```sql
-- Lab

-- 1

create or replace view user_activity as
select customer_id, convert(rental_date, date) as Activity_date,
date_format(rental_date, '%m') as Activity_Month,
date_format(convert(rental_date,date), '%Y') as Activity_year
from rental;

create or replace view Monthly_active_users as
select count(distinct customer_id) as Active_users, Activity_year, Activity_Month
from user_activity
group by Activity_year, Activity_Month
order by Activity_year, Activity_Month;

-- 2

select *
from monthly_active_users;


select Active_users, lag(Active_users,1) over (partition by Activity_year) as
previous_month, Activity_year, Activity_month
 from monthly_active_users;

-- 3
with cte_activity as (
  select Active_users, lag(Active_users,1) over (partition by Activity_year) as
last_month, Activity_year, Activity_month
  from Monthly_active_users)
select *, ((Active_users - last_month) / last_month) *100 as Percentage_variation
where last_month is not null
;

select *, ((Active_users - last_month) / last_month) *100 as Percentage_variation
from ( select Active_users, lag(Active_users,1) over (partition by Activity_year) as
last_month, Activity_year, Activity_month
  from Monthly_active_users)sub
where last_month is not null;

-- 4
with distinct_users as (
  select distinct customer_id , Activity_month, Activity_year
  from user_activity
)
select count(distinct d1.customer_id) as Retained_customers, d1.Activity_month,
d1.Activity_year
from distinct_users d1
join distinct_users d2
```

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on d1.customer_id = d2.customer_id  and d1.activity_month = d2.activity_month + 1
group by d1.Activity_month, d1.Activity_year
order by d1.Activity_year, d1.Activity_month;


select count(distinct customer_id) , Activity_month, Activity_year
from user_activity
group by Activity_month, Activity_year
order by Activity_year, Activity_month;
```