```sql
-- refresh statistics
analyze table flights, airlines,
airplanes,airports,countries,flight_number_codeshare,flight_numbers,statuses;
-- show occupied space
SELECT table_schema "DB Name", '*' as "table_name",
   sum(data_length) AS "data", sum(index_length) AS "index",
   ROUND((sum(data_length) + sum(index_length)) / 1024 / 1024, 1) "Size in MB"
FROM information_schema.tables
WHERE table_schema='flropt'
UNION
SELECT table_schema, table_name, data_length, index_length,
        ROUND((data_length + index_length) / 1024 / 1024, 1)
FROM information_schema.tables
WHERE table_schema='flropt';
```

```sql
-- Part1,1.
explain
-- analyze
-- 0.325 sec -- 0.051 sec
select * from flights where flight_number_id=146225;
```

```sql
-- Part1,2.
explain
select * from flight_numbers
WHERE flight_number_id=127;
```

```sql
-- Part1,3.
select * from flight_numbers
WHERE flight_number='DL9411';
```

```sql
-- Part1,5.
-- 2.363 -- 0.786
explain
-- analyze
select count(1) c, countries.country from flights
join airports on flights.airport_dest=airports.code
join countries on airports.country_code=countries.country_code
group by airports.country_code
-- group by countries.country_code
-- group by countries.country
order by c desc
limit 5;
```

```sql
-- Part1,5a.
-- 2.640 sec, 0.942 sec
explain
select count(1) c, country, country_code from (
  select countries.country, countries.country_code from flights
  join airports on flights.airport_dest=airports.code
  join countries on airports.country_code=countries.country_code
) t
group by country
order by c desc
limit 5;
```

```sql
-- Part1,6.
-- 0.403 sec, 0.123
explain
-- analyze
SELECT COUNT(1) C,airlines.airline_name FROM flights
JOIN airlines on flights.airline_code=airlines.airline_code
JOIN statuses on flights.airport_orig_status_id = statuses.status_id
-- where flights.airport_orig_status_id=10
 where status='canceled'
group by flights.airline_code
order by c desc limit 5;
```

```sql
-- =====
```

```sql
-- Part2,1.
-- 0.259, 0.025
-- explain
SELECT airport_orig_schedule_time, flight_number, countries.country as
dest_country, airlines.airline_name, statuses.status FROM flights
JOIN flight_numbers ON flights.flight_number_id=flight_numbers.flight_number_id
JOIN airports on flights.airport_dest=airports.code
JOIN countries on airports.country_code=countries.country_code
JOIN airlines on flights.airline_code=airlines.airline_code
JOIN statuses on flights.airport_orig_status_id=statuses.status_id
JOIN airports airports_orig on flights.airport_orig=airports_orig.code
WHERE airports_orig.city='lisbon'
and airport_orig_schedule_time between '2022-01-01 11:00' and '2022-01-01
13:59:59.9'
ORDER BY airport_orig_schedule_time;
```

```sql
-- Part2,2.
-- 0.286(0.484) -- (0.114)
-- explain
select flight_number, airplane_model,
airports_orig.name, airport_orig_schedule_time,
airports_dest.name, airport_dest_schedule_time
from flights
JOIN flight_numbers ON flights.flight_number_id=flight_numbers.flight_number_id
join airplanes on flights.airplane_reg=airplanes.airplane_reg
join airlines on airplanes.airline_code=airlines.airline_code
JOIN airports airports_orig on flights.airport_orig=airports_orig.code
JOIN airports airports_dest on flights.airport_dest=airports_dest.code
WHERE airport_orig_status_time<='2022-01-12 10:00' and
airport_dest_status_time>='2022-01-12 10:00'
-- and airlines.airline_name like 'TAP%'
;
```

```sql
-- Part2,3.
-- explain
select min(airport_orig_schedule_time) min_time,
max(airport_orig_schedule_time) max_time,
airports.name,
count(1) as num_flights,
 round((count(case when statuses.status='departed' then null else 1
end)/count(1))*100) as per_canc
-- round((sum(not statuses.status='departed')/count(1))*100) as per_canc
from flights
join statuses on flights.airport_orig_status_id=statuses.status_id
join airports on flights.airport_orig=airports.code
where airport_orig_schedule_time between
  DATE_SUB('2022-01-20 10:00', interval 1 week) and '2022-01-20 10:00'
group by flights.airport_orig;
```