) NOT NULL
);
```

```
-- any source code should be from cities table
```

```
ALTER TABLE distances
```

```
ADD CONSTRAINT fk_source FOREIGN KEY (Source) REFERENCES cities(city_code);
```

```
-- any destination code should be from cities table
```

```
ALTER TABLE distances
```

```
ADD CONSTRAINT fk_dest FOREIGN KEY (Destination) REFERENCES cities
(city_code);
```

```
DELIMITER $$
```

```

CREATE procedure insert_user(
IN SSN int(16),
IN un varchar(50),
IN fn varchar(50),
IN ln varchar(50),
IN db DATE,
IN mob int(15),
IN eml varchar(50),
IN adre varchar(255)
)
BEGIN
    INSERT INTO User_Details values(SSN,un,fn,ln,db,mob,eml,adre);
END $$

```

-- procedural call to insert values in User_Details

```

call insert_user('943543123','SakshamAg','Saksham','Agarwal','1999-03-09','0923142746','saagarwa@tcd.ie','Dublin');

```

```

call insert_user('821675487','John92','John','Parker','1997-04-03','0843322142','jparker@gmail.com','Paris');

```

```

call insert_user('771424862','Sean123','Sean','Porter','1998-12-3','0724565132','sean@gmail.com','London');

```

```

call insert_user('891487912','Meadbh_M','Meadbh','Morgan','1993-10-21','0851387621','medbh@gmail.com','Dublin');

```

```

call insert_user('788845321','Ravi_k21','Ravi','Kumar','1991-06-24','0965324181','ravikumar@gmail.com','Dublin');

```

-- Table of all the cities supported by our application

```

INSERT INTO cities VALUES ('PAR','Paris');

```

```
INSERT INTO cities VALUES ('DUB','Dublin');
```

```
INSERT INTO cities VALUES ('LHR','London');
```

```
INSERT INTO cities VALUES ('AMS','Amsterdam');
```

```
INSERT INTO cities VALUES ('ROM','Rome');
```

```
-- Distance between all the above cities stored in a table
```

```
INSERT INTO distances VALUES('DUB','LHR','577');
```

```
INSERT INTO distances VALUES('DUB','PAR','1052');
```

```
INSERT INTO distances VALUES('DUB','ROM','2461');
```

```
INSERT INTO distances VALUES('DUB','AMS','955');
```

```
INSERT INTO distances VALUES('LHR','AMS','574');
```

```
INSERT INTO distances VALUES('LHR','ROM','1906');
```

```
-- list of airplanes
```

```
INSERT INTO Airplanes VALUES('pid001','200','RyanAir');
```

```
INSERT INTO Airplanes VALUES('pid002','150','AerLingus');
```

```
INSERT INTO Airplanes VALUES('pid003','300','VirginAtlantic');
```

```
INSERT INTO Airplanes VALUES('pid004','250','BritishAirways');
```

```
INSERT INTO Airplanes VALUES('pid005','300','AirFrance');
```

```
INSERT INTO Airplanes VALUES('pid006','250','Vistara');
```

```
-- Schedule of Flights in a week between 2 cities
```

```
INSERT INTO flight_schedule VALUES('6E-905','1','0900','0810','DUB','LHR');
```

```
INSERT INTO flight_schedule VALUES('6E-906','1','1100','1010','LHR','DUB');
```

```
INSERT INTO flight_schedule VALUES('6E-907','1','1200','1020','DUB','ROM');
```

```

INSERT INTO flight_schedule VALUES('6E-908','1','1600','1340','DUB','PAR');
INSERT INTO flight_schedule VALUES('6E-909','1','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-910','1','2000','1850','LHR','AMS');
INSERT INTO flight_schedule VALUES('6E-911','2','0900','0810','DUB','LHR');
INSERT INTO flight_schedule VALUES('6E-912','2','1100','1010','LHR','DUB');
INSERT INTO flight_schedule VALUES('6E-913','2','1200','1020','DUB','ROM');
INSERT INTO flight_schedule VALUES('6E-914','2','1600','1340','DUB','PAR');
INSERT INTO flight_schedule VALUES('6E-915','2','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-916','2','2000','1850','LHR','AMS');
INSERT INTO flight_schedule VALUES('6E-917','3','0900','0810','DUB','LHR');
INSERT INTO flight_schedule VALUES('6E-918','3','1100','1010','LHR','DUB');
INSERT INTO flight_schedule VALUES('6E-919','3','1200','1020','DUB','ROM');
INSERT INTO flight_schedule VALUES('6E-920','3','1600','1340','DUB','PAR');
INSERT INTO flight_schedule VALUES('6E-921','3','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-922','3','2000','1850','LHR','AMS');
INSERT INTO flight_schedule VALUES('6E-923','4','0900','0810','DUB','LHR');
INSERT INTO flight_schedule VALUES('6E-924','4','1100','1010','LHR','DUB');
INSERT INTO flight_schedule VALUES('6E-925','4','1200','1020','DUB','ROM');
INSERT INTO flight_schedule VALUES('6E-926','4','1600','1340','DUB','PAR');
INSERT INTO flight_schedule VALUES('6E-927','4','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-928','4','2000','1850','LHR','AMS');
INSERT INTO flight_schedule VALUES('6E-929','5','0900','0810','DUB','LHR');
INSERT INTO flight_schedule VALUES('6E-930','5','1100','1010','LHR','DUB');
INSERT INTO flight_schedule VALUES('6E-931','5','1200','1020','DUB','ROM');
INSERT INTO flight_schedule VALUES('6E-932','5','1600','1340','DUB','PAR');

```

```

INSERT INTO flight_schedule VALUES('6E-933','5','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-934','5','2000','1850','LHR','AMS');
INSERT INTO flight_schedule VALUES('6E-935','6','0900','0810','DUB','LHR');
INSERT INTO flight_schedule VALUES('6E-936','6','1100','1010','LHR','DUB');
INSERT INTO flight_schedule VALUES('6E-937','6','1200','1020','DUB','ROM');
INSERT INTO flight_schedule VALUES('6E-938','6','1600','1340','DUB','PAR');
INSERT INTO flight_schedule VALUES('6E-939','6','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-940','6','2000','1850','LHR','AMS');
INSERT INTO flight_schedule VALUES('6E-941','7','0900','0810','DUB','LHR');
INSERT INTO flight_schedule VALUES('6E-942','7','1100','1010','LHR','DUB');
INSERT INTO flight_schedule VALUES('6E-943','7','1200','1020','DUB','ROM');
INSERT INTO flight_schedule VALUES('6E-944','7','1600','1340','DUB','PAR');
INSERT INTO flight_schedule VALUES('6E-945','7','1720','1600','DUB','AMS');
INSERT INTO flight_schedule VALUES('6E-946','7','2000','1850','LHR','AMS');

```

-- In this table we map flight_od with plane_id to link the flight scheduled to fly out out to the destination

```

INSERT INTO flight_map VALUES('6E-905','pid004');
INSERT INTO flight_map VALUES('6E-906','pid003');
INSERT INTO flight_map VALUES('6E-907','pid001');
INSERT INTO flight_map VALUES('6E-908','pid005');
INSERT INTO flight_map VALUES('6E-909','pid002');
INSERT INTO flight_map VALUES('6E-910','pid006');
INSERT INTO flight_map VALUES('6E-911','pid004');
INSERT INTO flight_map VALUES('6E-912','pid003');

```

```

INSERT INTO flight_map VALUES('6E-913','pid001');
INSERT INTO flight_map VALUES('6E-914','pid005');
INSERT INTO flight_map VALUES('6E-915','pid002');
INSERT INTO flight_map VALUES('6E-916','pid006');
INSERT INTO flight_map VALUES('6E-917','pid004');
INSERT INTO flight_map VALUES('6E-918','pid003');
INSERT INTO flight_map VALUES('6E-919','pid001');
INSERT INTO flight_map VALUES('6E-920','pid005');
INSERT INTO flight_map VALUES('6E-921','pid002');
INSERT INTO flight_map VALUES('6E-922','pid006');
INSERT INTO flight_map VALUES('6E-923','pid004');
INSERT INTO flight_map VALUES('6E-924','pid003');
INSERT INTO flight_map VALUES('6E-925','pid001');
INSERT INTO flight_map VALUES('6E-926','pid005');
INSERT INTO flight_map VALUES('6E-927','pid002');
INSERT INTO flight_map VALUES('6E-928','pid006');
INSERT INTO flight_map VALUES('6E-929','pid004');
INSERT INTO flight_map VALUES('6E-930','pid003');
INSERT INTO flight_map VALUES('6E-931','pid001');
INSERT INTO flight_map VALUES('6E-932','pid005');
INSERT INTO flight_map VALUES('6E-933','pid002');
INSERT INTO flight_map VALUES('6E-934','pid006');
INSERT INTO flight_map VALUES('6E-935','pid004');
INSERT INTO flight_map VALUES('6E-936','pid003');
INSERT INTO flight_map VALUES('6E-937','pid001');

```

```

INSERT INTO flight_map VALUES('6E-938','pid005');
INSERT INTO flight_map VALUES('6E-939','pid002');
INSERT INTO flight_map VALUES('6E-940','pid006');
INSERT INTO flight_map VALUES('6E-941','pid004');
INSERT INTO flight_map VALUES('6E-942','pid003');
INSERT INTO flight_map VALUES('6E-943','pid001');
INSERT INTO flight_map VALUES('6E-944','pid005');
INSERT INTO flight_map VALUES('6E-945','pid002');
INSERT INTO flight_map VALUES('6E-946','pid006');

```

-- Table for transactions

```

INSERT INTO transactions VALUES('939921','2020-08-03 19:50:42','SakshamAg','6E-905','30','1','BOOKED','2020-12-14');

INSERT INTO transactions VALUES('942366','2020-09-01 09:32:11','John92','6E-914','18','1','BOOKED','2020-12-21');

INSERT INTO transactions VALUES('947862','2020-12-03 21:41:07','SakshamAg','6E-918','22','1','BOOKED','2020-12-22');

INSERT INTO transactions VALUES('911111','2020-07-01 12:18:32','SakshamAg','6E-939','20','1','BOOKED','2020-08-01');

```

-- this trigger deletes all the entries from transactions table, whose date of journey was 90 days before current date

DELIMITER \$\$

CREATE TRIGGER delete_transactions AFTER INSERT ON transactions FOR EACH ROW

BEGIN

DELETE from transactions where date_of_journey < (select sysdate-90 from dual);

END \$\$


```
CREATE VIEW usr_details AS
```

```
SELECT
```

```
    t.booking_date,
```

```
    u.username,
```

```
    t.flight_id,
```

```
    t.reservation_status,
```

```
    u.mobile
```

```
FROM
```

```
    User_Details AS u
```

```
INNER JOIN
```

```
    transactions AS t
```

```
ON u.username = t.username;
```