

Database Management System

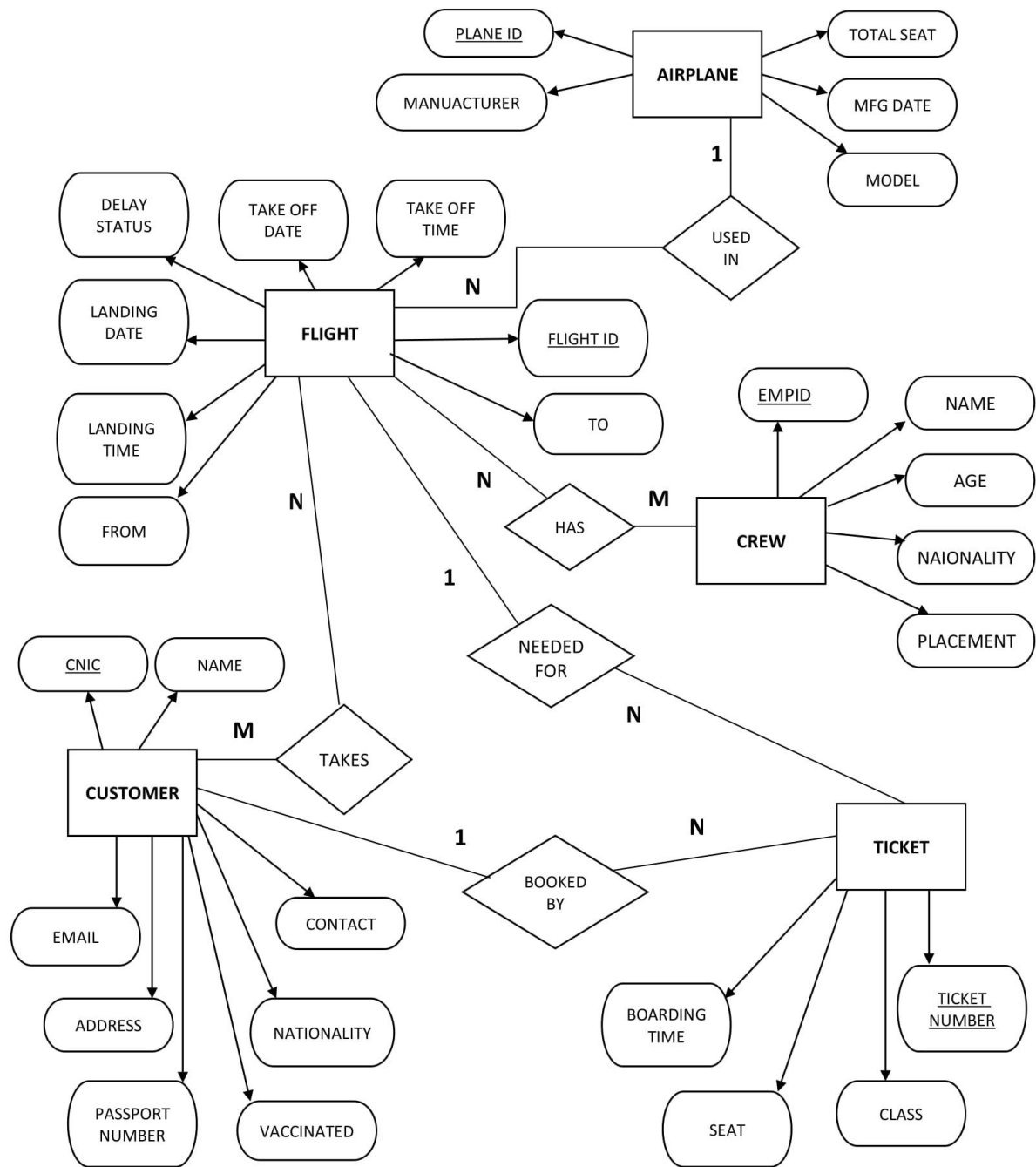
Project Report

Project name: Airline Ticket Management System

Objective:

To build a DBMS using majority of the concepts and syntax learned throughout the semester and then, to fill that system with dummy values to test it.

Below is the ERD of our DBMS:



Tables:

There are a total of 5 tables and 2 relational tables in our database:

1. Airplane
2. Flight
3. Crew
4. Customer
5. Ticket
6. Flight_has_crew
7. Customer_takes_flight

Following is the cardinality of the relationships between the tables:

- Airplane 1 : N Flight
- Flight N : M Crew
- Flight 1 : N Ticket
- Flight N : M Customer
- Customer 1 : M Ticket

As the Flight-Crew and Flight-Customer relationships have a Many-to-Many relationship, the relational tables **flight_has_crew** and **customer_takes_flight** have been created to establish the relationship.

Following is what all these tables look like (dummy values have been added for testing):

Airplane table:

```
SQL> select * from airplane;
```

PLANE	MANUFACTURER	MODEL	MFGDATE	SEATS
A1	Airbus	A370	16-OCT-15	30
A2	Airbus	A370	20-MAY-19	35
A3	Boeing	B770	01-JAN-10	30
A4	Boeing	B780	25-NOV-20	35

Flight table:

```
SQL> select flightid, going_from, going_to, takeoff_date,
2  TO_CHAR(takeoff_time,'hh24:mi:ss') "TAKEOFF_TIME",
3  landing_date, TO_CHAR(landing_time,'hh24:mi:ss') "LANDING_TIME",
4  delay_status, planeID from flight;
```

FLIGHT	GOING_FROM	GOING_TO	TAKEOFF_D	TAKEOFF_	LANDING_D	LANDING_	D	PLANE
F1	IIA-ISB	HTH-LON	25-JAN-21	06:36:05	25-JAN-21	08:22:56	F	A1
F2	HTH-LON	IIA-ISB	26-JAN-21	16:24:07	26-JAN-21	18:29:06	T	A1
F3	IIA-ISB	JFK-NYC	05-JUN-21	21:19:25	06-JUN-21	08:12:16	F	A2
F4	JFK-NYC	IIA-ISB	07-JUN-21	07:39:45	07-JUN-21	17:16:26	F	A2
F5	KIA-KHI	BIA-BEIJ	08-FEB-21	08:06:00	08-FEB-21	11:44:15	T	A3
F6	BIA-BEIJ	KIA-KHI	10-FEB-21	16:18:35	10-FEB-21	19:32:43	F	A3

6 rows selected.

Crew table:

```
SQL> select * from crew;
```

EMPID	NAME	AGE	NATIONALITY	PLACEMENT
E1	Ahmad Jawad	40	Pakistani	Pilot
E2	Arbaz Khan	30	Pakistani	Co-pilot
E3	Wajeeda Khan	35	Pakistani	Hostess
E4	Jahanzeb Naeem	40	Pakistani	Pilot
E5	Waqas bin Shabeer	30	Pakistani	Co-pilot
E6	Zinat Khawar	30	Pakistani	Hostess
E7	Ahmad Fayyaz	50	Pakistani	Pilot
E8	Wahid Khan	37	Pakistani	Co-pilot
E9	Shaheera Amjad	27	Pakistani	Hostess

9 rows selected.

Customer table:

SQL> select * from customer;

CNIC	PASSPORT_NUM	NAME	CONTACT	EMAIL	ADDRESS	NATIONALITY	U
12345	10000	Abid Ali	300100	qqq@outlook.com	ISB	PAK	T
13333	10001	Hina Aslam	300101	www@outlook.com	ISB	PAK	T
11111	10002	Sheraz Khan	300102	eee@outlook.com	PWR	PAK	F
12222	10003	Darya Khan	300103	rrr@outlook.com	MRD	PAK	F
14444	10004	Missile Khan	300104	ttt@outlook.com	QUT	PAK	F
15555	10005	Abida Akram	300105	yyy@outlook.com	LHR	PAK	T
16666	10006	Shahana Baig	300106	uuu@outlook.com	ISB	PAK	T
17777	10007	Hamza Ishaq	300107	iii@outlook.com	FSB	PAK	F
18888	10008	Abid Anjum	300108	ppp@outlook.com	MSH	PAK	F
19999	10009	Noor Ali	300109	aaa@outlook.com	ISB	PAK	T
10000	100010	Ijaz Khan	3001010	sss@outlook.com	RWP	PAK	F
11222	100011	Mahnoor Shahid	3001011	ddd@outlook.com	SKT	PAK	T
11333	100012	Sara Abid	3001012	fff@outlook.com	ISB	PAK	T
11444	100013	Humera Akram	3001013	ggg@outlook.com	RWP	PAK	F
11555	100014	Kinza Aslam	3001014	hhh@outlook.com	GWD	PAK	T
11666	100015	Shah Baloch	3001015	jjj@outlook.com	QUT	PAK	T
11777	100016	Hashim Abid	3001016	kkk@outlook.com	MTN	PAK	F
11888	100017	Fahad Khan	3001017	lll@outlook.com	RWP	PAK	T
11999	100019	Arif Hussain	3001019	zzz@outlook.com	THT	PAK	F
12111	100020	Zayyan Khan	3001020	ccc@outlook.com	GUJ	PAK	T
12333	100021	Arsalan Zahoor	3001021	vvv@outlook.com	SHW	PAK	F
12444	100022	Asad Bukhari	3001022	bbb@outlook.com	KHI	PAK	T
12555	100023	Ikram Hassan	3001023	nnn@outlook.com	BWP	PAK	T
12666	100024	Fauzia Quddus	3001024	mmm@outlook.com	SKP	PAK	T
12777	100025	Nadeem Qaiser	3001025	nnnn@outlook.com	PKP	PAK	T

25 rows selected.

Customer_takes_flight table:

```
SQL> select * from customer_takes_flight;
```

CNIC	FLIGHT
10000	F3
10000	F6
11111	F1
11222	F3
11333	F3
11444	F3
11555	F3
11666	F4
11666	F6
11777	F4
11888	F4

CNIC	FLIGHT
11999	F4
12111	F4
12222	F1
12333	F5
12333	F6
12345	F1
12345	F6
12444	F5
12555	F5
12666	F5
12777	F5

CNIC	FLIGHT
13333	F1
14444	F1
15555	F1
15555	F6
16666	F2
17777	F2
18888	F2
19999	F2

30 rows selected.

Flight_has_crew table:

```
SQL> select * from flight_has_crew;
```

FLIGHT	EMPID
--------	-------

F1	E1
----	----

F1	E2
----	----

F1	E3
----	----

F2	E1
----	----

F2	E5
----	----

F2	E6
----	----

F3	E1
----	----

F3	E8
----	----

F3	E9
----	----

F4	E4
----	----

F4	E5
----	----

FLIGHT	EMPID
--------	-------

F4	E6
----	----

F5	E6
----	----

F5	E7
----	----

F5	E8
----	----

F6	E7
----	----

F6	E8
----	----

F6	E9
----	----

18 rows selected.

Ticket table:

```
SQL> select * from ticket;
```

TICKET	CLASS	SEAT	BOARDING_	FLIGHT	CNIC
F1T1	Business	A1	01-JUN-21	F1	12345
F1T2	Economy	A2	01-JUN-21	F1	13333
F1T3	Business	A3	01-JUN-21	F1	11111
F1T4	Economy+	A4	01-JUN-21	F1	12222
F1T5	Business	A5	01-JUN-21	F1	14444
F2T1	Business	A1	01-JUN-21	F2	15555
F2T2	Business	A2	01-JUN-21	F2	16666
F2T3	Economy	A3	01-JUN-21	F2	17777
F2T4	Economy	A4	01-JUN-21	F2	18888
F2T5	Business	A5	01-JUN-21	F2	19999
F3T1	Business	A1	01-JUN-21	F3	10000

TICKET	CLASS	SEAT	BOARDING_	FLIGHT	CNIC
F3T2	Business	A2	01-JUN-21	F3	11222
F3T3	Economy	A3	01-JUN-21	F3	11333
F3T4	Economy	A4	01-JUN-21	F3	11444
F3T5	Economy+	A5	01-JUN-21	F3	11555
F4T1	Business	A1	01-JUN-21	F4	11666
F4T2	Business	A2	01-JUN-21	F4	11777
F4T3	Business	A3	01-JUN-21	F4	11888
F4T4	Business	A4	01-JUN-21	F4	11999
F4T5	Economy	A5	01-JUN-21	F4	12111
F5T1	Business	A1	01-JUN-21	F5	12333
F5T2	Economy+	A2	01-JUN-21	F5	12444

TICKET	CLASS	SEAT	BOARDING_	FLIGHT	CNIC
F5T3	Economy+	A3	01-JUN-21	F5	12555
F5T4	Economy+	A4	01-JUN-21	F5	12666
F5T5	Economy	A5	01-JUN-21	F5	12777
F6T1	Business	A1	01-JUN-21	F6	12345
F6T2	Business	A2	01-JUN-21	F6	15555
F6T3	Business	A3	01-JUN-21	F6	10000
F6T4	Business	A4	01-JUN-21	F6	11666
F6T5	Business	A5	01-JUN-21	F6	12333

30 rows selected.

Here are some of the joins statements that we have run on these tables:

1.

```
SQL> select airplane.planeid, flightid, going_from, going_to
  2  from airplane
  3  inner join flight
  4  on airplane.planeid = flight.planeid;
```

PLANE	FLIGHT	GOING_FROM	GOING_TO
A1	F1	IIA-ISB	HTH-LON
A1	F2	HTH-LON	IIA-ISB
A2	F3	IIA-ISB	JFK-NYC
A2	F4	JFK-NYC	IIA-ISB
A3	F5	KIA-KHI	BIA-BEIJ
A3	F6	BIA-BEIJ	KIA-KHI

6 rows selected.

This join statement show all the airplanes that were used in flights, their flight ID and from where to where these flights were going.

2.

```
SQL> select airplane.planeid, flightid
  2  from airplane
  3  left outer join flight
  4  on airplane.planeid = flight.planeid;
```

PLANE	FLIGHT
A1	F1
A1	F2
A2	F3
A2	F4
A3	F5
A3	F6
A4	

7 rows selected.

This join statement shows all the data in the airplane table and the corresponding values in the flight table. (For those rows where corresponding value was not available, the system added null)

3.

```
SQL> select flight_has_crew.flightid, flight_has_crew.empid, name
  2   from flight_has_crew
  3   inner join crew on flight_has_crew.empid = crew.empid;
```

FLIGHT	EMPID	NAME
F1	E1	Ahmad Jawad
F1	E2	Arbaz Khan
F1	E3	Wajeeha Khan
F2	E1	Ahmad Jawad
F2	E5	Waqas bin Shabeer
F2	E6	Zinat Khawar
F3	E1	Ahmad Jawad
F3	E8	Wahid Khan
F3	E9	Shaheera Amjad
F4	E4	Jahanzeb Naeem
F4	E5	Waqas bin Shabeer

FLIGHT	EMPID	NAME
F4	E6	Zinat Khawar
F5	E6	Zinat Khawar
F5	E7	Ahmad Fayyaz
F5	E8	Wahid Khan
F6	E7	Ahmad Fayyaz
F6	E8	Wahid Khan
F6	E9	Shaheera Amjad

18 rows selected.

This join statement shows all the flight IDs, and IDs and names of employees who were on these flights.

4.

```
SQL> select crew.empid, nationality
  2   from crew
  3   inner join flight_has_crew
  4   on crew.empid = flight_has_crew.empid
  5   where flightid = 'F3';
```

EMPID	NATIONALITY
E1	Pakistani
E8	Pakistani
E9	Pakistani

This join statement shows the nationality of the employees on a particular flight.

5.

```
SQL> select flightid, manufacturer, model
  2   from flight
  3   inner join airplane
  4   on flight.planeid = airplane.planeid;
```

FLIGHT	MANUFACTURER	MODEL
F1	Airbus	A370
F2	Airbus	A370
F3	Airbus	A370
F4	Airbus	A370
F5	Boeing	B770
F6	Boeing	B770

6 rows selected.

This join statement shows which plane model was used to each flight and who manufactured that plane.

6.

```
SQL> select flight.flightid, ticket_num
  2   from flight
  3   inner join ticket
  4   on flight.flightid = ticket.flightid
  5  where flight.flightid = 'F6';
```

FLIGHT	TICKET
F6	F6T1
F6	F6T2
F6	F6T3
F6	F6T4
F6	F6T5

This join statement shows all the ticket numbers of passengers on a particular flight.

7.

```
SQL> select customer.cnic, name, ticket_num
2   from customer
3   inner join ticket
4   on customer.cnic = ticket.cnic
5   where customer.cnic = 10000;
```

CNIC	NAME	TICKET
10000	Ijaz Khan	F3T1
10000	Ijaz Khan	F6T3

This join statement shows the cnic, name and ticket numbers of all the ticket bought by a particular customer.

8.

```
SQL> select ticket_num, nationality, vaccinated
2   from ticket
3   inner join customer
4   on ticket.cnic = customer.cnic
5   where ticket_num = 'F2T3';
```

TICKET	NATIONALITY	V
F2T3	PAK	F

This join statement shows the nationality and vaccination status of a customer with particular ticket number.

9.

```
SQL> select * from airplane
      2 full outer join flight
      3 on flight.planeid = airplane.planeid;
```

PLANE	MANUFACTURER	MODEL	MFGDATE	SEATS	FLIGHT	GOING_FROM
A1	Airbus	A370	16-OCT-15	30	F1	IIA-ISB
HTH-LON	25-JAN-21	01-JUN-21	25-JAN-21	01-JUN-21	F A1	
A1	Airbus	A370	16-OCT-15	30	F2	HTH-LON
IIA-ISB	26-JAN-21	01-JUN-21	26-JAN-21	01-JUN-21	T A1	
A2	Airbus	A370	20-MAY-19	35	F3	IIA-ISB
JFK-NYC	05-JUN-21	01-JUN-21	06-JUN-21	01-JUN-21	F A2	
A2	Airbus	A370	20-MAY-19	35	F4	JFK-NYC
IIA-ISB	07-JUN-21	01-JUN-21	07-JUN-21	01-JUN-21	F A2	
A3	Boeing	B770	01-JAN-10	30	F5	KIA-KHI
BIA-BEIJ	08-FEB-21	01-JUN-21	08-FEB-21	01-JUN-21	T A3	
A3	Boeing	B770	01-JAN-10	30	F6	BIA-BEIJ
KIA-KHI	10-FEB-21	01-JUN-21	10-FEB-21	01-JUN-21	F A3	
A4	Boeing	B780	25-NOV-20	35		

This join statement shows all the data in the airplane and flight tables. The records for which corresponding data values were not available, null has been added by the system.

10.

```
SQL> select * from customer
  2 inner join customer_takes_flight
  3 on customer.cnic = customer_takes_flight.cnic
  4 where flightid = 'F5';
```

CNIC	PASSPORT_NUM	NAME	CONTACT			
EMAIL			ADDRESS	NATIONALITY	U	

CNIC FLIGHT						

12333	100021	Arsalan Zahoor	3001021	PAK	F	
vvv@outlook.com			SHW			
12333 F5						
12444	100022	Asad Bukhari	3001022	PAK	T	
bbb@outlook.com			KHI			
12444 F5						

CNIC	PASSPORT_NUM	NAME	CONTACT			
EMAIL			ADDRESS	NATIONALITY	U	

CNIC FLIGHT						

12555	100023	Ikram Hassan	3001023	PAK	T	
nnn@outlook.com			BWP			
12555 F5						
12666	100024	Fauzia Quddus	3001024	PAK	T	
mmm@outlook.com			SKP			

CNIC	PASSPORT_NUM	NAME	CONTACT			
EMAIL			ADDRESS	NATIONALITY	U	

CNIC FLIGHT						

12666 F5						
12777	100025	Nadeem Qaiser	3001025	PAK	T	
mmnn@outlook.com			PKP			
12777 F5						

This join statement shows all the customer details of the passengers on a particular flight.

Conclusion:

It can be seen that it is indeed possible build said DBMS using the concepts learned throughout the semester.