1. For each *customer*, compute the *minimum* and *maximum* sales quantities along with the *corresponding products, dates* (i.e., dates of those maximum and minimum sales quantities) and the *states* in which the sale transactions took place. For the same *customer*, also compute the *average* sales quantity.
2. For each combination of *customer* and *product*, output the *maximum sales quantities for October* (regardless of the year, that is, both 10/11/2016 and 10/23/2019 are considered sales transactions for October) and *minimum sales quantities for November and December (again, regardless of the year) in 3 separate columns*. Like the first report, display the *corresponding dates* (i.e., dates of those maximum and minimum sales quantities). Furthermore, for October (MAX), include only the sales that occurred after 2017 (that is, not to include sales that occurred in 2017 or earlier); for November (MIN) and December (MIN), include all sales.
3. For *each of the 12 months* (regardless of the year), find the *most "popular"* and *least "popular" products* (those products with most and least total sales quantities) and the corresponding *total sales quantities (i.e., SUMs)*.
4. For each *product*, find the "*most favorable*" *month* (when most amount of the product was sold) and the "*least favorable*" *month* (when the least amount of the product was sold).
5. For the years 2016, 2017, 2018, 2019 and 2020, show, for each *product* and *customer* combination, the *average sales quantities for the 4 states*, 'CT', 'NY', 'NJ' and 'PA' (in four separate columns). Also compute the *average for the "whole" year* (again ignoring the YEAR component, meaning simply compute AVG) along with the *total quantities* (SUM) and the *counts* (COUNT).

Solutions:

1.

```
with T1 as
(
     select cust,min(quant) min_q,max(quant)
max_q,avg(quant) avg_q
     from sales
     group by cust
),

T2 as
(
    select s.date  min_date, s.state  st,s.prod
```

```
min_prod,T1.cust,T1.min_q,T1.max_q,T1.avg_q
    from T1, sales s
    where T1.cust=s.cust and T1.min_q=s.quant
)
select T2.cust,T2.min_q,T2.min_prod,
T2.min_date,T2.st,T2.max_q,s.prod max_prod, s.date
max_date, s.state st,T2.avg_q
   from T2, sales s
   where T2.cust=s.cust and T2.max_q=s.quant
```

2.

```
with T1 as
(
   select cust,prod,max(quant) as OCT_MAX
   from sales
  where month=10 and
  year>2017 group by cust,prod
),

T2 as
(
    select  T1.cust,T1.prod,T1.oct_max,s.date as
oct_date
    from T1, sales s
    where T1.cust=s.cust
```

```
    and T1.prod=s.prod
    and T1.OCT_MAX=s.quant and s.month=10 and
s.year>2017),


T3 as
(
   select cust,prod, min(quant) as NOV_MIN
        from sales
    where month=11 group by cust,prod
),
T4 as
(
   select  T3.cust,T3.prod,T3.NOV_MIN,s1.date as
NOV_DATE
   from T3, sales s1
   where T3.cust=s1.cust
   and T3.prod=s1.prod
   and T3.NOV_MIN=s1.quant and s1.month=11 ),


T5 as
(
   select cust,prod, min(quant) as DEC_MIN  from
sales
   where month=12 group by cust,prod
),
```

```
T6 as
(
select  T5.cust,T5.prod,T5.DEC_MIN,s.date as
DEC_DATE
from T5, sales s
where T5.cust=s.cust
and T5.prod=s.prod
and T5.DEC_MIN=s.quant and s.month=12
)


select T2.cust as CUSTOMER,T2.prod as PRODUCT,
T2.OCT_MAX, T2.OCT_DATE, T4.NOV_MIN, T4.NOV_DATE,
T6.DEC_MIN, T6.DEC_DATE
from T2 left join T4 on T2.cust= T4.cust and
T2.prod=T4.prod
left join T6 on T4.cust=T6.cust and T4.prod=T6.prod
```

3.

```
with T1 as
(
        select prod,month,sum(quant)as sum_q
        from sales
        group by prod,month
```

```
),
T2 as
(
        select max(sum_q)as
MOST_POP_TOTAL_Q,min(sum_q) as
LEAST_POP_TOTAL_Q,month
        from T1
        group by month
),
T3 as
(
        select  T2.month, T2.MOST_POP_TOTAL_Q,
T2.LEAST_POP_TOTAL_Q, T1.prod as MOST_POPULAR_PROD
        from T2,T1
        where T2.month=T1.month and
T1.sum_q=T2.MOST_POP_TOTAL_Q
)
select  T3.month, T3.MOST_POPULAR_PROD,
T3.MOST_POP_TOTAL_Q, T1.prod as LEAST_POPULAR_PROD,
T3.LEAST_POP_TOTAL_Q
from T3,T1
where T3.month=T1.month and
T3.LEAST_POP_TOTAL_Q=T1.sum_q
order by T3.month;
```

4.

```
with T1 as
(
        select prod, sum(quant) sum_q, month
        from sales
        group by prod,month
        order by month,prod
),
T2 as
(
        select max(sum_q) max_q, min(sum_q) min_q,
prod
        from T1
        group by prod
),
T3 as
(
        select T1.prod,T2.max_q,T1.month
MOST_FAV_MO,T2.min_q
        from T1,T2
        WHERE T1.prod=T2.prod and T1.sum_q=T2.max_q
)

select T3.prod,T3.MOST_FAV_MO,T1.month LEAST_FAV_MO
```

```
from T1,T3
where T1.prod=T3.prod and T1.sum_q=T3.min_q
```

5.

```
select  prod as PRODUCT, cust as CUSTOMER,
        round(avg(case when  state='CT' then quant
end))as CT_AVG,
        round(avg(case when  state='NY' then quant
end))as NY_AVG,
        round(avg(case when  state='NJ' then quant
end))as NJ_AVG,
        round(avg(case when  state='PA' then quant
end)))as PA_AVG,

        round(avg (quant)) as AVERAGE, sum(quant) as
TOTAL, count(quant) as COUNT

from sales group by PRODUCT,CUSTOMER
```