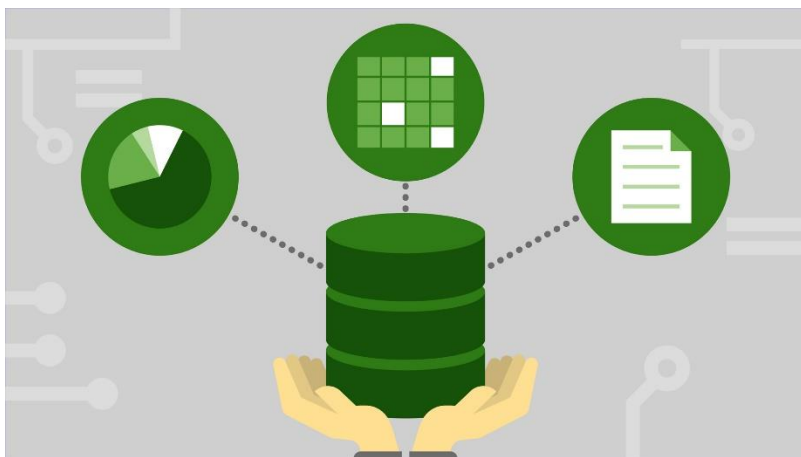


به نام خدا



دانشگاه تهران
پردیس دانشکده‌های فنی
دانشکده برق و کامپیوتر



آزمایشگاه پایگاه داده

دستورکار شماره ۴

شماره دانشجویی

۸۱۰۱۹۵۵۲۶

آبان ۹۹

پارسا صدری سینکی

گزارش فعالیت‌های انجام شده

1. لیست مناطق در دیتابیس

```
select * from "Northwind".public.region r;
```

```
region_id|region_description|
-----|-----|
1|Eastern|
2|Western|
3|Northern|
4|Southern|
```

2. با یک جوین روی دو جدول منطقه و ناحیه همه ناحیه های مناطق بدست می آید

```
select r.region_description , t.territory_description
from "Northwind".public.region r inner join "Northwind".public.territories
t on r.region_id = t.region_id;
```

```
region_description|territory_description|
-----|-----|
Eastern|Westboro|
Eastern|Bedford|
Eastern|Georgetow|
Eastern|Boston|
Eastern|Cambridge|
Eastern|Braintree|
Eastern|Providence|
Northern|Hollis|
Northern|Portsmouth|
Eastern|Wilton|
Eastern|Morristown|
Eastern|Edison|
Eastern|New York|
Eastern|New York|
Eastern|Mellville|
Eastern|Fairport|
Northern|Philadelphia|
Eastern|Neward|
Eastern|Rockville|
Eastern|Greensboro|
Eastern|Cary|
Southern|Columbia|
Southern|Atlanta|
Southern|Savannah|
Southern|Orlando|
Southern|Tampa|
Eastern|Louisville|
Northern|Beachwood|
Northern|Findlay|
Northern|Southfield|
Northern|Troy|
Northern|Bloomfield Hills|
Northern|Racine|
Northern|Roseville|
Northern|Minneapolis|
Western|Hoffman Estates|
Western|Chicago|
Southern|Bentonville|
```

| | | |
|----------|------------------|--|
| Southern | Dallas | |
| Southern | Austin | |
| Western | Denver | |
| Western | Colorado Springs | |
| Western | Phoenix | |
| Western | Scottsdale | |
| Western | Santa Monica | |
| Western | Menlo Park | |
| Western | San Francisco | |
| Western | Campbell | |
| Western | Santa Clara | |
| Western | Santa Cruz | |
| Western | Bellevue | |
| Western | Redmond | |
| Western | Seattle | |

دستور قسمت قبل را با جدول employee_territories جویین می کنیم و روی اسم هر منطقه گروه بندی می کنیم

```
select r.region_description , count(et.employee_id)
from "Northwind".public.region r inner join
"Northwind".public.territories t on r.region_id = t.region_id
inner join "Northwind".public.employee_territories et on t.territory_id =
et.territory_id
group by r.region_description;
```

| region_description | count |
|--------------------|-------|
| ----- | ---- |
| Eastern | 20 |
| Western | 15 |
| Southern | 3 |
| Northern | 11 |

3. همان دستور قبلی را اینجا استفاده می کنیم با این تفاوت که روی منطقه و ناحیه گروه بندی می کنیم

```
select r.region_description , t.territory_description ,
count(et.employee_id)
from "Northwind".public.region r inner join
"Northwind".public.territories t on r.region_id = t.region_id
inner join "Northwind".public.employee_territories et on t.territory_id =
et.territory_id
group by r.region_description , t.territory_description;
```

| region_description | territory_description | count |
|--------------------|-----------------------|-------|
| ----- | ----- | ---- |
| Eastern | Morristown | 1 |
| Northern | Beachwood | 1 |
| Eastern | Mellville | 1 |
| Southern | Atlanta | 1 |
| Northern | Southfield | 1 |
| Northern | Racine | 1 |
| Eastern | Greensboro | 1 |
| Western | Chicago | 1 |
| Eastern | Edison | 1 |
| Eastern | Westboro | 1 |
| Western | San Francisco | 1 |
| Eastern | Rockville | 1 |
| Western | Redmond | 1 |
| Eastern | Providence | 1 |
| Eastern | Cary | 1 |
| Northern | Bloomfield Hills | 1 |

| | | |
|----------|------------------|---|
| Western | Campbell | 1 |
| Western | Phoenix | 1 |
| Eastern | Louisville | 1 |
| Northern | Roseville | 1 |
| Northern | Troy | 1 |
| Northern | Portsmouth | 1 |
| Eastern | New York | 3 |
| Eastern | Boston | 1 |
| Western | Seattle | 1 |
| Eastern | Wilton | 1 |
| Western | Santa Clara | 1 |
| Eastern | Braintree | 1 |
| Western | Menlo Park | 1 |
| Northern | Findlay | 1 |
| Western | Santa Monica | 1 |
| Western | Hoffman Estates | 1 |
| Western | Denver | 1 |
| Northern | Minneapolis | 1 |
| Southern | Tampa | 1 |
| Eastern | Cambridge | 1 |
| Eastern | Bedford | 1 |
| Western | Scottsdale | 1 |
| Eastern | Fairport | 1 |
| Western | Santa Cruz | 1 |
| Eastern | Georgetow | 1 |
| Northern | Hollis | 1 |
| Southern | Savannah | 1 |
| Western | Colorado Springs | 1 |
| Northern | Philadelphia | 1 |
| Eastern | Neward | 1 |
| Western | Bellevue | 1 |

4. کافیسست سه جدول کارمندان، ناحیه و جدول رابط این دو را جوین کنیم

```
select e.first_name , e.last_name
from "Northwind".public.employees e inner join
"Northwind".public.employee_territories et on e.employee_id =
et.employee_id
inner join "Northwind".public.territories t on et.territory_id =
t.territory_id
where t.territory_description = 'Orlando';
```

```
first_name|last_name|
-----|-----|
Janet      |Leverling|
```

5. تعداد مشتریان غیر آمریکایی

```
select count(*)
from "Northwind".public.customers c
where c.country <> 'USA';
```

```
count|
-----|
78|
```

6. لیست محصولات را توسط شرط در قسمت where بدست می آوریم و آن ها را به صورت صعودی بر اساس تعداد موجودی مرتب می کنیم

```
select p.product_name , p.units_in_stock
from "Northwind".public.products p
where p.units_in_stock < p.reorder_level
order by p.units_in_stock ;
```

| product_name | units_in_stock |
|---------------------------|----------------|
| Gorgonzola Telino | 0 |
| Sir Rodney's Scones | 3 |
| Longlife Tofu | 4 |
| Louisiana Hot Spiced Okra | 4 |
| Rogede sild | 5 |
| Scottish Longbreads | 6 |
| Mascarpone Fabioli | 9 |
| Nord-Ost Matjeshering | 10 |
| Maxilaku | 10 |
| Gravad lax | 11 |
| Aniseed Syrup | 13 |
| Chocolade | 15 |
| Outback Lager | 15 |
| Chang | 17 |
| Ipoh Coffee | 17 |
| Gnocchi di nonna Alice | 21 |
| Wimmers gute Semmelknödel | 22 |
| Queso Cabrales | 22 |

7. قیمت نهایی را با کم کردن مقدار تخفیف برای سفارش با شماره ۱۰۴۱۲ بدست می آوریم

```
select od.unit_price * (1-od.discount) as price
from "Northwind".public.orders o
inner join "Northwind".public.order_details od on o.order_id =
od.order_id
where o.order_id = 10412;
```

| price |
|--------------------|
| 16.740000315606594 |

8. برای پیدا کردن این که کدام محصول بیشترین تعداد سفارش را داشته در یک ماه (ماه جولای ۱۹۹۶) کافیت سه جدول سفارشات، جزئیات سفارشات و محصولات را با هم جوین کنیم و بر اساس هر محصول نتایج را گروه بندی کنیم و سپس بر اساس جمع تعداد فروش محصول در سفارش های آن ماه مرتب کنیم و در انتها هم با دستور limit بیشترین را بدست بیاوریم.

در این سوال اگر هدف بدست آوردن این بود که در این ماه کدام محصول بیشترین تعداد بار سفارش را داشته است کافی است مرتب سازی بر اساس count(*) انجام شود.

```
select p.product_id , p.product_name
from "Northwind".public.orders o inner join
"Northwind".public.order_details od on o.order_id = od.order_id
inner join "Northwind".public.products p on p.product_id = od.product_id
where o.order_date > '1996-07-01' and o.order_date < '1996-08-01'
group by p.product_id
order by sum(od.quantity) desc
limit 1;
```

```
product_id|product_name|
-----|-----|
2|Chang|
```

9. کافیت بعد از دسته بندی بر اساس کشور مقصد جمع تعداد فروش هر سفارش را گزارش کنیم

```
select o.ship_country , sum(od.quantity)
from "Northwind".public.orders o inner join
"Northwind".public.order_details od on o.order_id = od.order_id
where o.ship_country <> 'USA'
group by o.ship_country;
```

```
ship_country|sum |
-----|----|
Argentina   | 339|
Spain       | 718|
Switzerland |1275|
Italy       | 822|
Venezuela   |2936|
Belgium     |1392|
Norway      | 161|
Sweden      |2235|
France      |3254|
Mexico      |1025|
Brazil      |4247|
Austria     |5167|
Poland      | 205|
UK          |2742|
Ireland     |1684|
Germany     |9213|
Denmark     |1170|
Canada      |1984|
Portugal    | 533|
Finland     | 885|
```

10. چهار جدول مشخص شده را جویین می کنیم و بر اساس نام دسته محصول دسته بندی می کنیم و جمع فروش تمام

سفارشات را گزارش می کنیم

```
select c.category_name , sum(od.quantity)
from "Northwind".public.orders o inner join
"Northwind".public.order_details od on o.order_id = od.order_id
inner join "Northwind".public.products p on p.product_id = od.product_id
inner join "Northwind".public.categories c on c.category_id =
p.category_id
where o.ship_country = 'France'
group by c.category_name ;
```

| category_name | sum |
|----------------|-----|
| ----- | --- |
| Beverages | 618 |
| Produce | 259 |
| Condiments | 287 |
| Grains/Cereals | 322 |
| Meat/Poultry | 243 |
| Confections | 566 |
| Dairy Products | 408 |
| Seafood | 551 |

11. برای بدست آوردن مشتریانی که شماره فکس آن ها موجود نیست از NULL is استفاده می کنیم

```
select c.customer_id
from "Northwind".public.customers c
where c.fax is NULL;
```

| customer_id |
|-------------|
| ----- |
| ANTON |
| BSBEV |
| CHOPS |
| COMMI |
| FAMIA |
| FOLKO |
| GODOS |
| GOURL |
| GREAL |
| ISLAT |
| KOENE |
| LETSS |
| MORGK |
| PRINI |
| QUEEN |
| QUICK |
| RICAR |
| RICSU |
| SAVEA |
| THEBI |
| TORTU |
| WELLI |

12. برای پیدا کردن ۳ کارمندی که بیشترین تعداد سفارش را ثبت کرده اند در یک سال اخیر تمام سفارشات را بر اساس شماره

کارمندی گروه بندی می کنیم و قسمت سال تاریخ را توسط تابع date_part به صورت زیر بدست می آوریم

```
select o.employee_id
from "Northwind".public.orders o
where date_part('year', o.order_date) = '1996'
group by o.employee_id
order by count(*)
limit 3;
```

| employee_id |
|-------------|
| ----- |
| 9 |
| 5 |
| 7 |

13. لیست shipper های فرانسه و آلمان

```
select distinct s.company_name
from "Northwind".public.orders o inner join "Northwind".public.shippers s
on o.ship_via = s.shipper_id
where o.ship_country = 'France' or o.ship_country = 'Germany';
```

```
company_name |
-----|
Federal Shipping|
Speedy Express |
United Package |
```

14. ابتدا توسط کوئری داخل with دسته های کالایی که به آلمان فرستاده می شوند را پیدا می کنیم سپس تمامی دسته های کالا را پیدا می کنیم و دنبال دسته ای می گردیم که در نتیجه قسمت with نباشد.

```
with germany_categories as (
  select distinct c.category_name
  from "Northwind".public.orders o inner join
  "Northwind".public.order_details od on o.order_id = od.order_id
  inner join "Northwind".public.products p on od.product_id =
  p.product_id
  inner join "Northwind".public.categories c on c.category_id =
  p.category_id
  where o.ship_country = 'Germany'
)
select c2.category_name
from "Northwind".public.categories c2
where c2.category_name not in (select category_name from
germany_categories);
```

```
category_name|
-----|
```

15. ابتدا territory_id و employee_id کسانی که در اورلاندو هستند را پیدا می کنیم و سپس territory_id آن ها را به territory_id شهر نیویورک تغییر می دهیم.

نکته عجیبی که در این سوال وجود داشت این بود که در دیتابیس ما ناحیه نیویورک با دو territory_id مختلف وجود داشت.

```
update "Northwind".public.employee_territories
set territory_id = (
  select t.territory_id
  from "Northwind".public.territories t
  where t.territory_description = 'New York'
  limit 1
)
where employee_id = (
  select et.employee_id
  from "Northwind".public.employee_territories et
  inner join "Northwind".public.employees e on et.employee_id =
  e.employee_id
```



```

        inner join "Northwind".public.territories t on t.territory_id =
et.territory_id
        where t.territory_description = 'Orlando'
    )
    and territory_id = (
        select et.territory_id
        from "Northwind".public.employee_territories et
        inner join "Northwind".public.employees e on et.employee_id =
e.employee_id
        inner join "Northwind".public.territories t on t.territory_id =
et.territory_id
        where t.territory_description = 'Orlando'
    );

```

16. ابتدا در کوئری به این صورت `floor(EXTRACT(DAY FROM NOW())-e.birth_date)/365` سن افراد را

محاسبه میکنیم.

سپس این کوئری را به یک view تبدیل می کنیم.

```

create view employees_age as
select *, floor(EXTRACT(DAY FROM NOW())-e.birth_date)/365) AS Age
select ea.employee_id, ea.age from employees_age ea;

```

```

employee_id|age |
-----|---|
1|71.0|
2|68.0|
3|57.0|
4|83.0|
5|65.0|
6|57.0|
7|60.0|
8|62.0|
9|54.0|

```

در مرحله بعد با استفاده از view ساخته شده در قسمت قبل سن کارکنان هر منطقه را میانگین میگیریم و گزارش می

کنیم

```

select r.region_description, avg(ea.age)
from "Northwind".public.region r
inner join "Northwind".public.territories t on r.region_id = t.region_id
inner join "Northwind".public.employee_territories et on et.territory_id
= t.territory_id
inner join employees_age ea on ea.employee_id = et.employee_id
group by r.region_description ;

```

```

region_description|avg
-----|-----|
Eastern           |        68.95|
Western           |         59.0|
Southern          |         57.0|
Northern          |56.909090909091|

```

17. کوئری داخل with تمام خرید های مشتریان را بر اساس مشتری و ماه خرید دسته بندی می کند. در ادامه توسط تابع پنجره ای row_number() به هر سطر خروجی های یک ماه کوئری داخل with یک شماره مشخص و خاص می دهد که بر اساس مبلغ خرج شده کلی هر مشتری در آن ماه مرتب می شود. در انتها ۵ مشتری که عدد بدست آمده در قسمت قبل آن ها در هر ماه از همه بیشتر است را به عنوان مشتریان برتر هر ماه گزارش می کنیم. نکته دیگر این کوئری هم مربوط به استفاده || برای استفاده از داده چند ستون در یک ستون هست.

```
with q as (
select c.contact_name || ' - ' || c.contact_title as "customer",
to_char(order_date, 'month') as "month", sum(od.unit_price * od.quantity
* (1-
od.discount)) as "total_paid"
from orders o
inner join customers c on o.customer_id = c.customer_id
inner join order_details od on o.order_id = od.order_id
where order_date >= to_date('1997', 'YYYY') and order_date <
to_date('1998', 'YYYY')
group by "customer", "month"
)
select t.customer, t.month, t.total_paid
from (
select *, row_number() over (partition by "month" order by total_paid
desc) as "rank" from q
) as t
where "rank" <= 5;
```

| customer | month | total_paid |
|---------------------------------------|----------|--------------------|
| Horst Kloss - Accounting Manager | april | 9921.300194740295 |
| Roland Mendel - Sales Manager | april | 8623.4499168396 |
| Jose Pavarotti - Sales Representative | april | 4707.540032543242 |
| Patricia McKenna - Sales Associate | april | 4429.549953796714 |
| Miguel Angel Paolino - Owner | april | 4150.050006866455 |
| Roland Mendel - Sales Manager | august | 5510.5923958596595 |
| Martine Rancé - Assistant Sales Agent | august | 4985.5 |
| Jean Fresnière - Marketing Assistant | august | 3957.5 |
| José Pedro Freyre - Sales Manager | august | 2775.050018310547 |
| Lúcia Carvalho - Marketing Assistant | august | 2761.937497998588 |
| Roland Mendel - Sales Manager | december | 13453.67503783293 |
| Maria Larsson - Owner | december | 5205.75 |

| | |
|--|----------|
| Martine Rancé - Assistant Sales Agent 4303.000045776367 | december |
| Hari Kumar - Sales Manager 3747.334959268346 | december |
| Renate Messner - Sales Representative 3603.220016479492 | december |
| Jose Pavarotti - Sales Representative 6942.634905655086 | february |
| Pascale Cartrain - Accounting Manager 3891.000051498413 | february |
| Horst Kloss - Accounting Manager 3849.660049931109 | february |
| Frédérique Citeaux - Marketing Manager 3832.7200319486856 | february |
| Pirkko Koskitalo - Accounting Manager 3077.000045776367 | february |
| Jytte Petersen - Owner 11188.400139808655 | january |
| Jean Fresnière - Marketing Assistant 9194.560067065953 | january |
| Roland Mendel - Sales Manager 8467.714867878556 | january |
| Paula Wilson - Assistant Sales Representative 3868.6000175476074 | january |
| Elizabeth Lincoln - Accounting Manager 3661.050011895597 | january |
| Jose Pavarotti - Sales Representative 14333.399974450469 | july |
| Howard Snyder - Marketing Manager 6281.499986812472 | july |
| Jean Fresnière - Marketing Assistant 5210.700017939508 | july |
| Roland Mendel - Sales Manager 4725.0 | july |
| Horst Kloss - Accounting Manager 3119.9999883770943 | july |
| Jean Fresnière - Marketing Assistant 3105.149997007102 | june |
| Jose Pavarotti - Sales Representative 2944.399983690679 | june |
| Frédérique Citeaux - Marketing Manager 2875.1599836909772 | june |
| Maria Larsson - Owner 2844.5000076293945 | june |
| Patricia McKenna - Sales Associate 2518.999991208315 | june |
| Paula Wilson - Assistant Sales Representative 10495.60012435913 | march |
| Carlos Hernández - Sales Representative 4615.680028886795 | march |
| Palle Ibsen - Sales Manager 2517.999988231063 | march |
| Pascale Cartrain - Accounting Manager 2218.4799897503854 | march |
| Lino Rodriguez - Sales Manager 1868.78500105083 | march |
| Horst Kloss - Accounting Manager 15248.974954277277 | may |
| Hari Kumar - Sales Manager 4237.1099893154205 | may |

| | | |
|---|-----------|--|
| Georg PIPPS - Sales Manager 4180.0 | may | |
| Christina Berglund - Order Administrator 3192.6499910354614 | may | |
| Mary Saveley - Sales Agent 2811.999969482422 | may | |
| Jose Pavarotti - Sales Representative 5277.999961853027 | november | |
| Horst Kloss - Accounting Manager 4529.800006866455 | november | |
| Yang Wang - Owner 4202.199991650879 | november | |
| Michael Holz - Sales Manager 3276.0839665476083 | november | |
| Elizabeth Lincoln - Accounting Manager 3117.999973297119 | november | |
| Horst Kloss - Accounting Manager 15913.675053825602 | october | |
| Jose Pavarotti - Sales Representative 12693.749870300293 | october | |
| Patricia McKenna - Sales Associate 4097.979977665544 | october | |
| Karl Jablonski - Owner 3535.6499729633333 | october | |
| Philip Cramer - Sales Associate 3463.0 | october | |
| Jose Pavarotti - Sales Representative 9628.099939346313 | september | |
| Patricia McKenna - Sales Associate 5523.500007059425 | september | |
| Peter Franken - Marketing Manager 4807.900011176616 | september | |
| Michael Holz - Sales Manager 4666.94002532959 | september | |
| Horst Kloss - Accounting Manager 4464.599971601367 | september | |