```
--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

-- Vypište všechny dvojice station_id substance_id kde došlo k překročení limitu dané
látky na dané stanici alespoň vdevíti různých měsících.

SELECT m.station_id, m.substance_i d, COUNT(DISTINCT MONTH(m.meas_date)) as prekroceni
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 nalezněte 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
```

```sql
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 nekde neco 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 prekroceni limitu
koncentrace danné látky na danné stanici aspon v deviti ruznych mesicich

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
```

```sql
-- najdete stanice, kde v mesici unor nedoslo k prekroceni 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 kterych koncentrace prekrocila 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 měřících 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 'prekroceno', 'neprekroceno' 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, 'prekroceno' 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, 'neprekroceno'
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 znečišťovately a minimálně 3 lokálnimi 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


/*vypiště stanice které mají vyvýšení nad 20 metrů a počet záznamů pod
lihttps://pastebin.com/T712Jhqd?fbclid=IwAR3rwBqwsGhWAz9j0MQ0IP5qAP4XVccikkUMUb
57O0zUhEPlDXdIYhNhs30mit 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
       )

--Príklady--
--------------------------------------------------------------------------
--Nalezněte města, kde u žádne 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
--meření

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 vypište stanici, kteerá měla v dubnu nejvyšší koncentraci
--dané látky. Vypište (substance_id, substance_name, station_id, station_name)
--a setřiďte podle substance_id.

--Nalezňete stanice, kde došlo v březnu k překročení limitu častěji u
--polétavého prachu PM10 než u prachu PM2,5.
-------------------------------------------------------------------------
--Riešenie--

/* streda 10:45 A
2. Naleznete vsechny stanice, kde soucasne platı, ze v srpnu byla:
• prumerna koncentrace merenı PM10 vetsı nez 40, a zaroven
• nejvyssı teplota merenı byla vetsı nez 45.
Pokud u stanice nebylo v srpnu provedeno merenı 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='Polétavý 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 měřenı´ v rámci měsı´ců ledna, února a března, kde
byla koncentrace látky nejvyššı´.
--Vypište (substance id, substance name, station id, station name, temperature,
meas date) a seřad’te 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_ido


/*
2) Pro každou stanici, která je ve městě s alespon dvěma lokálními topeništi,
spočitejte nasledujici:
      * pruměrna koncentrace PM10
      * Pruměrna 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 so1 on so1.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 so1.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 su1.substance_id
            from test.substance su1 join test.measurement m1 on
su1.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 > su1.limit and s1.elevation > 20 and su.substance_id =
su1.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
```