

--Streda 7:15 Varianta A, Treti priklad

```
SELECT
m.substance_id,s.substance_name,m.station_id,st.station_name,m.temperature,m.meas_date
FROM (SELECT * FROM test.measurement m WHERE m.meas_date LIKE '____01%' OR
m.meas_date LIKE '____02%' OR m.meas_date LIKE '____03%' ) m
JOIN test.substance s ON s.substance_id = m.substance_id
JOIN test.station st ON st.station_id = m.station_id
WHERE m.concentration >= (
SELECT MAX(m1.concentration)
FROM (SELECT * FROM test.measurement m1 WHERE m1.meas_date LIKE '____01%' OR
m1.meas_date LIKE '____02%' OR m1.meas_date LIKE '____03%') m1
WHERE m.substance_id = m1.substance_id )
ORDER BY m.substance_id
```

-- Vypiste vsechny dvojice station_id substance_id kde doslo k prekročení limitu dané látky na dané stanici alespon vdevíti různých měsících.

```
SELECT m.station_id, m.substance_id, COUNT(DISTINCT MONTH(m.meas_date)) as prekročení
FROM test.measurement as m
LEFT JOIN test.substance as s ON m.substance_id = s.substance_id
WHERE m.concentration > s.limit
GROUP BY station_id, m.substance_id
HAVING COUNT(DISTINCT MONTH(meas_date)) >= 9;
```

-- Pro každou stanici v Ostravě naleznete záznam(y) v tabulce measurement,
-- který představuje nejvyšší naměřenou koncentraci oxidu uhelnatého v "databázi"
stanice.
-- Berte do úvahy pouze měření, kde byla teplota pod 10 stupňů
--Pozn.: substance_name je napsaný jako Oxid uhelnatý CO (2 mezery místo jedné jako u
zbytku)

```
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit
```

```

SELECT s.station_name, MAX(m.concentration)
FROM test.station s
    LEFT JOIN test.measurement m ON s.station_id = m.station_id
WHERE s.city_id = (SELECT city_id FROM test.city WHERE city_name = 'Ostrava')
AND m.substance_id = (SELECT substance_id FROM test.substance WHERE substance_name =
'Oxid uhelnatý CO')
AND m.temperature < 10
GROUP BY s.station_name;

```

/* Ke každé stanici vypište název látky (nebo látek), která při měření nejčastěji překročila povolený limit. Vypište vždy dvojici (název stanice, název látky) */

/* Nechybi nikde něco jako measurement.concentration >= substance.limit? */

```

SELECT st.station_name, su.substance_name
FROM test.station st
    LEFT JOIN test.measurement me ON st.station_id = me.station_id
    LEFT JOIN test.substance su ON me.substance_id = su.substance_id
GROUP BY st.station_id, st.station_name, me.substance_id, su.substance_name
HAVING COUNT(me.substance_id) >= ALL
(
    SELECT COUNT(*)
    FROM test.measurement me_in
    WHERE me_in.station_id = st.station_id
    GROUP BY me_in.substance_id
)

```

-- vypsat vsechny dvojice (station_id, substance_id), kde doslo k prekročení limitu koncentrace dané látky na dané stanici aspon v devíti různých měsících

```

SELECT station_id, m.substance_id, COUNT(distinct month(meas_date))
FROM test.measurement m
JOIN test.substance s on m.substance_id = s.substance_id
WHERE m.concentration > s.limit
GROUP BY station_id, m.substance_id
HAVING COUNT(DISTINCT MONTH(meas_date)) >= 9

```

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
    INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```

-- najdete stanice, kde v mesici unor nedoslo k prekročení koncentrace latky
Poletaveho prachu PM10

```
SELECT * FROM test.station WHERE station_id NOT IN (SELECT me.station_id
FROM test.measurement me
JOIN test.substance su ON me.substance_id = su.substance_id
WHERE MONTH(me.meas_date) = 2
AND su.substance_name = 'Polétavý prach PM10'
AND me.concentration >= su.limit)
```

```
select * from test.station
except
select stat.* from test.station stat
join test.measurement meas on stat.station_id = meas.station_id
join test.substance sub on sub.substance_id = meas.substance_id
where sub.limit < meas.concentration and
MONTH(meas.meas_date) = 2 and
sub.substance_name = 'Polétavý prach PM10'
```

```
SELECT *
FROM test.station st1
WHERE st1.station_id NOT IN (
SELECT DISTINCT(st.station_id)
FROM test.station st
LEFT JOIN test.measurement me ON st.station_id = me.station_id
LEFT JOIN test.substance su ON su.substance_id = me.substance_id
WHERE su.substance_name = 'Polétavý prach PM10'
AND MONTH(me.meas_date) = 2
AND me.concentration > su.limit
)
```

```
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit
```

```
select st2.station_id from test.station st2 --stanice
```

```
except --bez
```

```
select st.station_id from test.station st --stanice kde byl překročen limit v unoru  
--pro poletavý prach
```

```
left join test.measurement me on me.station_id = st.station_id
```

```
left join test.substance su on su.substance_id = me.substance_id
```

```
where MONTH(me.meas_date) = 2 and me.concentration > su.limit and su.substance_name =  
'Polétavý prach PM10'
```

```
-- najdete latky u kterých koncentrace překročila limit v kvetnu SOUCASNE na stanicich  
id 1 a 2
```

```
/* Ke každé stanici vypište kolikrát byla v prvním čtvrtletí roku 2017 naměřena  
hodnota polétavého prachu PM10, která přesahuje povolený limit */
```

```
SELECT *,
```

```
(
```

```
    SELECT COUNT(*)
```

```
    FROM test.measurement me
```

```
        JOIN test.substance su ON me.substance_id = su.substance_id
```

```
        WHERE MONTH(me.meas_date) BETWEEN 1 AND 3 -- chceme data pro první čtvrtletí
```

```
... tedy leden, únor, březen
```

```
        AND YEAR(me.meas_date) = 2017 -- roku 2017
```

```
SELECT su.substance_name
```

```
FROM test.measurement me
```

```
JOIN test.substance su
```

```
ON me.substance_id = su.substance_id
```

```
AND MONTH(me.meas_date) = 5
```

```
WHERE me.station_id = 1
```

```
AND me.concentration >= su.limit
```

```
    INTERSECT
```

```
SELECT su.substance_name
```

```
FROM test.measurement me
```

```
JOIN test.substance su
```

```
ON me.substance_id = su.substance_id
```

```
AND MONTH(me.meas_date) = 5
```

```
WHERE me.station_id = 2
```

```
AND me.concentration >= su.limit
```

```

        AND su.substance_name = 'Polétavý prach PM10' -- zajímá nás pouze
polétavý prach
        AND me.concentration > su.limit    -- kde naměřená koncentrace je větší
než povolený limit
        AND me.station_id = st.station_id
) 'pocet prekroceni'
FROM test.station st

```

KAM ZMIZELO ZADÁNÍ!?

-> SNAD JE TO TOHLE

```

/* Ke každému městu vypište vždy počet příslušných měřicích stanic,
počet průmyslových zdrojů znečištění
a počet zdrojů znečištění typu 'Lokální topeniště' */

```

```

SELECT *,
(
    SELECT COUNT(*)
    FROM test.station st
    WHERE st.city_id = ci.city_id
) 'pocet stanic',
(
    SELECT COUNT(*)
    FROM test.source so
    WHERE so.source_type = 'Prumysl'
        AND so.city_id = ci.city_id
) 'zdroj prumysl',
(
    SELECT COUNT(*)
    FROM test.source so
    WHERE so.source_type = 'Lokální topeniště'
        AND so.city_id = ci.city_id
) 'zdroj lokalni topeniste'
FROM test.city ci

```

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```

/*kolikrát byl překročen limit substance na stanici o více jak 20% a o více jak 50%*/

```
SELECT st.station_name,su.substance_name,
(
SELECT COUNT(*) as pocet20
FROM test.measurement me
WHERE su.substance_id = me.substance_id
AND st.station_id = me.station_id
AND me.concentration / limit * 100 > 120
)'pocet_20',
(
SELECT COUNT(*) pocet50
FROM test.measurement me
WHERE su.substance_id = me.substance_id
AND st.station_id = me.station_id
AND me.concentration / limit * 100 > 150
)'pocet_50'
FROM test.substance su, test.station st
ORDER BY pocet_20 DESC
```

/* Ke každé látce vypište průměr naměřené koncentrace ze všech měření. Ke každé látce dále vypište buď 'překroceno', 'nepřekroceno' v závislosti na tom, zda průměr překročil nebo nepřekročil povolený limit */

```
SELECT su.substance_id, su.substance_name, su.limit, me.prumer, me.stav
FROM test.substance su
LEFT JOIN
(
SELECT me2.substance_id, AVG(me2.concentration) prumer, 'překroceno' stav
FROM test.measurement me2
JOIN test.substance su2 ON me2.substance_id = su2.substance_id
GROUP BY me2.substance_id, su2.limit
HAVING AVG(me2.concentration) > su2.limit
UNION
SELECT me2.substance_id, AVG(me2.concentration) prumer, 'nepřekroceno'
stav
FROM test.measurement me2
```

```
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit
```

```

        JOIN test.substance su2 ON me2.substance_id = su2.substance_id
    GROUP BY me2.substance_id, su2.limit
    HAVING AVG(me2.concentration) <= su2.limit
) me ON su.substance_id = me.substance_id

```

-- další možné řešení, využívá konstrukci CASE, ta ale nebyla v předmětu probrána

```

SELECT su.substance_id, su.substance_name, su.limit, me.prumer,
       CASE
           WHEN me.prumer > su.limit THEN 'prekroceno'
           WHEN me.prumer <= su.limit THEN 'neprekroceno'
       END 'stav'
FROM test.substance su
LEFT JOIN
(
    SELECT me2.substance_id, AVG(me2.concentration) prumer
    FROM test.measurement me2
    GROUP BY me2.substance_id
) me ON su.substance_id = me.substance_id

```

**/*nalezněte stanice, které jsou umístěny v městech s minimálně
4 průmyslovými znečišťovateli a minimálně 3 lokálními znečišťovateli*/**

```

SELECT station_name
FROM test.source so
JOIN test.city ci ON so.city_id=ci.city_id AND source_type='Prumysl'
JOIN test.station st ON st.city_id=ci.city_id
GROUP BY station_name
HAVING COUNT(*) >=4

```

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```

```

INTERSECT
SELECT station_name
FROM test.source so
JOIN test.city ci ON so.city_id=ci.city_id AND source_type='Lokální topeniště'
JOIN test.station st ON st.city_id=ci.city_id
GROUP BY station_name
HAVING COUNT(*) >=3

```

*/*Vyber stanici, která měla nejvyšší počet překročení PM10, která se nachází v městě s minimálně 3 průmyslovými znečišťovateli*/*

```

SELECT station_name
FROM test.measurement me
JOIN test.station st
ON st.station_id=me.station_id
JOIN test.substance su
ON su.substance_id=me.substance_id
WHERE st.station_id IN (SELECT station_id
                        FROM test.station st
                        JOIN test.city ci
                        ON ci.city_id=st.city_id
                        JOIN test.source so
                        ON so.city_id=ci.city_id
                        WHERE source_type='Prumysl'
                        GROUP BY st.station_id
                        HAVING COUNT(*)>3)
AND substance_name='Polétavý prach PM10'
AND concentration>limit
GROUP BY station_name
HAVING COUNT(*) >= ALL (SELECT COUNT(*)
                        FROM test.measurement me_in

```

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```

```

JOIN test.station st
ON st.station_id=me_in.station_id
JOIN test.substance su
ON su.substance_id=me_in.substance_id
WHERE st.station_id IN (SELECT station_id
                        FROM test.station st
                        JOIN test.city ci
                        ON ci.city_id=st.city_id
                        JOIN test.source so
                        ON so.city_id=ci.city_id
                        WHERE source_type='Prumysl'
                        GROUP BY st.station_id
                        HAVING COUNT(*)>3)
AND substance_name='Polétavý prach PM10'
AND concentration>limit
GROUP BY station_name)

```

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```

--vypíše maximální počet záznamů v tabulce measurement seskupeno podle stanice
--Kez by to tam bylo :D (y)

```
(SELECT station_id, COUNT(*) pocet
FROM test.measurement
GROUP BY station_id) x
```

**/*vypišťe stanice které mají vyvýšení nad 20 metrů a počet záznamů pod
li<https://pastebin.com/T712Jhqdfbclid=IwAR3rwBqwsGhWAZ9j0MQ0IP5qAP4XVccikkUMUb5700zUhEP1DXdIYhNhs30>mit větší než nad limit*/**

```
SELECT station_name
FROM test.station st
WHERE elevation>20
AND (
    SELECT COUNT(*) pocet
    FROM test.measurement me
    JOIN test.substance su ON su.substance_id=me.substance_id
    WHERE concentration>limit
    AND st.station_id=me.station_id
)
<
(
    SELECT COUNT(*) pocet
    FROM test.measurement me
    JOIN test.substance su ON su.substance_id=me.substance_id
    WHERE concentration<limit
    AND st.station_id=me.station_id
)
```

--Příklady--

--Nalezněte města, kde u žádné stanice v daném městě nedošlo v červnu k
--situaci, že by více než polovina měření měla nadlimitní koncentraci látek.
--Jinými slovy u každé stanice v daném městě v červnu nepřevažují nadlimitními
--měření

```
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit
```

--Pro každou látku vypíšte stanici, která měla v dubnu nejvyšší koncentraci
--dané látky. Vypíšte (substance_id, substance_name, station_id, station_name)
--a seřadíte podle substance_id.

--Naleznete stanice, kde došlo v březnu k překročení limitu častěji u
--poléťavého prachu PM10 než u prachu PM2,5.

--Riešenie--

/* streda 10:45 A

2. Naleznete vsechny stanice, kde soucasne platí, ze v srpnu byla:

- prumerna koncentrace mereni PM10 vetsi nez 40, a zaroven
- nejvyssi teplota mereni byla vetsi nez 45.

Pokud u stanice nebylo v srpnu provedeno mereni PM10, pak stanici ignorujte.
(12 bodu)

*/

```
select st.station_id, st.station_name
from test.station st
where
    exists(

        select *
        from test.measurement m
        left join test.substance sub on m.substance_id = sub.substance_id
        where MONTH(m.meas_date)=8 and
              m.temperature>45 and
              m.station_id=st.station_id

    )
and (
    select AVG(m.concentration)
    from test.measurement m
    left join test.substance sub on m.substance_id = sub.substance_id
    where MONTH(m.meas_date)=8 and
          sub.substance_name='Poléťavý prach PM10' and
          m.station_id=st.station_id

    )>40
```

```
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit
```

--Pro každou látku nalezněte měření v rámci měsíců ledna, února a března, kde byla koncentrace látky nejvyšší.
--Vypište (substance id, substance name, station id, station name, temperature, meas date) a seřadte podle substance id

```
select sub.substance_id, sub.substance_name, st.station_id, st.station_name,
meas.temperature, meas.meas_date
from test.substance sub
left join test.measurement meas on meas.substance_id = sub.substance_id and
                                month(meas.meas_date) between 1 and 3
                                and meas.concentration >= (
                                    select max(m.concentration)
                                    from test.measurement m
                                    where sub.substance_id = m.substance_id
and
                                month(m.meas_date) between 1 and
3)
left join test.station st on st.station_id = meas.station_id
order by substance_id
```

```
/*
2) Pro každou stanici, která je ve městě s alespon dvěma lokálními topeništi,
spočítejte následující:
    * průměrná koncentrace PM10
    * Průměrná koncentrace PM2.5
3) Nalezněte látky, u kterých v lednu nikdy nedošlo k překročení koncentrace
limitu na stanici v Brně s výškou nad 20
*/
```

2)

```
select s1.station_id, t1.[Prumer PM10], t2.[Prumer PM2.5]
```

```
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit
```

```

from test.station s1 join test.city c1 on c1.city_id = s1.city_id join
test.source sol on sol.city_id = c1.city_id
join(
    select s2.station_id, avg(m2.concentration) as 'Prumer PM10'
    from test.station s2 join test.measurement m2 on s2.station_id =
m2.station_id join test.substance su2 on su2.substance_id = m2.substance_id
    where su2.substance_name = 'Polétavý prach PM10'
    group by s2.station_id
)t1 on s1.station_id = t1.station_id
join(
    select s2.station_id, avg(m2.concentration) as 'Prumer PM2.5'
    from test.station s2 join test.measurement m2 on s2.station_id =
m2.station_id join test.substance su2 on su2.substance_id = m2.substance_id
    where su2.substance_name = 'Polétavý prach PM2,5'
    group by s2.station_id
)t2 on s1.station_id = t2.station_id
where sol.source_type = 'Lokální topenište'
group by s1.station_id, t1.[Prumer PM10], t2.[Prumer PM2.5]
having count(*) >= 2

```

```

3)
select su.substance_id, su.substance_name, su.limit
from test.substance su
where su.substance_id not in (
    select sul.substance_id
    from test.substance sul join test.measurement m1 on
sul.substance_id = m1.substance_id join test.station s1 on s1.station_id =
m1.station_id join test.city c1 on c1.city_id = s1.city_id
    where month(m1.meas_date) = 1 and c1.city_name = 'Brno' and
m1.concentration > sul.limit and s1.elevation > 20 and su.substance_id =
sul.substance_id)

```

První test na SELECT říjen 2019

Zadání

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```

```

SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 1
AND me.concentration >= su.limit
INTERSECT
SELECT su.substance_name
FROM test.measurement me
JOIN test.substance su
ON me.substance_id = su.substance_id
AND MONTH(me.meas_date) = 5
WHERE me.station_id = 2
AND me.concentration >= su.limit

```