



## ER SCHEM<sub>A</sub>

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type_id,engines,registration_number)
aircraft,family_id,family_name,manufacturer)
part_of(aircraft_id,aircraft_type_id)
aircraft_type(aircraft_type_id,variant_name,family_id,type_rating_id,manufacturer,max_range)
aircraft_type(aircraft_type_id,passenger_capacity)
aircraft_type(aircraft_type_id,cabin_crew_capacity,passenger_capacity)
staff(staff_id,first_name,last_name,birth_date,[language],password_hash,role,rank,gender,nationality)
licensed_on(staff_id,type_rating_id)
on_certificate(staff_id,dish_id)
driving_license(driving_license_id,operator_id)
operating_on(staff_id,flight_id)
flight(flight_id,date,departure_time,departure_airport,arrival_time,arrival_airport,gate,status,flight_number,boarding_time)
on_aircraft(staff_id,aircraft_id)
assists_on(flight_id,seat_number)
flight_ticket(ticket_id,seat_number,class)
own_ticket(ticket_id,passport_number)
passenger(passport_number,first_name,last_name,birth_date,gender,nationality,has_allergy,disability_assistance)

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### **Cardinality**

Relation	Type	Reason
part_of	General-Object-(General-Object)	An aircraft usually can have more than 1 engine/propeller An aircraft usually can have more than 1 cabin/cockpit
has_rating	M(Type, Rating)-(M(aircraft_Type))	Multiple Rating types exist for a type rating An aircraft type must only have 1 type rating
assigned_type	M(aircraft_Type)-(M(aircraft))	The aircraft type may be assigned to more than 1 aircraft
is_based_on	M(Type, Rating)-(M(aircraft))	A type rating may have many aircrafts that are based on it Many aircraft may be licensed on the same type rating
can_cook	M(Aircraft)-((Staff))	A data can have multiple staff who can cook in it A data can have multiple staff who can cook in it
operating_on	M(Digit)-((Flight)-((Staff)))	A flight can have multiple staff assigned to it A staff can be assigned to multiple flights at different times!
on_airport	M(Digit)-((Airport))	A flight may only have 1 airport assigned to it The aircraft may have multiple airports assigned to it at different times!
connected_flight	M(Digit)-((Ticket))-M(Digit)	A flight ticket can be connected to another flight allowing transit / shared flights A flight ticket can be connected to multiple flight tickets
wore_ticket	Passenger-(M(Digit)-((Ticket)))	A passenger may own multiple flight tickets A flight ticket can be owned by only 1 passenger

Participation      P = partial participation / T = total participation

Relation	Type	Reason
part_of	P(chicken_egg)~P(airplane_type)	An airplane family is a parent, and parents must be partial to avoid chicken egg problem
has_rating	P(type,rating)~P(airline_type)	A type rating is a parent and parents must be partial to avoid chicken egg problem
assigned_to	P(airline_type)~P(staff)	Not every airline type has staff who have a type rating
licensed_on	P(type,rating)~P(staff)	Not every type rating has staff who have been licensed on it
can_cook	P(dish)~P(staff)	Not every dish can be cooked by a staff
operating_on	P(flight)~P(staff)	Every flight has to be staff assigned to it
on_aircraft	P(flight)~P(aircraft)	Not every staff is assigned to a flight
connected_flight	P(flight_ticket)~P(flight)	Every flight ticket is connected to a flight
own_ticket	P(passerby)~P(flight_ticket)	Not every passerby has a flight ticket
		Every flight ticket is owned by a passenger

Relations

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type(rating, rating_id, rating_name)
aircraft_family(family_id, family_name, manufacturer)
aircraft_type(aircraft_id, variant_name, family_id, type_rating_id, max_range)
staff(staff_id, first_name, last_name, birth_date, password_hash, role, rank, gender, nationality)
speaks(staff_id, language)
licensed_on(staff_id, type_rating_id)
can_fly(aircraft_id, staff_id)
dish(dish_id, dish_name)
operating_on_id(flight_id)
flight(flight_id, aircraft_id, departure_time, departure_airport, arrival_time, arrival_airport, gate, status, flight_number, boarding_time)
connected_flight(flight_id, id_tweeted)
flight_ticket(ticket_id, passport_number_id, seat_number, class)

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passenger

snapshot		aircraft_family		
type_rating		family_id	family_name	manufacturer
type_rating_id	rating_name			
1	B737/767 Common	1	737	Boeing
2	A320 Family	2	767	Boeing
3	H772	3	320	Airbus
4	H773K	4	777	Boeing

staff

student_id	first_name	last_name	birth_date	parent_email	parent_name	parent_phone	parent_gender	nationality
1	Jane	Bond	1999-01-01	janebond@outlook.com	Mrs. Bond	010-12345678	Female	British
2	John	Doe	1998-02-21	john.doe@outlook.com	Mr. Doe	010-12345678	Male	British
3	Jackie	Chen	1997-03-21	jackie.chen@outlook.com	Mrs. Chen	010-12345678	Female	British
4	Peter	Wick	1996-04-21	peter.wick@outlook.com	Mr. Wick	010-12345678	Male	British
5	Grace	Wilson	2000-05-21	grace.wilson@outlook.com	Mrs. Wilson	010-12345678	Female	British

  

student_id	language	proficiency	start_date	end_date	status	instructor_id	instructor_name	instructor_email
1	Spanish	beginner	2023-09-01	2023-12-31	Active	1	Mr. Lopez	lopez.m@outlook.com
1	Spanish	intermediate	2023-09-01	2024-06-30	Active	2	Miss. Garcia	garcia.m@outlook.com
1	Spanish	advanced	2023-09-01	2024-12-31	Active	3	Mr. Hernandez	hernandez.m@outlook.com
2	French	beginner	2023-09-01	2023-12-31	Active	1	Mr. Lopez	lopez.m@outlook.com
2	French	intermediate	2023-09-01	2024-06-30	Active	2	Miss. Garcia	garcia.m@outlook.com
2	French	advanced	2023-09-01	2024-12-31	Active	3	Mr. Hernandez	hernandez.m@outlook.com
3	German	beginner	2023-09-01	2023-12-31	Active	1	Mr. Lopez	lopez.m@outlook.com
3	German	intermediate	2023-09-01	2024-06-30	Active	2	Miss. Garcia	garcia.m@outlook.com
3	German	advanced	2023-09-01	2024-12-31	Active	3	Mr. Hernandez	hernandez.m@outlook.com
4	Chinese	beginner	2023-09-01	2023-12-31	Active	1	Mr. Lopez	lopez.m@outlook.com
4	Chinese	intermediate	2023-09-01	2024-06-30	Active	2	Miss. Garcia	garcia.m@outlook.com
4	Chinese	advanced	2023-09-01	2024-12-31	Active	3	Mr. Hernandez	hernandez.m@outlook.com
5	Arabic	beginner	2023-09-01	2023-12-31	Active	1	Mr. Lopez	lopez.m@outlook.com
5	Arabic	intermediate	2023-09-01	2024-06-30	Active	2	Miss. Garcia	garcia.m@outlook.com
5	Arabic	advanced	2023-09-01	2024-12-31	Active	3	Mr. Hernandez	hernandez.m@outlook.com

Flight									
Flight_id	arrive_at	date	departure_time	destination_airport	arrival_time	arrival_airport	gate	status	flight_number
1	T	15/10/2024	03:30	IST	DE 35:0	LHR	12A	Arrived	AA251
2	T	15/10/2024	16:45	IAT	TR 74:5	IAT	12B	Boarding	AT111
3	T	16/10/2024	02:00	IAT	TR 74:5	IAT	12C	Arrived	AT222
4	S	16/10/2024	12:30	IAT	TR 23:0	LHR	PC	Scheduled	AT223
5	S	16/10/2024	11:00	SAN	TR 1:00	LHR	9A	Deboarding	AS256

Flight_id	Ticket_id	Passenger_id	Passenger_name (DE)	Passenger_name (EN)	Passenger_number	Class
1	1	1	Werner GÖTTSCHE	Werner Götsche	124	Economy
2	1	2	Ulrich GÖTTSCHE	Ulrich Götsche	228	Economy
1	2	3	Ulrich GÖTTSCHE	Ulrich Götsche	224	Economy
2	2	4	Ulrich GÖTTSCHE	Ulrich Götsche	206	Business

  

Passenger						
First_name	Last_name	Birth_date	Height_cm	Gender	Nationality	Passport_number
Jens	Brand	01/12/1960	180	Male	Deutsch	BRD1234567890123456
Zsolt	Chen	05/01/1985	185	Male	Deutsch	CHN1234567890123456
Julian	Elmer	07/07/2005	130	Male	Deutsch	ELM1234567890123456

aircraft					
aircraft_id	airplane_type	pilot_capacity	cabin_crew_capacity	passenger_capacity	
1	1	4	6	234	
2	1	4	6	235	
3	2	4	7	246	
4	3	4	8	240	
5	4	5	8	195	
6	5	4	16	550	
7	6	5	16	550	