Aufgabe 1: Dimensionen und Fakten

Facts (Numerical measures that can be aggregated):

```
Air_Time (minutes)
Elapsed_Time (minutes)
Scheduled_Time (minutes)
Taxi_Out (minutes)
Taxi_In (minutes)

Distance (miles)

Departure_Delay (minutes)
Arrival_Delay (minutes)
Air_System_Delay (minutes)
Security_Delay (minutes)
Airline_Delay (minutes)
Late_Aircraft_Delay (minutes)
Weather_Delay (minutes)
```

Dimensions

Time Dimension (Temporal Hierarchy):

```
Year
Month
Day
Day_of_Week
Scheduled_Departure
Scheduled_Arrival
Wheels_On
Wheels_Off
Arrival_Time
```

Airline Dimension:

```
IATA_CODE (Identifier)
Airline (Name)
```

Flight Dimension:

```
Flight_ID
Flight_Number
Tail_Number
```
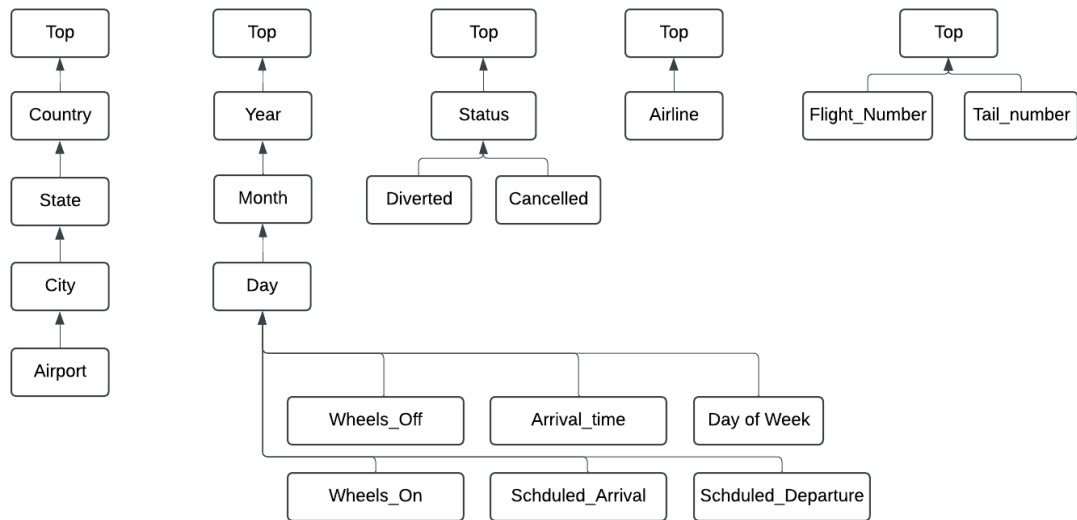
Flight Status Dimension:

```
Diverted
Cancelled
```

Airport Dimension:

```
IATA_CODE (Location Identifier)
Airport (Name)
Latitude
Longitude
City
```
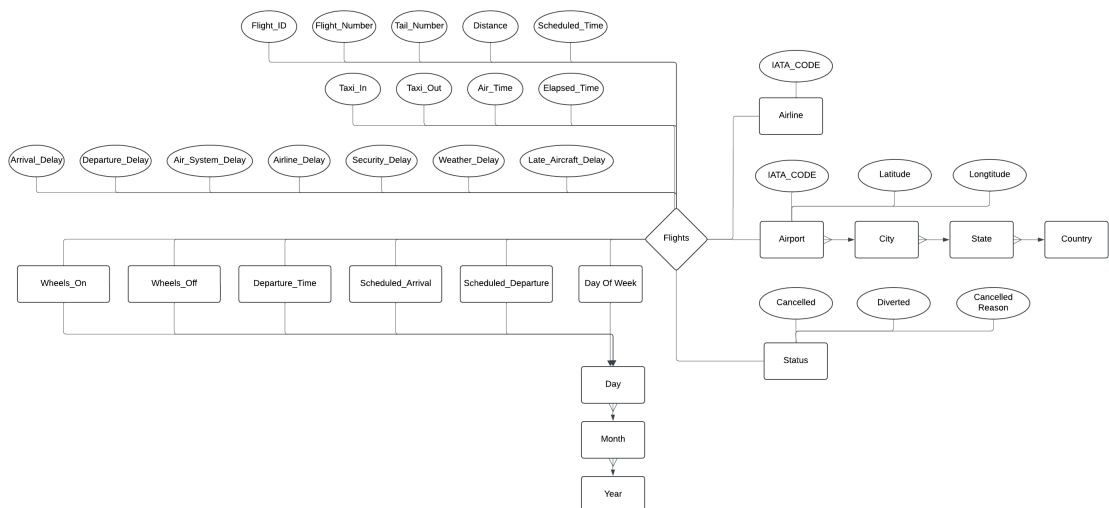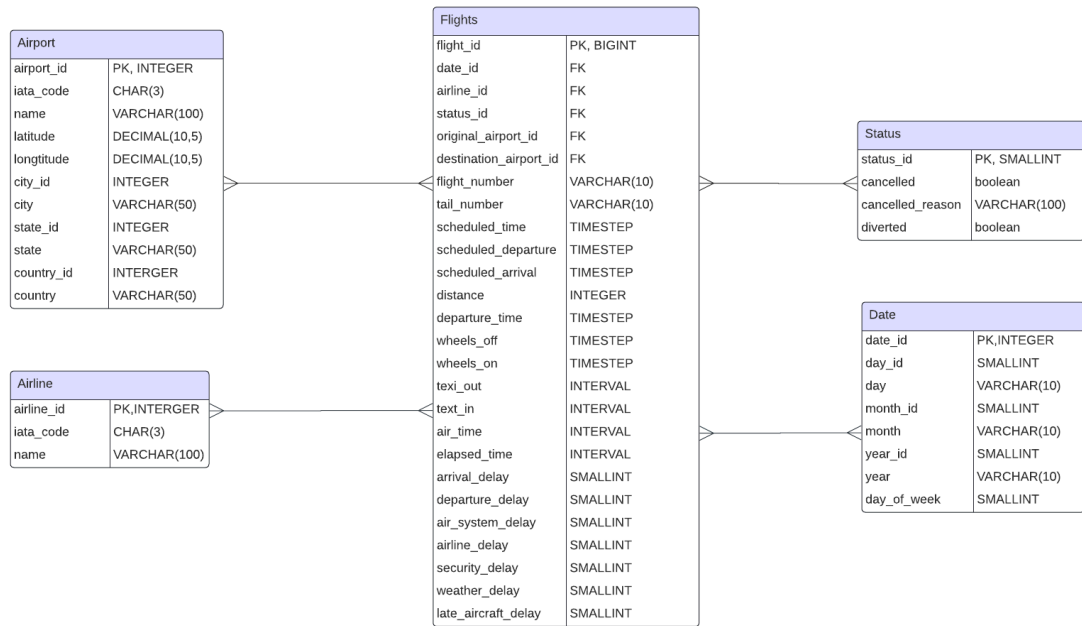
```
State
Country
```

Dimension Schema:

Aufgabe 2: Konzeptionelle M/ER Modell

Conceptual Model:

Aufgabe 3: Logical Model

Logical Model:

Airport	
airport_id	PK, INTEGER
iata_code	CHAR(3)
name	VARCHAR(100)
latitude	DECIMAL(10,5)
longtitude	DECIMAL(10,5)
city_id	INTEGER
city	VARCHAR(50)
state_id	INTEGER
state	VARCHAR(50)
country_id	INTERGER
country	VARCHAR(50)

Airline	
airline_id	PK,INTERGER
iata_code	CHAR(3)
name	VARCHAR(100)

Flights	
flight_id	PK, BIGINT
date_id	FK
airline_id	FK
status_id	FK
original_airport_id	FK
destination_airport_id	FK
flight_number	VARCHAR(10)
tail_number	VARCHAR(10)
scheduled_time	TIMESTEP
scheduled_departure	TIMESTEP
scheduled_arrival	TIMESTEP
distance	INTEGER
departure_time	TIMESTEP
wheels_off	TIMESTEP
wheels_on	TIMESTEP
texi_out	INTERVAL
text_in	INTERVAL
air_time	INTERVAL
elapsed_time	INTERVAL
arrival_delay	SMALLINT
departure_delay	SMALLINT
air_system_delay	SMALLINT
airline_delay	SMALLINT
security_delay	SMALLINT
weather_delay	SMALLINT
late_aircraft_delay	SMALLINT

Status	
status_id	PK, SMALLINT
cancelled	boolean
cancelled_reason	VARCHAR(100)
diverted	boolean

Date	
date_id	PK,INTEGER
day_id	SMALLINT
day	VARCHAR(10)
month_id	SMALLINT
month	VARCHAR(10)
year_id	SMALLINT
year	VARCHAR(10)
day_of_week	SMALLINT

Aufgabe 4: RelationaleTabellen (DDL Statements)

```sql
-- Date dimension
CREATE DIMENSION time_dim
    LEVEL day IS (
        dim_date.day_id,
        dim_date.day
    )
    LEVEL month IS (
        dim_date.month_id,
        dim_date.month
    )
    LEVEL quarter IS (
        TRUNC((dim_date.month_id-1)/3) + 1 AS quarter_id,
        'Q' || TO_CHAR(TRUNC((dim_date.month_id-1)/3) + 1) AS quarter
    )
    LEVEL year IS (
        dim_date.year_id,
        dim_date.year
    )
    HIERARCHY time_rollup (
        day     CHILD OF
        month   CHILD OF
        quarter CHILD OF
        year
    );

-- Airport dimension
CREATE DIMENSION location_dim
    LEVEL city IS (
        dim_airport.city_id,
        dim_airport.city
    )
    LEVEL state IS (
        dim_airport.state_id,
        dim_airport.state
    )
    LEVEL country IS (
```

```sql
        dim_airport.country_id,
        dim_airport.country
    )
    HIERARCHY geo_rollup (
        city   CHILD OF
        state  CHILD OF
        country
    );

-- date dimension tables
CREATE TABLE dim_date (
    date_id INTEGER PRIMARY KEY,
    day_id SMALLINT,
    day VARCHAR(10),
    month_id SMALLINT,
    month VARCHAR(10),
    year_id SMALLINT,
    year VARCHAR(10),
    day_of_week SMALLINT
);

-- fact table
CREATE TABLE fact_flights (
    flight_id BIGINT PRIMARY KEY,
    date_id INTEGER REFERENCES dim_date(date_id),
    airline_id INTEGER REFERENCES dim_airline(airline_id),
    status_id SMALLINT REFERENCES dim_status(status_id),
    original_airport_id INTEGER REFERENCES dim_airport(airport_id),
    destination_airport_id INTEGER REFERENCES dim_airport(airport_id),
    flight_number VARCHAR(10),
    tail_number VARCHAR(10),
    scheduled_time TIMESTEP,
    scheduled_departure TIMESTEP,
    scheduled_arrival TIMESTEP,
    distance INTEGER,
    departure_time TIMESTEP,
    wheels_off TIMESTEP,
    wheels_on TIMESTEP,
    taxi_out INTERVAL,
    taxi_in INTERVAL,
    air_time INTERVAL,
    elapsed_time INTERVAL,
    arrival_delay SMALLINT,
    departure_delay SMALLINT,
    air_system_delay SMALLINT,
    airline_delay SMALLINT,
    security_delay SMALLINT,
    weather_delay SMALLINT,
    late_aircraft_delay SMALLINT,
    DIMENSION time_dim REFERENCES date_id,
    DIMENSION location_dim REFERENCES original_airport_id
);

--declare the dimension tables
ALTER DIMENSION time_dim
    DETERMINE day BY (day_id, day)
    DETERMINE month BY (month_id, month)
    DETERMINE quarter BY (quarter_id, quarter)
    DETERMINE year BY (year_id, year);

ALTER DIMENSION location_dim
    DETERMINE city BY (city_id, city)
```

```
DETERMINE state BY (state_id, state)
DETERMINE country BY (country_id, country);
```