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“Київський політехнічний інститут”  
Кафедра АСОІУ

ЗВІТ  
про виконання контрольної роботи  
з дисципліни  
“Програмне застосування баз даних”  
Тема: Запити з використанням PIVOT UNPIVOT

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## Постановка завдання

```
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Mercedes', 53, 'March');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'BMW', 64, 'December');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Range Rover', 33, 'October');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Land Rover', 75, 'August');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Volkswagen', 12, 'June');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'BMW', 5, 'March');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Audi', 1, 'April');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Toyota', 5, 'June');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Land Rover', 5, 'December');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Edward', 'Lanos', 61, 'March');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Mercedes', 6, 'July');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'BMW', 2, 'April');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Range Rover', 19, 'December');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Land Rover', 4, 'April');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Volkswagen', 56, 'July');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Range Rover', 5, 'July');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Audi', 23, 'August');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Toyota', 2, 'May');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Lanos', 61, 'March');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Mark', 'Lanos', 3, 'May');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Volkswagen', 24, 'February');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Audi', 51, 'February');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Toyota', 10, 'April');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Lanos', 1, 'February');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Mercedes', 6, 'July');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'BMW', 2, 'April');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Range Rover', 19, 'December');
INSERT INTO "Mechanics" (name, car_brand, repairs, month) VALUES ('Louise', 'Land Rover', 4, 'April');
```

### 1 Згідно предметної області визначеної варіантом придумати та записати наступні запити

Для використання pivot  
-- enable crosstable  
CREATE extension tablefunc;

## Запит з PIVOT з використанням однієї агрегатної функції та 3-5 стовпчиками

```
-- create pivot table with group by and sum
-- get total repairs during a whole year by car brand
SELECT * FROM crosstab(
'SELECT name, car_brand, SUM(repairs) AS total_repairs
FROM "Mechanics"
GROUP by car_brand, name
ORDER by 1, 2',
'SELECT DISTINCT car_brand
FROM "Mechanics"
ORDER by 1'
)
AS final_result(
Name TEXT,
Audi INT,
BMW INT,
Land_Rover INT,
Lanos INT,
Mercedes INT,
Range_Rover INT,
Toyota INT,
Volkswagen INT
);
```

```
eduardnabokov(# );
  name | audi | bmw | land_rover | lanos | mercedes | range_rover | toyota | volkswagen
-----+-----+-----+-----+-----+-----+-----+-----+-----
Edward |    1 |   69 |          80 |    61 |        53 |          33 |     5 |         12
Louise |   51 |    2 |           4 |     1 |         6 |          19 |    10 |         24
Mark   |   23 |    2 |           4 |    64 |         6 |          24 |     2 |         56
(3 rows)
```

## Запит з PIVOT з використанням двох агрегатної функції та 3-5 стовпчиками

```
-- create pivot with two aggregate
-- Find the most repairable cars for each month and find total income for every mechanic per year
WITH mechanics_income_per_month as (
SELECT * FROM crosstab(
'SELECT month, name, 0.15 * SUM(repairs) as Total
FROM "Mechanics"
GROUP by month, name
HAVING SUM(repairs) > 10
ORDER by 1, 2',
'SELECT DISTINCT name
FROM "Mechanics"
ORDER by 1'
)
AS (
Month TEXT,
Edward FLOAT,
Louise FLOAT,
Mark FLOAT
)
), popular_car_per_month as (
SELECT * FROM crosstab(
'SELECT month, name, car_brand
FROM "Mechanics"
GROUP by name, month, car_brand
HAVING SUM(repairs) > 10
ORDER by 1, 2',
'SELECT DISTINCT name
FROM "Mechanics"
ORDER by 1'
)
AS (
Month TEXT,
Edward TEXT,
Louise TEXT,
Mark TEXT
)
)
SELECT
*
FROM popular_car_per_month
UNION ALL
SELECT
'Total income' as Month,
CAST(SUM(edward) AS TEXT),
CAST(SUM(louise) AS TEXT),
CAST(SUM(mark) AS TEXT)
FROM mechanics_income_per_month;
```

[eduardnabokov-# FROM mechanics_income_per_month;			
month	edward	louise	mark
August	Land Rover		Audi
December	BMW	Range Rover	Range Rover
February		Volkswagen	
July			Volkswagen
June	Volkswagen		
March	Mercedes		Lanos
October	Range Rover		
Total income	46.95	16.65	25.5
(8 rows)			

## Запит з UNPIVOT

**Note: postgres не має явної unpivot функції**

**Але можна використати unnest, array**

-- There is no unpivot in postgresSQL. But it's possible to manage with this.  
-- Let's take pivot table from one of queries before. And try to recover to plain original table  
-- pivot table outputs Name, Car\_brands\* as columns and for each intersection of name  
-- and car brand is total repairs per month

```
WITH pivot_table as (  
  SELECT * FROM crosstab(  
    'SELECT name, car_brand, SUM(repairs) AS total_repairs  
    FROM "Mechanics"  
    GROUP by name, car_brand  
    ORDER by 1, 2',  
    'SELECT DISTINCT car_brand  
    FROM "Mechanics"  
    ORDER by 1'  
  )  
  AS final_result(  
    Name TEXT,  
    Audi INT,  
    BMW INT,  
    Land_Rover INT,  
    Lanos INT,  
    Mercedes INT,  
    Range_Rover INT,  
    Toyota INT,  
    Volkswagen INT  
  )  
)  
  
SELECT  
  name,  
  unnest(array['Audi', 'BMW', 'Land_Rover', 'Lanos', 'Mercedes', 'Range_Rover', 'Toyota', 'Volkswagen']) as car_brand,  
  unnest(array[audi, bmw, land_rover, lanos, mercedes, range_rover, toyota, volkswagen]) as repairs  
FROM pivot_table  
WHERE  
  name='Edward'  
  OR name='Louise'  
  OR name='Mark';
```

name	car_brand	repairs
Edward	Audi	1
Edward	BMW	69
Edward	Land_Rover	80
Edward	Lanos	61
Edward	Mercedes	53
Edward	Range_Rover	33
Edward	Toyota	5
Edward	Volkswagen	12
Louise	Audi	51
Louise	BMW	2
Louise	Land_Rover	4
Louise	Lanos	1
Louise	Mercedes	6
Louise	Range_Rover	19
Louise	Toyota	10
Louise	Volkswagen	24
Mark	Audi	23
Mark	BMW	2
Mark	Land_Rover	4
Mark	Lanos	64
Mark	Mercedes	6
Mark	Range_Rover	24
Mark	Toyota	2
Mark	Volkswagen	56

(24 rows)