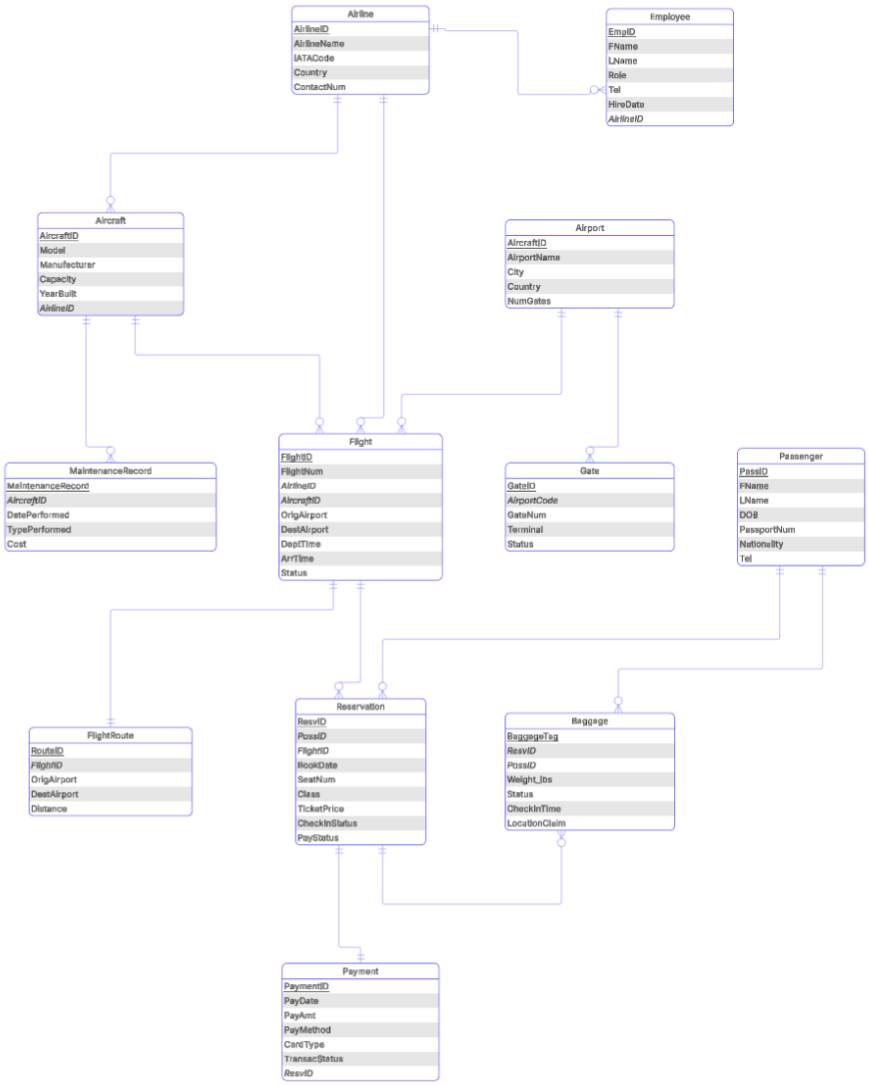
1. Project Title: Airline Reservation System

This project is centered on building a relational database system designed to support the operations of a commercial airline company. The system consists of multiple interconnected tables that organize information related to airlines, flights, aircraft, airports, passengers, reservations, payments, baggage tracking, gates, routes, employees, and maintenance activities. It contains detailed records of flight schedules, aircraft assignments, airport connections, and ticket purchases while linking passengers to their reservations. The database also manages aircraft maintenance logs, gate availability, baggage status updates, and employee roles to ensure smooth and safe flight operations. Also, revenue tracking and route management are integrated into the system to support analytical reporting. This database is in third normal form, ensuring accuracy and eliminating redundancy. This database provides a reliable foundation for decision making and efficiency, as well as overall airline performance.

2. ER Diagram:



3. Drop Create Tables

Create tables and insert data for each table. Each table should have at least ten records.

```
--Drop Tables

Drop table Baggage;
Drop table Payment;
Drop table Reservation;
Drop table Passenger;
Drop table Flight;
Drop table Airline;
Drop table Aircraft;
Drop table Airport;
Drop table Gate;
Drop table Employee;
Drop table MaintenanceRecord;
Drop table FlightRoute;

--Create Tables

Create Table Passenger
(PassID int not null,
FName varchar(20) not null,
LName varchar(20) not null,
DOB date not null,
PassportNum varchar(20) not null,
Nationality varchar(20) not null,
Tel varchar(15),
Primary Key (PassID));

insert into passenger values(109, 'eric', 'thieret', to_date('01/31/2002','mm/dd/yyyy'),
'p12783984', 'american', '330-456-9087');
insert into passenger values(110, 'liza', 'galchenko', to_date('03/18/2004','mm/dd/yyyy'),
'a98367478', 'russian', '457-908-3875');
insert into passenger values(111, 'mary', 'evans', to_date('03/30/2004','mm/dd/yyyy'),
'a92671190', 'american', '376-927-1264');
insert into passenger values(112, 'ella', 'boyd', to_date('09/13/2003','mm/dd/yyyy'),
'k18990376', 'guatemalen', '274-872-1234');
insert into passenger values(113, 'adam', 'thorn', to_date('01/19/2004','mm/dd/yyyy'),
'a17329282', 'american', '184-183-2356');
```

```
insert into passenger values(114, 'ellie', 'gray', to_date('02/25/2002','mm/dd/yyyy'),
'p12783984', 'american', '098-734-9231');
insert into passenger values(115, 'ben', 'hatcher', to_date('05/03/2000','mm/dd/yyyy'),
's09276387', 'canadian', '341-476-1778');
insert into passenger values(116, 'joe', 'stinch', to_date('11/07/1984','mm/dd/yyyy'),
'w18367199', 'american', '203-902-3401');
insert into passenger values(117, 'elsa', 'allmen', to_date('07/01/2007','mm/dd/yyyy'),
'l179547202', 'canadian', '284-193-0191');
insert into passenger values(118, 'dillon', 'cosh', to_date('06/05/1997','mm/dd/yyyy'),
'm17353557', 'american', '673-981-4587');

commit;

Create Table Airport
(AirportCode varchar(5) not null,
AirportName varchar(50) not null,
City varchar(30) not null,
Country varchar(30) not null,
NumGates int not null,
Primary key (AirportCode));

insert into airport values('jfk', 'john f. kennedy', 'new york city', 'usa', 120);
insert into airport values('ewr', 'newark liberty', 'newark', 'usa', 115);
insert into airport values('lax', 'los angeles intl', 'los angeles', 'usa', 137);
insert into airport values('yyz', 'toronto pearson', 'toronto', 'canada', 127);
insert into airport values('atl', 'hartsfield', 'atlanta', 'usa', 129);
insert into airport values('dfw', 'dallas fort worth', 'dallas', 'usa', 123);
insert into airport values('lhr', 'heathrow', 'london', 'uk', 109);
insert into airport values('ord', 'o''hare intl', 'chicago', 'usa', 140);
insert into airport values('mco', 'orlando intl', 'orlando', 'usa', 110);
insert into airport values('ind', 'indianapolis intl', 'indianapolis', 'usa', 131);

commit;

Create Table Airline
(AirlineID int not null,
AirlineName varchar(50) not null,
IataCode varchar(5) not null,
Country varchar(30),
ContactNum varchar(20),
```

```
Primary key (AirlineID));

insert into airline values(829,'southwest','sw','usa','332-456-0987');
insert into airline values(830,'american','am','usa','343-467-1934');
insert into airline values(831,'jetblue','jb','usa','232-982-1345');
insert into airline values(832,'spirit','sp','usa','897-191-1992');
insert into airline values(833,'frontier','fr','usa','193-393-2922');
insert into airline values(834,'delta','de','usa','475-823-7274');
insert into airline values(835,'aircanada','ac','canada','714-982-1934');
insert into airline values(836,'united','un','usa','925-203-0012');
insert into airline values(837,'alaska','al','usa','200-111-1234');
insert into airline values(838,'allegiant','at','usa','777-345-3322');

commit;

Create Table Aircraft
(AircraftID int not null,
Model varchar(20) not null,
Manufacturer varchar(20),
Capacity int,
YearBuilt int,
AirlineID int,
Primary Key (AircraftID),
Foreign Key (AirlineID) references Airline(AirlineID));

insert into aircraft values(1,'b777','boeing',300,2011,836);
insert into aircraft values(2,'b737','boeing',200,2012,837);
insert into aircraft values(3,'a321','airbus',800,2015,833);
insert into aircraft values(4,'b737','boeing',200,2013,835);
insert into aircraft values(5,'a319','airbus',800,2015,838);
insert into aircraft values(6,'a320','airbus',100,2009,831);
insert into aircraft values(7,'a350','airbus',250,2017,834);
insert into aircraft values(8,'b737','boeing',200,2012,830);
insert into aircraft values(9,'b737','boeing',200,2013,829);
insert into aircraft values(10,'a320','airbus',100,2010,832);

commit;

Create Table Flight
(FlightID int not null,
```

```
FlightNum varchar(10) not null,
AirlineID int not null,
AircraftID int not null,
OrigAirport varchar(5) not null,
DestAirport varchar(5) not null,
DeptTime timestamp,
ArrTime timestamp,
Status varchar(20),
Primary Key (FlightID),
Foreign Key (AirlineID) references Airline(AirlineID),
Foreign Key (AircraftID) references Aircraft(AircraftID),
Foreign Key (OrigAirport) references Airport(AirportCode),
Foreign Key (DestAirport) references Airport(AirportCode));

insert into flight values(20,'al6006',837,2,'dfw','lax', to_timestamp('11/20/2025
08:00','mm/dd/yyyy hh24:mi'), to_timestamp('11/20/2025 09:50','mm/dd/yyyy
hh24:mi'),'scheduled');
insert into flight values(21,'sw1001',829,9,'mco','atl', to_timestamp('11/21/2025
07:30','mm/dd/yyyy hh24:mi'), to_timestamp('11/21/2025 09:45','mm/dd/yyyy
hh24:mi'),'delayed');
insert into flight values(22,'fr8008',833,3,'ord','dfw', to_timestamp('11/22/2025
13:00','mm/dd/yyyy hh24:mi'), to_timestamp('11/22/2025 15:50','mm/dd/yyyy
hh24:mi'),'delayed');
insert into flight values(23,'de2002',834,7,'atl','jfk', to_timestamp('11/22/2025
09:00','mm/dd/yyyy hh24:mi'), to_timestamp('11/22/2025 11:15','mm/dd/yyyy
hh24:mi'),'scheduled');
insert into flight values(24,'am9009',830,8,'jfk','lax', to_timestamp('11/23/2025
08:00','mm/dd/yyyy hh24:mi'), to_timestamp('11/23/2025 11:45','mm/dd/yyyy
hh24:mi'),'delayed');
insert into flight values(25,'sp7007',832,10,'mco','ewr', to_timestamp('11/24/2025
15:30','mm/dd/yyyy hh24:mi'), to_timestamp('11/24/2025 18:00','mm/dd/yyyy
hh24:mi'),'scheduled');
insert into flight values(26,'un4004',836,1,'ord','yyz', to_timestamp('11/25/2025
10:20','mm/dd/yyyy hh24:mi'), to_timestamp('11/25/2025 12:45','mm/dd/yyyy
hh24:mi'),'scheduled');
insert into flight values(27,'at1111',838,5,'ind','mco', to_timestamp('11/25/2025
13:00','mm/dd/yyyy hh24:mi'), to_timestamp('11/25/2025 15:10','mm/dd/yyyy
hh24:mi'),'scheduled');
```

```
insert into flight values(28,'ac3003',835,4,'yyz','lhr', to_timestamp('11/26/2025
18:00','mm/dd/yyyy hh24:mi'), to_timestamp('11/27/2025 06:10','mm/dd/yyyy
hh24:mi'),'scheduled');
insert into flight values(29,'jb5005',831,6,'ewr','ord', to_timestamp('11/26/2025
11:30','mm/dd/yyyy hh24:mi'), to_timestamp('11/26/2025 13:45','mm/dd/yyyy
hh24:mi'),'delayed');

commit;

Create Table Reservation
(ResvID int not null,
PassID int not null,
FlightID int not null,
BookDate Date,
SeatNum varchar(5),
Class varchar(20),
TicketPrice int not null,
CheckInStatus varchar(10),
PayStatus varchar(10),
Primary Key (ResvID),
Foreign Key (PassID) references Passenger(PassID),
Foreign Key (FlightID) references Flight(FlightID));

insert into reservation values(400, 111, 20,
to_date('10/09/2025','mm/dd/yyyy'),'12f','business',1100,'yes','paid');
insert into reservation values(401, 109, 21,
to_date('10/30/2025','mm/dd/yyyy'),'2a','firstclass',2000,'yes','paid');
insert into reservation values(402, 114, 22,
to_date('09/30/2025','mm/dd/yyyy'),'34b','economy',50,'yes','paid');
insert into reservation values(403, 110, 23,
to_date('10/29/2025','mm/dd/yyyy'),'29d','economy',100,'yes','paid');
insert into reservation values(404, 118, 24,
to_date('09/15/2025','mm/dd/yyyy'),'10c','business',1300,'no','pending');
insert into reservation values(405, 112, 25,
to_date('10/17/2025','mm/dd/yyyy'),'18f','economy',200,'yes','paid');
insert into reservation values(406, 117, 26,
to_date('10/30/2025','mm/dd/yyyy'),'3b','firstclass',3000,'yes','paid');
insert into reservation values(407, 116, 27,
to_date('09/07/2025','mm/dd/yyyy'),'22a','economy',500,'no','pending');
```

```
insert into reservation values(408, 113, 28,
to_date('11/02/2025','mm/dd/yyyy'),'7d','business',1600,'yes','paid');
insert into reservation values(409, 115, 29,
to_date('10/12/2025','mm/dd/yyyy'),'30c','economy',80,'no','pending');

commit;


Create Table Baggage
(BaggageTag int not null,
ResvID int not null,
PassID int not null,
Weight_lbs int,
Status varchar(20),
CheckInTime timestamp,
LocationClaim varchar(10),
Primary key (BaggageTag),
Foreign key (PassID) references Passenger(PassID),
Foreign Key (ResvID) references Reservation(ResvID));

insert into baggage values(12345,400,111,20,'checked', to_timestamp('11/20/2025
06:00','mm/dd/yyyy hh24:mi'),'lax');
insert into baggage values(28495,401,109,15,'checked', to_timestamp('11/21/2025
05:30','mm/dd/yyyy hh24:mi'),'atl');
insert into baggage values(84283,402,114,26,'checked', to_timestamp('11/22/2025
11:00','mm/dd/yyyy hh24:mi'),'dfw');
insert into baggage values(58365,403,110,34,'checked', to_timestamp('11/22/2025
07:00','mm/dd/yyyy hh24:mi'),'jfk');
insert into baggage values(17432,404,118,50,'checked', to_timestamp('11/23/2025
06:00','mm/dd/yyyy hh24:mi'),'lax');
insert into baggage values(30984,405,112,37,'checked', to_timestamp('11/24/2025
13:30','mm/dd/yyyy hh24:mi'),'ewr');
insert into baggage values(17568,406,115,29,'checked', to_timestamp('11/25/2025
08:20','mm/dd/yyyy hh24:mi'),'yyz');
insert into baggage values(44627,407,116,19,'checked', to_timestamp('11/25/2025
11:00','mm/dd/yyyy hh24:mi'),'mco');
insert into baggage values(67845,408,117,48,'checked', to_timestamp('11/26/2025
16:00','mm/dd/yyyy hh24:mi'),'lhr');
insert into baggage values(27658,409,115,32,'checked', to_timestamp('11/26/2025
09:30','mm/dd/yyyy hh24:mi'),'ord');
```

```
commit;

Create Table Employee
(EmpID int not null,
FName varchar(20),
LName varchar(20),
Role varchar(30),
Tel varchar(15),
HireDate date,
AirlineID int,
Primary Key (EmpID),
Foreign Key (AirlineID) references Airline(AirlineID));

insert into employee values(1900,'sarah','johnson','flight attendent','901-556-4354',
to_date('01/10/2015','mm/dd/yyyy'),829);
insert into employee values(1901,'shawn','miller','pilot','891-098-1893',
to_date('05/20/2018','mm/dd/yyyy'),829);
insert into employee values(1902,'jaclyn','zach','flight attendent','384-382-3889',
to_date('03/15/2012','mm/dd/yyyy'),831);
insert into employee values(1903,'ross','hest','pilot','456-234-9812',
to_date('07/10/2019','mm/dd/yyyy'),834);
insert into employee values(1904,'elliot','brown','pilot','901-223-3445',
to_date('08/12/2014','mm/dd/yyyy'),831);
insert into employee values(1905,'james','lee','pilot','887-112-2234',
to_date('09/22/2020','mm/dd/yyyy'),835);
insert into employee values(1906,'kim','davis','flight attendent','213-234-9982',
to_date('11/11/2011','mm/dd/yyyy'),834);
insert into employee values(1907,'jackie','esker','ground crew','405-267-6776',
to_date('12/01/2016','mm/dd/yyyy'),831);
insert into employee values(1908,'brad','pint','flight attendent','192-237-1023',
to_date('04/05/2013','mm/dd/yyyy'),835);
insert into employee values(1909,'emily','taylor','ground crew','654-345-2493',
to_date('06/18/2017','mm/dd/yyyy'),838);

commit;

Create Table Gate
(GateID int not null,
AirportCode varchar(5) not null,
```

```
GateNum varchar(10),
Terminal varchar(10),
Status varchar(20),
Primary Key (GateID),
Foreign Key (AirportCode) references Airport(AirportCode));

insert into gate values(600,'jfk','a3','t1','delayed');
insert into gate values(601,'jfk','b10','t2','delayed');
insert into gate values(602,'lax','b4','t2','open');
insert into gate values(603,'ord','c19','t3','delayed');
insert into gate values(604,'atl','a8','t1','open');
insert into gate values(605,'lhr','b6','t2','open');
insert into gate values(606,'ord','a2','t1','open');
insert into gate values(607,'lax','c17','t3','open');
insert into gate values(608,'atl','d13','t4','open');
insert into gate values(609,'lhr','e15','t5','delayed');

commit;

Create Table Payment
(PaymentID int not null,
PayDate Date,
PayAmt int not null,
PayMethod varchar(20),
CardType varchar(10),
TransacStatus varchar(20),
ResvID int not null,
Primary Key (PaymentID),
Foreign Key (ResvID) references Reservation(ResvID));

insert into payment values(200, to_date('10/09/2025','mm/dd/yyyy'),
1100,'card','visa','complete',400);
insert into payment values(201, to_date('10/30/2025','mm/dd/yyyy'),
2000,'card','master','complete',401);
insert into payment values(202, to_date('09/30/2025','mm/dd/yyyy'),
50,'card','visa','complete',402);
insert into payment values(203, to_date('10/29/2025','mm/dd/yyyy'),
100,'card','visa','complete',403);
insert into payment values(204, NULL, 1300,'card','master','pending',404);
```

```
insert into payment values(205, to_date('10/17/2025','mm/dd/yyyy'),
200,'card','visa','complete',405);
insert into payment values(206, to_date('10/30/2025','mm/dd/yyyy'),
3000,'card','visa','complete',406);
insert into payment values(207, NULL, 500,'card','master','pending',407);
insert into payment values(208, to_date('11/02/2025','mm/dd/yyyy'),
1600,'card','visa','complete',408);
insert into payment values(209, NULL, 80,'card','visa','pending',409);

commit;


Create Table MaintenanceRecord
(MaintenanceID int not null,
AircraftID int not null,
DatePerformed date not null,
TypePerformed varchar(50) not null,
Cost int not null,
Primary Key (MaintenanceID),
Foreign Key (AircraftID) references Aircraft(AircraftID));

insert into MaintenanceRecord values(341, 1, to_date('11/1/25','mm/dd/yy'), 'Routine',
5000);
insert into MaintenanceRecord values(342, 2, to_date('10/15/25','mm/dd/yy'), 'Oil Change',
3500);
insert into MaintenanceRecord values(343, 3, to_date('11/20/25','mm/dd/yy'), 'Landing
Gear', 150000);
insert into MaintenanceRecord values(344, 4, to_date('9/30/25','mm/dd/yy'), 'Routine',
5000);
insert into MaintenanceRecord values(345, 5, to_date('11/25/25','mm/dd/yy'), 'Tire
Replacement', 1200);
insert into MaintenanceRecord values(346, 6, to_date('10/1/25','mm/dd/yy'), 'Avionic
Update', 8000);
insert into MaintenanceRecord values(347, 7, to_date('11/10/25','mm/dd/yy'), 'Oil Change',
3500);
insert into MaintenanceRecord values(348, 8, to_date('9/1/25','mm/dd/yy'), 'Landing Gear',
150000);
insert into MaintenanceRecord values(349, 9, to_date('8/15/25','mm/dd/yy'), 'Routine',
5000);
```

```
insert into MaintenanceRecord values(350, 10, to_date('10/19/25','mm/dd/yy'), 'Tire
Replacement', 1200);

commit;


Create Table FlightRoute
(RouteID int not null,
FlightID int not null,
OrigAirport varchar(5) not null,
DestAirport varchar(5) not null,
Distance int not null,
Primary Key (RouteID),
Foreign Key (FlightID) references Flight(FlightID),
Foreign Key (OrigAirport) references Airport(AirportCode),
Foreign Key (DestAirport) references Airport(AirportCode));

insert into FlightRoute values(31, 20, 'dfw', 'lax', 802);
insert into FlightRoute values(32, 21, 'mco', 'atl', 1947);
insert into FlightRoute values(33, 22, 'ord', 'dfw', 690);
insert into FlightRoute values(34, 23, 'atl', 'jfk', 1740);
insert into FlightRoute values(35, 24, 'jfk', 'lax', 969);
insert into FlightRoute values(36, 25, 'mco', 'ewr', 1007);
insert into FlightRoute values(37, 26, 'ord', 'yyz', 2475);
insert into FlightRoute values(38, 27, 'ind', 'mco', 829);
insert into FlightRoute values(39, 28, 'yyz', 'lhr', 3554);
insert into FlightRoute values(40, 29, 'ewr', 'ord', 720);v7y787

commit;

Select * From Passenger;
Select * From Airport;
Select * From Airline;
Select * From Aircraft;
Select * From Flight;
Select * From Reservation;
Select * From Baggage;
Select * From Employee;
Select * From Gate;
Select * From Payment;
```

Select * From MaintenanceRecord;
Select * From FlightRoute;

Select * From Passenger;

PASSID	FNAME	LNAME	DOB	PASSPORTNUM	NATIONALITY	TEL
109	eric	thieret	31-JAN-02	p12783984	american	330-456-9087
110	liza	galchenko	18-MAR-04	a98367478	russian	457-908-3875
111	mary	evans	30-MAR-04	a92671190	american	376-927-1264
112	ella	boyd	13-SEP-03	k18990376	guatemalen	274-872-1234
113	adam	thorn	19-JAN-04	a17329282	american	184-183-2356
114	ellie	gray	25-FEB-02	p12783984	american	098-734-9231
115	ben	hatcher	03-MAY-00	s09276387	canadian	341-476-1778
116	joe	stinch	07-NOV-84	w18367199	american	203-902-3401
117	elsa	allmen	01-JUL-07	l179547202	canadian	284-193-0191
118	dillon	cosh	05-JUN-97	m17353557	american	673-981-4587

Select * From Airport;

AIRPORTCODE	AIRPORTNAME	CITY	COUNTRY	NUMGATES
jfk	john f. kennedy	new york city	usa	120
ewr	newark liberty	newark	usa	115
lax	los angeles intl	los angeles	usa	137
yyz	toronto pearson	toronto	canada	127
atl	hartsfield	atlanta	usa	129
dfw	dallas fort worth	dallas	usa	123
lhr	heathrow	london	uk	109
ord	o'hare intl	chicago	usa	140
mco	orlando intl	orlando	usa	110
ind	indianapolis intl	indianapolis	usa	131

Select * From Airline;

AIRLINEID	AIRLINENAME	IATACODE	COUNTRY	CONTACTNUM
829	southwest	sw	usa	332-456-0987
830	american	am	usa	343-467-1934
831	jetblue	jb	usa	232-982-1345
832	spirit	sp	usa	897-191-1992
833	frontier	fr	usa	193-393-2922
834	delta	de	usa	475-823-7274
835	aircanada	ac	canada	714-982-1934
836	united	un	usa	925-203-0012
837	alaska	al	usa	200-111-1234
838	allegiant	at	usa	777-345-3322

Select * From Aircraft;

AIRCRAFTID	MODEL	MANUFACTURER	CAPACITY	YEARBUILT	AIRLINEID
1	b777	boeing	300	2011	836
2	b737	boeing	200	2012	837
3	a321	airbus	800	2015	833
4	b737	boeing	200	2013	835
5	a319	airbus	800	2015	838
6	a320	airbus	100	2009	831
7	a350	airbus	250	2017	834
8	b737	boeing	200	2012	830
9	b737	boeing	200	2013	829
10	a320	airbus	100	2010	832

Select * From Flight;

FLIGHTID	FLIGHTNUM	AIRLINEID	AIRCRAFTID	ORIGAIRPORT	DESTAIRPORT	DEPTTIME	ARRTIME	STATUS
20	al6006	837	2	dfw	lax	20-NOV-25 08.00.00.000000 AM	20-NOV-25 09.50.00.000000 AM	scheduled
21	sw1001	829	9	mco	atl	21-NOV-25 07.30.00.000000 AM	21-NOV-25 09.45.00.000000 AM	delayed
22	fr8008	833	3	ord	dfw	22-NOV-25 01.00.00.000000 PM	22-NOV-25 03.50.00.000000 PM	delayed
23	de2002	834	7	atl	jfk	22-NOV-25 09.00.00.000000 AM	22-NOV-25 11.15.00.000000 AM	scheduled
24	am9009	830	8	jfk	lax	23-NOV-25 08.00.00.000000 AM	23-NOV-25 11.45.00.000000 AM	delayed
25	sp7007	832	10	mco	ewr	24-NOV-25 03.30.00.000000 PM	24-NOV-25 06.00.00.000000 PM	scheduled
26	un4004	836	1	ord	yyz	25-NOV-25 10.20.00.000000 AM	25-NOV-25 12.45.00.000000 PM	scheduled
27	at1111	838	5	ind	mco	25-NOV-25 01.00.00.000000 PM	25-NOV-25 03.10.00.000000 PM	scheduled
28	ac3003	835	4	yyz	lhr	26-NOV-25 06.00.00.000000 PM	27-NOV-25 06.10.00.000000 AM	scheduled
29	jb5005	831	6	ewr	ord	26-NOV-25 11.30.00.000000 AM	26-NOV-25 01.45.00.000000 PM	delayed

Select * From Reservation;

RESVID	PASSID	FLIGHTID	BOOKDATE	SEATNUM	CLASS	TICKETPRICE	CHECKINSTATUS	PAYSTATUS
400	111	20	09-OCT-25	12f	business	1100	yes	paid
401	109	21	30-OCT-25	2a	firstclass	2000	yes	paid
402	114	22	30-SEP-25	34b	economy	50	yes	paid
403	110	23	29-OCT-25	29d	economy	100	yes	paid
404	118	24	15-SEP-25	10c	business	1300	no	pending
405	112	25	17-OCT-25	18f	economy	200	yes	paid
406	117	26	30-OCT-25	3b	firstclass	3000	yes	paid
407	116	27	07-SEP-25	22a	economy	500	no	pending
408	113	28	02-NOV-25	7d	business	1600	yes	paid
409	115	29	12-OCT-25	30c	economy	80	no	pending

Select * From Baggage;

BAGGAGETAG	RESVID	PASSID	WEIGHT_LBS	STATUS	CHECKINTIME	LOCATIONCLAIM
12345	400	111	20	checked	20-NOV-25 06.00.00.000000 AM	lax
28495	401	109	15	checked	21-NOV-25 05.30.00.000000 AM	atl
84283	402	114	26	checked	22-NOV-25 11.00.00.000000 AM	dfw
58365	403	110	34	checked	22-NOV-25 07.00.00.000000 AM	jfk
17432	404	118	50	checked	23-NOV-25 06.00.00.000000 AM	lax
30984	405	112	37	checked	24-NOV-25 01.30.00.000000 PM	ewr
17568	406	115	29	checked	25-NOV-25 08.20.00.000000 AM	yyz
44627	407	116	19	checked	25-NOV-25 11.00.00.000000 AM	mco
67845	408	117	48	checked	26-NOV-25 04.00.00.000000 PM	lhr
27658	409	115	32	checked	26-NOV-25 09.30.00.000000 AM	ord

Select * From Employee;

EMPID	FNAME	LNAME	ROLE	TEL	HIREDATE	AIRLINEID
1900	sarah	johnson	flight attendent	901-556-4354	10-JAN-15	829
1901	shawn	miller	pilot	891-098-1893	20-MAY-18	829
1902	jaclyn	zach	flight attendent	384-382-3889	15-MAR-12	831
1903	ross	hest	pilot	456-234-9812	10-JUL-19	834
1904	elliot	brown	pilot	901-223-3445	12-AUG-14	831
1905	james	lee	pilot	887-112-2234	22-SEP-20	835
1906	kim	davis	flight attendent	213-234-9982	11-NOV-11	834
1907	jackie	esker	ground crew	405-267-6776	01-DEC-16	831
1908	brad	pint	flight attendent	192-237-1023	05-APR-13	835
1909	emily	taylor	ground crew	654-345-2493	18-JUN-17	838

Select * From Gate;

GATEID	AIRPORTCODE	GATENUM	TERMINAL	STATUS
600	jfk	a3	t1	delayed
601	jfk	b10	t2	delayed
602	lax	b4	t2	open
603	ord	c19	t3	delayed
604	atl	a8	t1	open
605	lhr	b6	t2	open
606	ord	a2	t1	open
607	lax	c17	t3	open
608	atl	d13	t4	open
609	lhr	e15	t5	delayed

Select * From Payment;

PAYMENTID	PAYDATE	PAYAMT	PAYMETHOD	CARDTYPE	TRANSACSTATUS	RESVID
200	09-OCT-25	1100	card	visa	complete	400
201	30-OCT-25	2000	card	master	complete	401
202	30-SEP-25	50	card	visa	complete	402
203	29-OCT-25	100	card	visa	complete	403
204	-	1300	card	master	pending	404
205	17-OCT-25	200	card	visa	complete	405
206	30-OCT-25	3000	card	visa	complete	406
207	-	500	card	master	pending	407
208	02-NOV-25	1600	card	visa	complete	408
209	-	80	card	visa	pending	409

Select * From MaintenanceRecord;

MAINTENANCEID	AIRCRAFTID	DATEPERFORMED	TYPEPERFORMED	COST
341	1	01-NOV-25	Routine	5000
342	2	15-OCT-25	Oil Change	3500
343	3	20-NOV-25	Landing Gear	150000
344	4	30-SEP-25	Routine	5000
345	5	25-NOV-25	Tire Replacement	1200
346	6	01-OCT-25	Avionic Update	8000
347	7	10-NOV-25	Oil Change	3500
348	8	01-SEP-25	Landing Gear	150000
349	9	15-AUG-25	Routine	5000
350	10	19-OCT-25	Tire Replacement	1200

Select * From FlightRoute;

ROUTEID	FLIGHTID	ORIGAIRPORT	DESTAIRPORT	DISTANCE
31	20	dfw	lax	802
32	21	mco	atl	1947
33	22	ord	dfw	690
34	23	atl	jfk	1740
35	24	jfk	lax	969
36	25	mco	ewr	1007
37	26	ord	yyz	2475
38	27	ind	mco	829
39	28	yyz	lhr	3554
40	29	ewr	ord	720

1. **Question: What is the AirportCode and the total cost of Landing Gear maintenance performed on aircraft that have ever operated a flight from that airport, but only for airports where all gates are currently delayed or open? Output: Give AirportCode and TotalLandingGearCost**

```
select A.AirportCode,
(
select sum(M.Cost)
   From MaintenanceRecord M
   Join Flight F on M.AircraftID = F.AircraftID
   Where F.OrigAirport = A.AirportCode
   and M.TypePerformed = 'Landing Gear'
) as TotalLandingGearCost
from Airport A

Where not exists
 (
   select G.GateID
   from Gate G
   where G.AirportCode = A.AirportCode
   and G.Status not in ('delayed', 'open')
);
```

AIRPORTCODE	TOTALLANDINGGEARCOST
jfk	150000
ewr	–
lax	–
dfw	–
ord	150000
ind	–
mco	–
yyz	–
atl	–
lhr	–

2. **Question: What is the Passenger ID, last name and total baggage weight for passengers who are in First Class or have a reservation paid for with an amount that exceeds $1500 that is a complete payment?**
   Output: Give PassID, LName, and total baggage weight.

```
select p.PassID, p.lname, sum(B.weight_lbs) as TotalBaggageWeight
from Passenger p
join Baggage B on P.PassID = B.PassID
where P.PassID in
(

  select R.PassID
  from Reservation R
  where R.Class = 'firstclass'

  union

  select R.PassID
  from Reservation R
  join Payment C on R.ResvID = C.ResvID
  where C.PayAmt > 1500 and C.TransacStatus = 'complete'
)

Group by p.PassID, P.lname
having sum(B.weight_lbs) > 0;
```

PASSID	LNAME	TOTALBAGGAGEWEIGHT
109	thieret	15
117	allmen	48

3. **What is the airline name and the maximum ticket sold, but only for airlines where the average cost of maintainance across their aircraft is greater than $5000?**
   Output: Give Airline and Max Ticket Price.

```
select a.AirlineName, max(r.Ticketprice) as Maxticketprice
from airline a
join flight f on a.AirlineId = f.AirlineId
join Reservation r on f.FlightId = r.FlightId
where a.AirlineId in
 (
   select c.AirlineId
   from Aircraft c
   join MaintenanceRecord m on c.AircraftId = m.AircraftId
   group by c.AirlineId
   having avg(m.Cost) > 5000
)
 group by a.AirlineName;
```

AIRLINENAME	MAXTICKETPRICE
jetblue	80
frontier	50
american	1300

4. **What is the passenger ID and the count of total reservations for passengers who are Canadian or passengers who checked in bags that weigh less than 20 lbs?**
   Output: Give passenger id and count of total reservations

```
select p.passid, count(r.resvid) as TotalReservations
from Passenger P
join reservation r on p.passid = r.passid
where p.passid in
(
   select passid
```

```
    from passenger
    where nationality = 'canadian'

    union

    select b.passid
    from baggage b
    where b.weight_lbs < 20
)
group by p.passid
having count(r.resvid) > 0;
```

PASSID	TOTALRESERVATIONS
109	1
115	1
116	1
117	1

5. **What is the Aircraft and model of aircraft whose maximum maintenance cost is greater than the average maintenance cost of all aircraft, excluding aircraft that had maintenance performed on 8/15/25?**
   Output: Give aircraftid and model.

```
select a.aircraftid, a.model
from aircraft a
join MaintenanceRecord m on a.aircraftid = m.aircraftid
group by a.aircraftid, a.model
having max(m.cost) >
(
    select avg(cost)
    from MaintenanceRecord
)
minus
(
    select a1.aircraftid, a1.model
```

```
from aircraft a1
join MaintenanceRecord m1 on a1.aircraftid = m1.aircraftid
where dateperformed = DATE '2025-08-15'
);
```

AIRCRAFTID	MODEL
3	a321
8	b737

6. **What is the flight number and the potential loss of revenue for reservations with a pending status for flights that were scheduled to be delayed.**
   Output: Give flight number and potential revenue loss.

```
select f.flightnum, f.flightid, sum(r.ticketprice) as potentialrevenueloss
from flight f
join airport a on f.origairport = a.airportcode
join reservation r on f.flightid = r.flightid
where f.status = 'delayed'
and r.resvid in
(
   select resvid
   from payment
   where transacstatus = 'pending'
)
group by f.flightnum, f.flightid;
```

FLIGHTNUM	FLIGHTID	POTENTIALREVENUELOSS
jb5005	29	80
am9009	24	1300

7. **What is the Employee ID and name of all employees who are pilots, excluding any pilot who's airline uses an aircraft model that has not received a routine maintenance record.**

Output: Give employee id, last name, first name and telephone.

```
select e.empid, e.fname, e.lname, e.tel
from employee e
where e.role = 'pilot'

minus

select e.empid, e.fname, e.lname, e.tel
from employee e
where e.role = 'pilot'
and e.airlineid
  in
(
  select a.airlineid
  from aircraft a
  where a.aircraftid
  not in
(
  select aircraftid
  from maintenancerecord
  where typeperformed = 'Routine'
  )
);
```

EMPID	FNAME	LNAME	TEL
1901	shawn	miller	891-098-1893
1905	james	lee	887-112-2234

8. **What is the employee id, name and role of employees whose job is pilot and work for an airline that employs at least one flight attendant where that airline also operates flights using aircraft that received an oil change.**

Output: give employeeid, first name, last name, airline id, and role.

```
select e.empid, e.fname, e.lname, e.airlineid, e.role
from employee e
where e.role = 'pilot'
and e.airlineid
in
(
select e2.airlineid
   from employee e2
   where e2.role = 'flight attendent'
 )
and e.airlineid
in
(
select f.airlineid
   from flight f
   where f.aircraftid
   in
(
select m.aircraftid
   from maintenancerecord m
   where m.typeperformed = 'Oil Change'
)
)
order by e.lname;
```

EMPID	FNAME	LNAME	AIRLINEID	ROLE
1903	ross	hest	834	pilot

9. **What is the airline name and total ticket revenue generated by the airline, but only for airlines that operate flights to all major North American airports (JFK, LAX, ORD, YYZ)?**

Output: Give airline name, total ticket revenue and IATA code.

```
select a.airlinename, a.IATACode,
(
select sum(r.ticketprice)
  from flight f
  join reservation r on f.flightid = r.flightid
  where f.airlineid = a.airlineid
)
as TotalTicketRevenue
from airline a
where not exists
 (
  (
    select airportcode
    from airport
    where airportcode in ('JFK', 'LAX', 'ORD', 'YYZ')
  )
  minus
  (
    select f2.destairport
     from flight f2
    where f2.airlineid = a.airlineid
  )
)
order by TotalTicketRevenue desc;
```

AIRLINENAME	IATACODE	TOTALTICKETREVENUE
united	un	3000
southwest	sw	2000
aircanada	ac	1600
american	am	1300
alaska	al	1100
allegiant	at	500
spirit	sp	200
delta	de	100
jetblue	jb	80
frontier	fr	50

10. What are all the airlines that have flights to every airport where a B737 is used, but don't have any aircraft with maintenance type "Landing Gear" and show their total revenue from paid reservations?

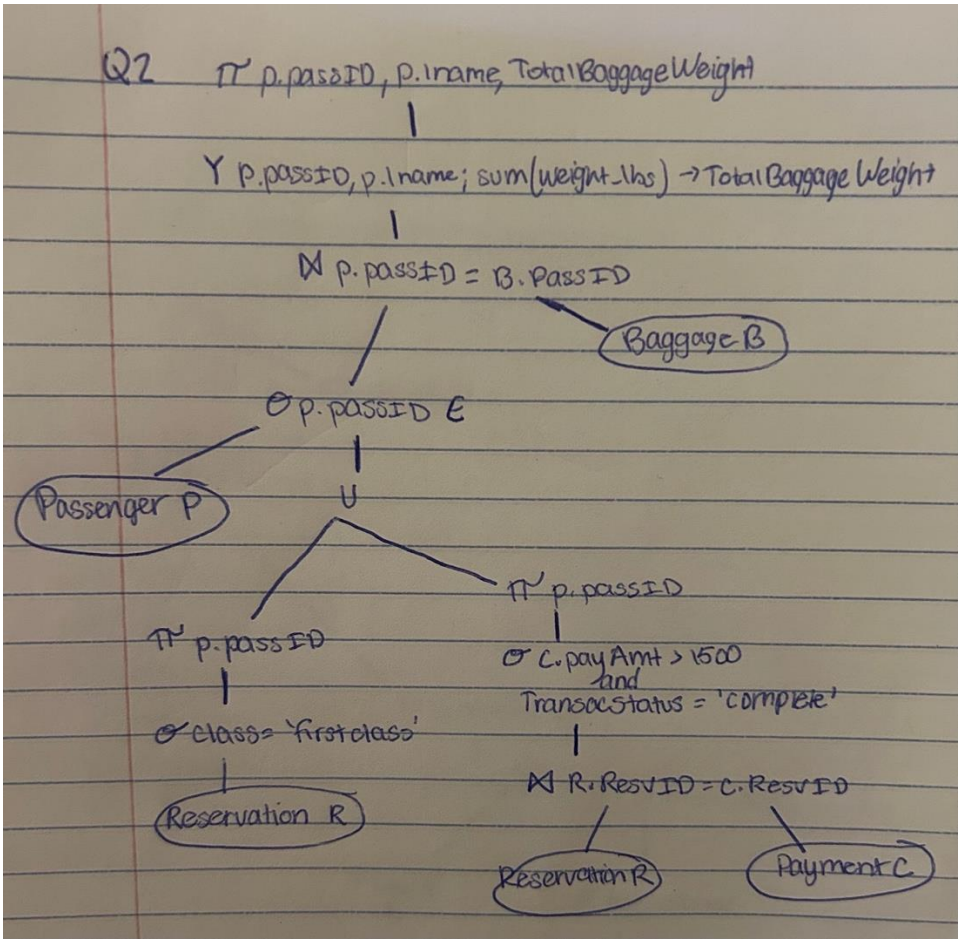
Output: Show airline name, iata code, and total revenue.

```
select a.airlinename, a.iatacode,
(
select sum(r.ticketprice)
  from reservation r
  join flight f on r.flightid= f.flightid
  where f.airlineid = a.airlineid
  and r.paystatus = 'paid'
)
as totalrevenue
from airline a
where not exists
  (
  select 1
  from aircraft ac
  join maintenancerecord m on ac.aircraftid = m.aircraftid
  where ac.airlineid = a.airlineid
  and m.typeperformed = 'Landing Gear'
  )
and not exists
(
  select airportcode
  from airport ap
  where airportcode in
(
  select f.origairport
  from flight f
  join aircraft ac on f.aircraftid = ac.aircraftid
  where ac.model = 'B737'

  union

  select f.destairport
  from flight f
  join aircraft ac on f.aircraftid = ac.aircraftid
  where ac.model = 'B737'
```

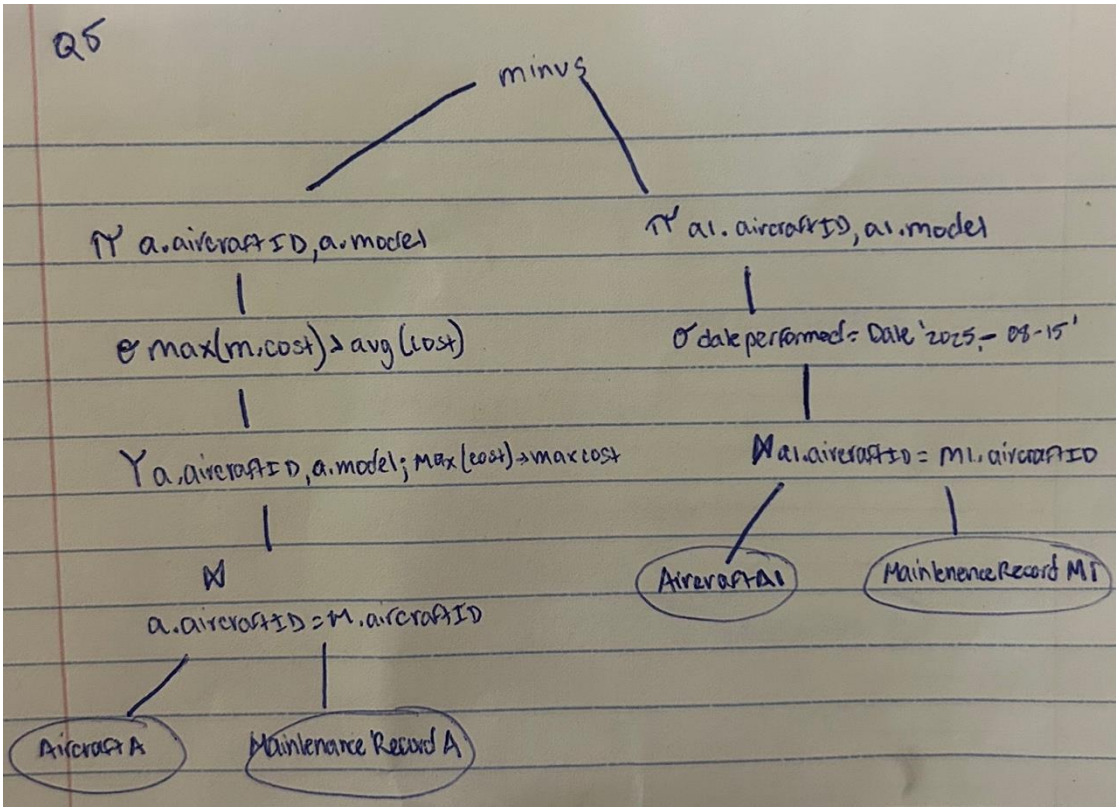
```
)
  minus

  (
  select f2.destairport
  from flight f2
  where f2.airlineid = a.airlineid

  union

  select f2.origairport
  from flight f2
  where f2.airlineid = a.airlineid
  )
)
order by totalrevenue desc;
```

AIRLINENAME	IATACODE	TOTALREVENUE
jetblue	jb	-
allegiant	at	-
united	un	3000
southwest	sw	2000
aircanada	ac	1600
alaska	al	1100
spirit	sp	200
delta	de	100

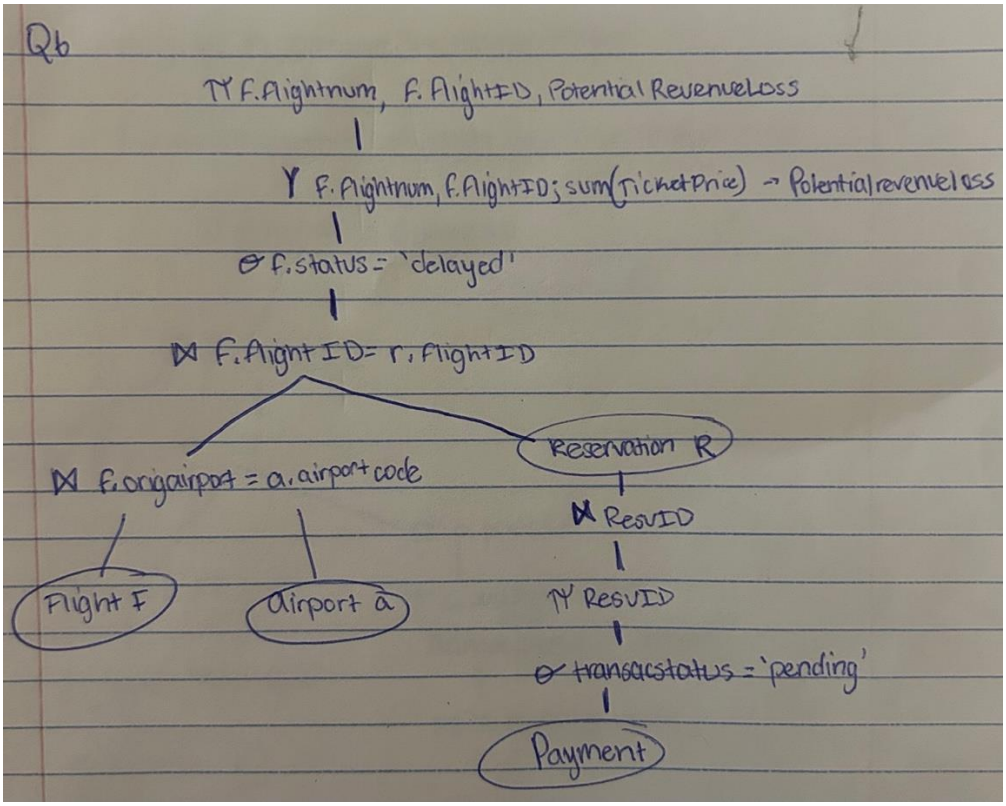
Q2.


Q2
π p.passID, p.lname, TotalBaggageWeight
γ p.passID, p.lname; sum(weight_lbs) → TotalBaggageWeight
⋈ p.passID = B.PassID
Baggage B
σ p.passID ∈
Passenger P
∪
π p.passID
σ class = 'firstclass'
Reservation R
π p.passID
σ C.payAmt > 1500 and TransacStatus = 'complete'
⋈ R.ResvID = C.ResvID
Reservation R
Payment C

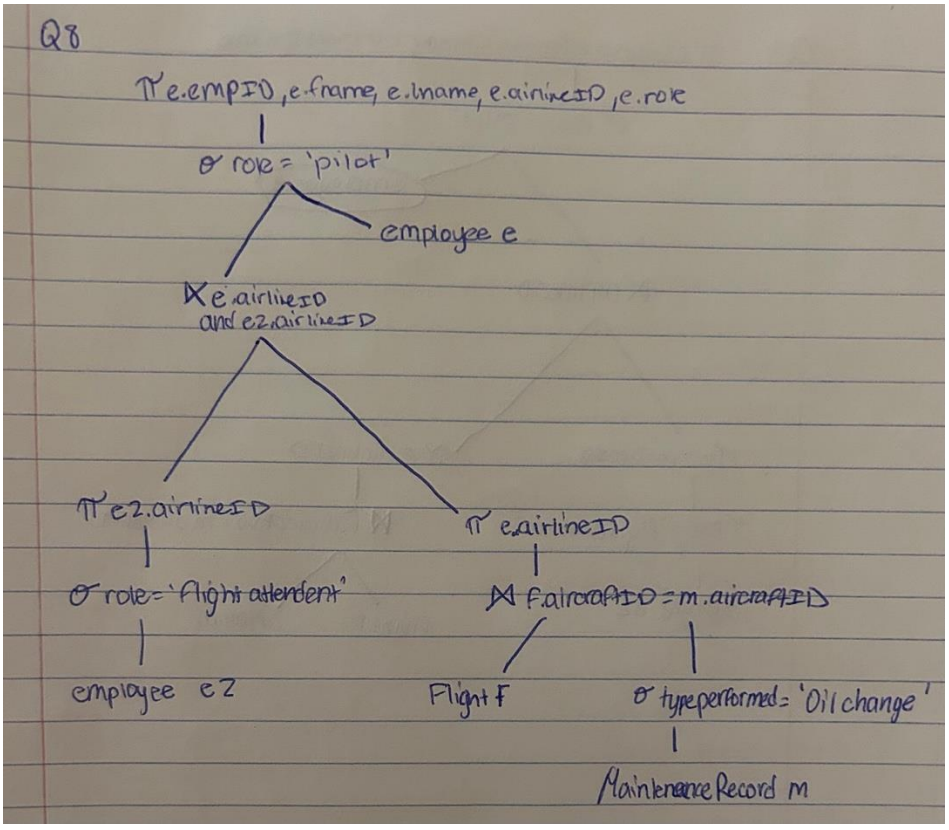
Q5.


Q5
minus
π a.aircraftID, a.model
σ max(m.cost) > avg(cost)
γ a.aircraftID, a.model; Max(cost) → maxcost
⋈ a.aircraftID = M.aircraftID
Aircraft A
Maintenance Record A
π a1.aircraftID, a1.model
σ date performed = Date '2025-08-15'
⋈ a1.aircraftID = M1.aircraftID
Aircraft A1
Maintenance Record M1

Q6.


Qb
π F.flightnum, F.flightID, PotentialRevenueLoss
γ F.flightnum, F.flightID; sum(TicketPrice) → Potentialrevenueloss
σ f.status = 'delayed'
⋈ F.flightID = r.flightID
⋈ f.origairport = a.airportcode
Reservation R
Flight F
Airport a
⋈ ResvID
π ResvID
σ transacstatus = 'pending'
Payment

Q8.


Q8
π e.empID, e.fname, e.lname, e.airlineID, e.role
σ role = 'pilot'
employee e
⋈ e.airlineID and e2.airlineID
π e2.airlineID
π e.airlineID
σ role = 'flight attendent'
⋈ f.aircraftID = m.aircraftID
employee e2
Flight F
σ typeperformed = 'Oil change'
Maintenance Record m