



## ER SCHEMA

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type_rating(type_rating_id, rating_name)
aircraft_type_rating(aircraft_type_id, rating_id)
aircraft_manufacturer(aircraft_type_id, manufacturer)
part_of_aircraft(aircraft_type_id, part)
aircraft_type(aircraft_type_id, variant_name, family_id, type_rating_id, manufacturer, max_range)
assigned_type(aircraft_type_id, aircraft_id)
aircraft(aircraft_id, name, capacity, passenger_capacity, economy_passenger_capacity, business_passenger_capacity, economy_passenger_layout, business_passenger_layout)
staff(staff_id, first_name, last_name, birth_date, [language], password_hash, role, rank, gender, nationality)
licensed_mech(staff_id, type_rating_id)
airline(airline_id, name, logo)
dash(dash_id, dash_name)
operating_on(staff_id, flight_id)
flight(flight_id, departure_time, departure_airport, arrival_time, arrival_airport, gate, status, flight_number, boarding_time)
on_board(on_board_id, staff_id, flight_id)
connected_flight(flight_id, ticket_id)
flight_ticket(ticket_id, seat_number, class)
row(ticket_id, seat_number, class)
passenger(passport_number, first_name, last_name, birth_date, gender, nationality, has_allergy, disability, assistance)
guardian(guardian_id, passport_id, child_passport)

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Cardinality	Type	Reason
relation		
part_of	(Concept, Object) MinCard=1, MaxCard=1	An instance family can have more than 1 concept/type but each concept/type can only have one instance family
has_instant	(Type, Entity) MinCard=1, MaxCard=1	Multiple instant types can have a type instant but the instance type must only have 1 single type instant
assigned_to	(Entity, Type) MinCard=1, MaxCard=1	An entity can have multiple types but each type can have only 1 assigned entity
located_in	(Object, Location) MinCard=1, MaxCard=1	A type instant may have many staff who are located in it Many staff can have the same location but they can't have type instant
can_work	(M_dish, M) MinCard=1, MaxCard=1	A dish can have many staff who can cook it A staff could cook more than 1 dish
operating_on	(M_dish, M) MinCard=1, MaxCard=1	A dish can have multiple shifts assigned to it A shift can have many dishes assigned to it at different times
an_instant	(M_dish, Entity) MinCard=1, MaxCard=1	A dish may only have 1 single instant type but the same type instant may have many dishes assigned to it at different times
connected_right	(Right_ticket, Ticket) MinCard=1, MaxCard=1	Right ticket can only be connected with 1 Right ticket but a different Right ticket needs to be issued for each Right ticket
owns_ticket	(Customer, Ticket) MinCard=1, MaxCard=1	A passenger may own multiple Right tickets but each Right ticket can only be owned by 1 passenger
Participation	participation / + total participation	

Relation	Type	Description
part_of	(CrewMember)T(CrewMember,Type)	An <i>aircraft family</i> is a parent and parents must be part of an <i>aircraft egg problem</i> . An <i>aircraft</i> must belong to an <i>aircraft's family</i> .
has_crew	T(CrewMember)T(CrewMember,Type)	A <i>flight rating</i> is a parent and parents must be part of an <i>aircraft egg problem</i> . An <i>aircraft</i> must have a <i>rating type</i> .
assigned_type	T(CrewMember,Type)T(CrewMember,Type)	An <i>aircraft</i> must have a <i>type</i> and <i>type</i> must be assigned to an <i>aircraft</i> . Every <i>aircraft</i> must have a <i>type</i> .
licensed_on	P(CrewMember,Rating,Flight)	Not every <i>rating type</i> has <i>staff</i> who are licensed on it. Not every <i>staff</i> have a <i>license</i> on a <i>rating type</i> .
can_work	P(Staff,CrewMember)	Every <i>flight</i> has a <i>base</i> which staff can work at it. Not every <i>staff</i> can work as a <i>staff member</i> in a <i>flight</i> .
operating_on	T(Flights)T(Flights)	Every <i>flight</i> has a <i>base</i> which staff can work at it. Not every <i>staff</i> is assigned to a <i>flight</i> .
on_aircraft	T(Flights)T(CrewMembers)	Every <i>flight</i> must have an <i>aircraft</i> assigned to it. Not every <i>aircraft</i> is assigned to a <i>flight</i> .
connected_flight	T(Flights,Stops)T(Flights)	Not every <i>flight</i> must be connected to a <i>flight</i> . Every <i>flight</i> must be connected to a <i>flight</i> .
own_ticket	P(Passenger,T(Flight,Ticket))	Not every <i>passenger</i> has a <i>flight ticket</i> . Every <i>flight ticket</i> is owned by a <i>passenger</i> .

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Relational Schema

type (rating_type, rating_id, rating_name)
aircraft (family_id, family_name, max_seating)
aircraft (model_id, model_name, family_id, type_rating_id, max_seats)
aircraft (model_id, max_seats, type_rating_id, plot_capacity, cabin_capacity, economy_passenger_capacity, business_passenger_capacity, economy_passenger_layout, business_passenger_layout)
staff (staff_id, first_name, last_name, birth_date, password_hash, role, rank, gender, nationality)
speaks (language_id, staff_id, rate)
language (language_id, name, region)
con_cook (staff_id, dish_id)
dish (dish_id, dish_name)
disability (disability_id, disability_name)
flight (flight_id, aircraft_id, flight_id)
flight (flight_id, aircraft_id, ticket_id)
connected (flight_id, ticket_id)
flight (flight_id, departure_time, departure_airport, arrival_time, arrival_airport, gate, status, flight_number, boarding_time)
passenger (passenger_id, first_name, last_name, birth_date, gender, nationality, has_allergy, disability, assistance)
guardian (guardian_id, passenger_id, child_passport)

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snapshot		type_rating		aircraft_family		aircraft_type		aircraft	
type	rating	family_id	family_name	model_id	model_name	type_id	type_name	capacity	max_weight
1	S/RS/PEZ	1	SE5	2000	Blériot	1	1	4,000	
2	S/RS/PEZ	2	SPAD	2000	Blériot	2	1	4,000	
3	S/RS/PEZ	3	A.120	2000	Blériot	3	1	4,000	
4	S/RS/PEZ	4	A.120	2000	Blériot	4	2	4,000	
5	S/RS/PEZ	5	A.120	2000	Blériot	5	2	4,000	
6	S/RS/PEZ	6	A.120	2000	Blériot	6	2	4,000	
7	S/RS/PEZ	7	A.120	2000	Blériot	7	1	4,000	
8	S/RS/PEZ	8	A.120	2000	Blériot	8	1	4,000	
9	S/RS/PEZ	9	A.120	2000	Blériot	9	1	4,000	
10	S/RS/PEZ	10	A.120	2000	Blériot	10	1	4,000	
11	S/RS/PEZ	11	A.120	2000	Blériot	11	1	4,000	
12	S/RS/PEZ	12	A.120	2000	Blériot	12	1	4,000	
13	S/RS/PEZ	13	A.120	2000	Blériot	13	1	4,000	
14	S/RS/PEZ	14	A.120	2000	Blériot	14	1	4,000	
15	S/RS/PEZ	15	A.120	2000	Blériot	15	1	4,000	
16	S/RS/PEZ	16	A.120	2000	Blériot	16	1	4,000	
17	S/RS/PEZ	17	A.120	2000	Blériot	17	1	4,000	
18	S/RS/PEZ	18	A.120	2000	Blériot	18	1	4,000	
19	S/RS/PEZ	19	A.120	2000	Blériot	19	1	4,000	
20	S/RS/PEZ	20	A.120	2000	Blériot	20	1	4,000	
21	S/RS/PEZ	21	A.120	2000	Blériot	21	1	4,000	
22	S/RS/PEZ	22	A.120	2000	Blériot	22	1	4,000	
23	S/RS/PEZ	23	A.120	2000	Blériot	23	1	4,000	
24	S/RS/PEZ	24	A.120	2000	Blériot	24	1	4,000	
25	S/RS/PEZ	25	A.120	2000	Blériot	25	1	4,000	
26	S/RS/PEZ	26	A.120	2000	Blériot	26	1	4,000	
27	S/RS/PEZ	27	A.120	2000	Blériot	27	1	4,000	
28	S/RS/PEZ	28	A.120	2000	Blériot	28	1	4,000	
29	S/RS/PEZ	29	A.120	2000	Blériot	29	1	4,000	
30	S/RS/PEZ	30	A.120	2000	Blériot	30	1	4,000	
31	S/RS/PEZ	31	A.120	2000	Blériot	31	1	4,000	
32	S/RS/PEZ	32	A.120	2000	Blériot	32	1	4,000	
33	S/RS/PEZ	33	A.120	2000	Blériot	33	1	4,000	
34	S/RS/PEZ	34	A.120	2000	Blériot	34	1	4,000	
35	S/RS/PEZ	35	A.120	2000	Blériot	35	1	4,000	
36	S/RS/PEZ	36	A.120	2000	Blériot	36	1	4,000	
37	S/RS/PEZ	37	A.120	2000	Blériot	37	1	4,000	
38	S/RS/PEZ	38	A.120	2000	Blériot	38	1	4,000	
39	S/RS/PEZ	39	A.120	2000	Blériot	39	1	4,000	
40	S/RS/PEZ	40	A.120	2000	Blériot	40	1	4,000	
41	S/RS/PEZ	41	A.120	2000	Blériot	41	1	4,000	
42	S/RS/PEZ	42	A.120	2000	Blériot	42	1	4,000	
43	S/RS/PEZ	43	A.120	2000	Blériot	43	1	4,000	
44	S/RS/PEZ	44	A.120	2000	Blériot	44	1	4,000	
45	S/RS/PEZ	45	A.120	2000	Blériot	45	1	4,000	
46	S/RS/PEZ	46	A.120	2000	Blériot	46	1	4,000	
47	S/RS/PEZ	47	A.120	2000	Blériot	47	1	4,000	
48	S/RS/PEZ	48	A.120	2000	Blériot	48	1	4,000	
49	S/RS/PEZ	49	A.120	2000	Blériot	49	1	4,000	
50	S/RS/PEZ	50	A.120	2000	Blériot	50	1	4,000	
51	S/RS/PEZ	51	A.120	2000	Blériot	51	1	4,000	
52	S/RS/PEZ	52	A.120	2000	Blériot	52	1	4,000	
53	S/RS/PEZ	53	A.120	2000	Blériot	53	1	4,000	
54	S/RS/PEZ	54	A.120	2000	Blériot	54	1	4,000	
55	S/RS/PEZ	55	A.120	2000	Blériot	55	1	4,000	
56	S/RS/PEZ	56	A.120	2000	Blériot	56	1	4,000	
57	S/RS/PEZ	57	A.120	2000	Blériot	57	1	4,000	
58	S/RS/PEZ	58	A.120	2000	Blériot	58	1	4,000	
59	S/RS/PEZ	59	A.120	2000	Blériot	59	1	4,000	
60	S/RS/PEZ	60	A.120	2000	Blériot	60	1	4,000	
61	S/RS/PEZ	61	A.120	2000	Blériot	61	1	4,000	
62	S/RS/PEZ	62	A.120	2000	Blériot	62	1	4,000	
63	S/RS/PEZ	63	A.120	2000	Blériot	63	1	4,000	
64	S/RS/PEZ	64	A.120	2000	Blériot	64	1	4,000	
65	S/RS/PEZ	65	A.120	2000	Blériot	65	1	4,000	
66	S/RS/PEZ	66	A.120	2000	Blériot	66	1	4,000	
67	S/RS/PEZ	67	A.120	2000	Blériot	67	1	4,000	
68	S/RS/PEZ	68	A.120	2000	Blériot	68	1	4,000	
69	S/RS/PEZ	69	A.120	2000	Blériot	69	1	4,000	
70	S/RS/PEZ	70	A.120	2000	Blériot	70	1	4,000	
71	S/RS/PEZ	71	A.120	2000	Blériot	71	1	4,000	
72	S/RS/PEZ	72	A.120	2000	Blériot	72	1	4,000	
73	S/RS/PEZ	73	A.120	2000	Blériot	73	1	4,000	
74	S/RS/PEZ	74	A.120	2000	Blériot	74	1	4,000	
75	S/RS/PEZ	75	A.120	2000	Blériot	75	1	4,000	
76	S/RS/PEZ	76	A.120	2000	Blériot	76	1	4,000	
77	S/RS/PEZ	77	A.120	2000	Blériot	77	1	4,000	
78	S/RS/PEZ	78	A.120	2000	Blériot	78	1	4,000	
79	S/RS/PEZ	79	A.120	2000	Blériot	79	1	4,000	
80	S/RS/PEZ	80	A.120	2000	Blériot	80	1	4,000	
81	S/RS/PEZ	81	A.120	2000	Blériot	81	1	4,000	
82	S/RS/PEZ	82	A.120	2000	Blériot	82	1	4,000	
83	S/RS/PEZ	83	A.120	2000	Blériot	83	1	4,000	
84	S/RS/PEZ	84	A.120	2000	Blériot	84	1	4,000	
85	S/RS/PEZ	85	A.120	2000	Blériot	85	1	4,000	
86	S/RS/PEZ	86	A.120	2000	Blériot	86	1	4,000	
87	S/RS/PEZ	87	A.120	2000	Blériot	87	1	4,000	
88	S/RS/PEZ	88	A.120	2000	Blériot	88	1	4,000	
89	S/RS/PEZ	89	A.120	2000	Blériot	89	1	4,000	
90	S/RS/PEZ	90	A.120	2000	Blériot	90	1	4,000	
91	S/RS/PEZ	91	A.120	2000	Blériot	91	1	4,000	
92	S/RS/PEZ	92	A.120	2000	Blériot	92	1	4,000	
93	S/RS/PEZ	93	A.120	2000	Blériot	93	1	4,000	
94	S/RS/PEZ	94	A.120	2000	Blériot	94	1	4,000	
95	S/RS/PEZ	95	A.120	2000	Blériot	95	1	4,000	
96	S/RS/PEZ	96	A.120	2000	Blériot	96	1	4,000	
97	S/RS/PEZ	97	A.120	2000	Blériot	97	1	4,000	
98	S/RS/PEZ	98	A.120	2000	Blériot	98	1	4,000	
99	S/RS/PEZ	99	A.120	2000	Blériot	99	1	4,000	
100	S/RS/PEZ	100	A.120	2000	Blériot	100	1	4,000	

staff_id	first_name	last_name	birth_date	passport_number	role	rank	gender	nationality
1	Sergio	Blanco	1984-12-01	S1234567890	Pilot	Junior	Male	Turkish
2	Jean	Bauer	1978-05-15	N1234567890	Captain	Senior	Female	American
3	John	Doe	1962-08-20	S2345678901	Cook	Junior	Male	Turkish
4	Isabella	Kapoor	2000-07-29	S2345678902	Cook	Junior	Female	Turkish
5	Zane	Hector	2004-07-15	S2345678903	Cook	Junior	Male	Turkish

<u>staff_id</u>	<u>language</u>	<u>staff_id</u>	<u>type_rating_id</u>	<u>staff_id</u>	<u>dish_id</u>	<u>staff_id</u>	<u>flight_id</u>
1	English	1	1	1	1	1	1
1	Turkish	1	2	1	2	1	2
2	French	2	1	2	1	2	1

flight	airline	origin	date	departure_time	arrival_time	arrival_airport	gate	status	flight_number	last_update
2	Delta	ATL	2024-05-10	08:00	09:30	BOS	12A	Arrived	DA2	2024-05-10T08:00:00Z
2	Delta	ATL	2024-05-10	08:30	09:45	BOS	12B	Boarding	DA11	2024-05-10T08:30:00Z
3	Delta	ATL	2024-05-10	09:00	10:30	CDG	10C	Arrived	DA23	2024-05-10T09:00:00Z
5	Delta	ATL	2024-05-10	11:00	12:00	CDG	10D	Scheduled	DA25	2024-05-10T11:00:00Z

connected_flight		flight_ticket			
Flight_Id	Ticket_Id	Ticket_Id	Passport_Number (PK)	Seat_Number	Class
1	1111111111	1111111111	10466666666664	12A	Economy
1	2222222222	2222222222	10466666666664	24B	Economy
2	3333333333	3333333333	9461666666664	32A	Economy
2	6666666666	4444444444	9461666666664	01C	Business

passenger							
passenger_id	first_name	last_name	birth_date	gender	home_address	city_hometown	nationality
P0234	Blond	Brian	01/02/1968	Male	yes, well-known	yes, well-known	Turkish
P05678	Diane	Clare	21/07/1978	Female	no	yes, dead	Turkish
P07236	Jackie	Chan	02/01/1970	Male	yes, well-known	yes, well-known	Turkish
P04311	Johannes	Keppler	14/7/2000	Male	no	no	Turkish
P01237	Ivana	Levina	07/02/2000	Male	no	no	Turkish

guardian	child_passport
guardian_passport	
N1289	NR177
N1289	NR678
N7926	NR177
N7926	NR678