



数据库系统课程实验报告

实验名称:	数据高级查询
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1.实验目的

- 熟练掌握设计正确的 SQL 查询语句以实现数据高级查询的方法
- 熟练掌握 openGauss 连接查询、子查询和集合查询的语法结构及使用方法
 - （内）连接、（全）外连接、左外连接、右外连接
 - 子查询（嵌套查询）
 - 不相关子查询与相关子查询
 - EXISTS/NOT EXISTS
 - ANY
 - ALL
 - 集合运算：UNION、INTERSECT、MINUS/EXCEPT
- 理解不相关子查询与相关子查询的不同，掌握构造相应 SQL 语句的方法
- 熟练掌握基于派生表的查询方法

2.实验内容和步骤

(1) 连接到数据库

1.在数据库主节点服务器上，切换至 omm 操作系统用户环境。

```
[root@ecs-4904 ~]# su - omm
Last login: Thu Mar 24 14:36:51 CST 2022 on pts/0

Welcome to 4.19.90-2003.4.0.0036.oe1.aarch64

System information as of time:  Sun Mar 27 12:20:10 CST 2022

System load:      0.02
Processes:        118
Memory used:      10.5%
Swap used:        0.0%
Usage On:         14%
IP address:       192.168.0.4
Users online:     1
```

2.查看服务是否启动。

```
[omm@ecs-4904 ~]$ gs_om -t status
```

```
-----  
cluster_name      : dbCluster  
cluster_state     : Unavailable  
redistributing    : No  
-----
```

3.启动服务。

```
[omm@ecs-4904 ~]$ gs_om -t start  
Starting cluster.
```

```
=====
```

```
[SUCCESS] ecs-4904  
2022-03-27 12:23:01.498 623fe6a5.1 [unknown] 281468942221328 [unknown]  
1 01000 0 [BACKEND] WARNING: could not create any HA TCP/IP socket  
=====
```

```
Successfully started.  
[omm@ecs-4904 ~]$
```

4.连接到数据库。

```
[omm@ecs-4904 ~]$ gsql -d postgres -p 26000  
gsql ((openGauss 2.0.0 build 78689da9) compiled at 2021-03-31 21:03:52 commit 0  
last mr )  
Non-SSL connection (SSL connection is recommended when requiring high-security)  
Type "help" for help.  
  
postgres=#
```

5.进入 sales 数据库

```
postgres=# \c sales;  
Non-SSL connection (SSL connection is recommended when requiring high-security)  
You are now connected to database "sales" as user "omm".  
sales=#
```

(2) 查询

1. 创建两张表

```
CREATE TABLE palette_a(  
  
    id INT PRIMARY KEY,  
  
    color VARCHAR2(100) NOT NULL);
```

```
CREATE TABLE palette_b(  
  
    id INT PRIMARY KEY,
```

color VARCHAR2(100) NOT NULL);

```
sales=# CREATE TABLE palette_a(  
      id INT PRIMARY KEY,  
      color VARCHAR2(100) NOT NULL);  
  
CREATE TABLE palette_b(  
      id INT PRIMARY KEY,  
      color VARCHAR2(100) NOT NULL);  
-- will create implicit index "palette_b_id"  
CREATE TABLE  
--  
--  
--  
CREATE TABLE
```

2.3.插入数据

Insert into palette_a values (1,'Red'),(2,'Green'),(3,'Blue'),(4,'Purple');

Insert into palette_b values (1,'Green'),(2,'Red'),(3,'Cyan'),(4,'Brown');

```
sales=# Insert into palette_a values (1,'Red'),(2,'Green'),(3,'Blue'),(4,'Purple');  
INSERT 0 4  
sales=# Insert into palette_b values (1,'Green'),(2,'Red'),(3,'Cyan'),(4,'Brown');  
INSERT 0 4
```

(4) 查询两张表中相同颜色的所有信息。

SELECT * FROM palette_a A,palette_b B

WHERE A.color=B.color;

```
sales=# SELECT * FROM palette_a A,palette_b B  
WHERE A.color=B.color;  
sales=#  id | color | id | color  
-----+-----+-----+-----  
      1 | Red   | 2 | Red  
      2 | Green | 1 | Green  
(2 rows)
```

(5) 查询 palette_a 表中颜色不出现在 palette_b 表中的两张表的 id 和颜色 (用左外连接)。

SELECT *

FROM palette_a A LEFT OUTER JOIN palette_b B

ON A.color = B.color

WHERE B.color IS NULL;

```
sales=# SELECT *
FROM palette_a A LEFT OUTER JOIN palette_b B
ON A.color = B.color
WHERE B.color IS NULL;
sales-# sales-# sales-# id | color | id | color
-----+-----+-----+-----
    3 | Blue  |    | 
    4 | Purple|    | 
(2 rows)
```

(6) 查询 palette_b 表中颜色不出现在 palette_a 表中的两张表的 id 和颜色（用右外连接）。

SELECT *

FROM palette_a A RIGHT OUTER JOIN palette_b B

ON A.color = B.color

WHERE A.color IS NULL;

```
sales=# SELECT *
FROM palette_a A RIGHT OUTER JOIN palette_b B
ON A.color = B.color
WHERE A.color IS NULL
sales-# sales-# sales-# sales-# ;
id | color | id | color
-----+-----+-----+-----
    |      | 3 | Cyan
    |      | 4 | Brown
(2 rows)
```

(7) 查询 (5) 或 (6) 两种情况的信息（用（全）外连接）。

SELECT *

FROM palette_a A FULL OUTER JOIN palette_b B

ON A.color = B.color

WHERE A.color IS NULL OR B.color IS NULL;

```
sales=# SELECT *
FROM palette_a A FULL OUTER JOIN palette_b B
ON A.color = B.color
WHERE A.color IS NULL OR B.color IS NULL
sales=# sales-# sales-# sales-# ;
 id | color | id | color
-----+-----+-----+-----
  3 | Blue  |    | 
  4 | Purple|    | 
    |      |  3 | Cyan
    |      |  4 | Brown
(4 rows)
```

(8) 查询产品表 products 中的 product_id, product_name, list_price 信息, 要求产品定价 list_price 大于其平均定价 list_price。

SELECT product_id,product_name,list_price

FROM products

WHERE list_price > (

SELECT AVG(list_price)

FROM products

);

```
sales=# SELECT product_id,product_name,list_price
FROM products
WHERE list_price > (
    SELECT AVG(list_price)
    FROM products
);
sales-# sales-# sales-# sales-# sales-# sales-# product_id | product_name
| list_price
-----+-----+-----+-----+-----+-----
 228 | Intel Xeon E5-2699 V3 (OEM/Tray) | 3410.46
 248 | Intel Xeon E5-2697 V3 | 2774.98
 249 | Intel Xeon E5-2698 V3 (OEM/Tray) | 2660.72
   2 | Intel Xeon E5-2697 V4 | 2554.99
  45 | Intel Xeon E5-2685 V3 (OEM/Tray) | 2501.69
  46 | Intel Xeon E5-2695 V3 (OEM/Tray) | 2431.95
  47 | Intel Xeon E5-2697 V2 | 2377.09
  51 | Intel Xeon E5-2695 V4 | 2269.99
  91 | Intel Xeon E5-2695 V2 | 2259.99
  92 | Intel Xeon E5-2643 V2 (OEM/Tray) | 2200.00
```


195	G.Skill Ripjaws 4 Series	1055.99
190	Supermicro X10SDV-8C-TLN4F	948.99
49	Samsung MZ-75E4T0B	1499.99
50	Intel SSDPECKME040T401	8867.99
208	Samsung MZ-V6P2T0BW	1199.99
(85 rows)		

(9) 查询产品表 products 中最便宜产品的 product_id, product_name, list_price。

```
SELECT product_id,product_name,list_price
```

```
FROM products
```

```
WHERE list_price = (
```

```
    SELECT MIN(list_price)
```

```
    FROM products
```

```
);
```

-----+-----+-----		
94	Western Digital WD2500AVVS	15.55
(1 row)		

(10) 查询没有一个订单的顾客姓名。

```
SELECT name
```

```
FROM customers
```

```
WHERE customer_id NOT IN (
```

```
    SELECT customer_id FROM orders
```

```
);
```

```

sales=# SELECT name
FROM customers
WHERE customer_id NOT IN (
    SELECT customer_id FROM orders
);
sales=# sales=# sales(= sales(=
-----
United Continental Holdings
INTL FCStone
Publix Super Markets
ConocoPhillips
3M
Exelon
Tesoro
Northwestern Mutual
Enterprise Products Partners
Rite Aid
Qualcomm
EMC
Time Warner Cable
Northrop Grumman
Lear
Genuine Parts

```

```

Ingram Micro
American Airlines Group
Johnson Controls
Goldman Sachs Group
Oracle
(272 rows)

```

(11) 查询产品表 products 中产品的 product_id, product_name, list_price, 要求产品定价 list_price 大于其同类产品（可由 category_id 表达）的平均定价。

```
SELECT product_id,product_name,list_price
```

```
FROM products A
```

```
WHERE list_price > (
```

```
    SELECT AVG(list_price)
```

```
    FROM products B
```

```
    WHERE A.category_id = B.category_id
```


);

sales-#	sales-#	sales(#	sales(#	sales(#	sales(#	product_id	product_name	list_price
228		Intel Xeon E5-2699 V3 (OEM/Tray)		3410.46				
248		Intel Xeon E5-2697 V3		2774.98				
249		Intel Xeon E5-2698 V3 (OEM/Tray)		2660.72				
2		Intel Xeon E5-2697 V4		2554.99				
45		Intel Xeon E5-2685 V3 (OEM/Tray)		2501.69				
46		Intel Xeon E5-2695 V3 (OEM/Tray)		2431.95				
47		Intel Xeon E5-2697 V2		2377.09				
51		Intel Xeon E5-2695 V4		2269.99				
91		Intel Xeon E5-2695 V2		2259.99				
92		Intel Xeon E5-2643 V2 (OEM/Tray)		2200.00				
93		Intel Xeon E5-2690 (OEM/Tray)		2116.72				
98		Intel Xeon E5-2687W V3		2064.99				
102		Intel Xeon E5-2687W V4		2042.69				
158		Intel Xeon E5-2667 V3 (OEM/Tray)		2009.46				
159		Intel Xeon E5-2690 V4		1994.49				
160		Intel Xeon E5-2690 V3		1908.73				
162		Intel Xeon E5-2470V2		1904.70				
163		Intel Xeon E5-2683 V4		1899.99				
164		Intel Xeon E5-2637 V2 (OEM/Tray)		1850.00				
169		Intel Xeon E5-2683 V4 (OEM/Tray)		1844.89				
240		Intel Core i7-4960X Extreme Edition		1805.97				
241		Intel Xeon E5-2699 V4 (OEM/Tray)		1756.00				

...skipping 1 line								
28		Supermicro X9SRH-7TF		470.09				
137		Asus Z10PE-D16 WS		460.09				
32		ASRock X99 Extreme11		460.09				
31		Supermicro MBD-X10DAX		443.72				
84		Asus X99-DELUXE/U3.1		440.30				
141		Supermicro X11SSL-CF		419.99				
34		Asus K6PE-D16		417.98				
143		Asus Z10PE-D16		402.99				
49		Samsung MZ-75E4T0B		1499.99				
50		Intel SSDPECKM040T401		8867.99				
208		Samsung MZ-V6P2T0BW		1199.99				
(132 rows)								

(12) 查询有订单 order 的所有顾客 customer 姓名 (查询涉及 customers 表和 orders 表)。

SELECT name

FROM customers

WHERE EXISTS(

SELECT customer_id

FROM orders

WHERE orders.customer_id = customers.customer_id

);

```

sales=# SELECT name
FROM customers
WHERE EXISTS(
    SELECT customer_id
    FROM orders
    WHERE orders.customer_id = customers.customer_id
);
sales=# sales=# sales(# sales(# sales(# sales(#          name
-----
Facebook
Supervalu
NextEra Energy
PG&E Corp.
Goodyear Tire & Rubber
Micron Technology
ConAgra Foods
Bank of New York Mellon Corp.
Sempra Energy
Raytheon
Plains GP Holdings
US Foods Holding
AbbVie
Centene
Community Health Systems
Alcoa
International Paper
Emerson Electric
Aflac
AutoNation
Progressive
Abbott Laboratories

```

```
Freeport-McMoRan
...skipping 1 line
Baker Hughes
Dollar Tree
Whole Foods Market
PPG Industries
DTE Energy
Becton Dickinson
AutoZone
(47 rows)
```

13.

```
sales=# SELECT * FROM customers WHERE customer_id IN (NULL);
 customer_id | name | address | website | credit_limit
-----+-----+-----+-----+-----
(0 rows)
```

```

sales=# SELECT * FROM customers WHERE EXISTS (SELECT NULL FROM customers);

```

customer_id	name	address	website	credit limit
177	United Continental Holdings	2984 S Salina St, Syracuse, NY	http://www.unitedcontinentalholdings.com	5888.08
188	INIL FOSTONE	9344 Haverford Ave, Philadelphia, PA	http://www.intlifestone.com	5888.08
184	Publix Super Markets	1795 Wu Mang, Muang Chonburi,	http://www.publix.com	1288.08
187	ConocoPhillips	Welpurgisstr 69, Munich,	http://www.conocophillips.com	2488.08
198	SM	Via Frenzy 6985, Roma,	http://www.sm.com	1288.08
192	Exelon	Via Luminosa 162, Firenze,	http://www.exeloncorp.com	588.08
209	Iesoro	Via Notoriosa 1942, Firenze,	http://www.iesocorp.com	588.08
287	Northwestern Mutual	1851 No Wong, Peking,	http://www.northwesternmutual.com	5888.08
288	Enterprise Products Partners	Via Notoriosa 1949, Firenze,	http://www.enterpriseproducts.com	2488.08
284	Rite Aid	Piazza Cacchistorg 23, San Gimignano,	http://www.riteaid.com	5888.08
222	Qualcomm	Piazza Svizzera, Milano,	http://www.qualcomm.com	588.08
216	EMC	Via Delle Grazie 11, San Gimignano,	http://www.emc.com	788.08
228	Time Warner Cable	1597 Legend St, Mysore, Kar	http://www.twc.com	5788.08
223	Northrop Grumman	1686 Sangam Blvd, New Delhi,	http://www.northropgrumman.com	5888.08
59	Lear	2115 N Lowe Ln No, Cedar Rapids, IA	http://www.lear.com	588.08
43	Facebook	5112 S 5th St, Des Moines, IA	http://www.facebook.com	588.08
46	Supervalu	8989 N Port Washington Rd, Milwaukee, WI	http://www.supervalu.com	588.08
49	NextEra Energy	4715 Sprecher Rd, Madison, WI	http://www.nexteraenergy.com	688.08
52	PG&E Corp.	8888 W National Ave, Milwaukee, WI	http://www.pge.com	788.08
55	Goodyear Tire & Rubber	688 N Broadway Pl 1, Milwaukee, WI	http://www.goodyear.com	788.08
59	Micron Technology	411 E Wisconsin Ave # 2558, Milwaukee, WI	http://www.micron.com	788.08
62	ConAgra Foods	122 E Dayton St, Madison, WI	http://www.conagrafoods.com	988.08
66	Bank of New York Mellon Corp.	686 22nd Ave Ne, Minneapolis, MN	http://www.bnymellon.com	1288.08
71	Genuine Parts	288 1st St Sw, Rochester, MN	http://www.gunpt.com	1288.08
75	Omnicom Group	2154 W Genesee St, Syracuse, NY	http://www.omnicomgroup.com	1288.08
79	Monsanto	157 Lark St, Albany, NY	http://www.monsanto.com	1288.08

第一条查询的是id为 null的情况，但是id为主码，不可能为空，所以返回0条结果；第二条是判断exists后的情况，证明SELECT NULL FROM table 返回值为1；

(14) 找出所有没有订单的顾客姓名（查询涉及 customers 表和 orders 表）。

SELECT name

FROM customers

WHERE NOT EXISTS(

SELECT customer_id

FROM orders

WHERE orders.customer_id = customers.customer_id

);

```

sales=# SELECT name
FROM customers
WHERE NOT EXISTS(
    SELECT customer_id
    FROM orders
    WHERE orders.customer_id = customers.customer_id
);
sales=# sales=# sales(# sales(# sales(# sales(#
-----
United Continental Holdings
INTL FCStone
Publix Super Markets
ConocoPhillips
3M
Exelon
Tesoro
Northwestern Mutual
Enterprise Products Partners
Rite Aid
Qualcomm
EMC
Time Warner Cable
Northrop Grumman
Lear
Genuine Parts
Omnicom Group
Monsanto
National Oilwell Varco
Marriott International
Core-Mark Holding
Cameron International
Xcel Energy
State Farm Insurance Cos.
Johnson & Johnson
Marathon Petroleum
Aetna
AIG
Intel
Pfizer
FedEx
New York Life Insurance
Ingram Micro
American Airlines Group
Johnson Controls
Goldman Sachs Group
Oracle
(272 rows)

```

(15) 查询产品表 products 中的产品名 product_name 和定价 list_price, 要求其定价高于产品种类 1 中的任何产品定价。

```
SELECT product_name,list_price
```

```

FROM products

WHERE list_price > ANY(

    SELECT list_price

    FROM products

    WHERE category_id = 1

);

```

```

sales=# SELECT product_name,list_price
FROM products
WHERE list_price > ANY(
    SELECT list_price
    FROM products
    WHERE category_id = 1
);

```

sales-#	sales-#	sales(#	sales(#	sales(#	sales(#	pro
1					3410.46	
2					2774.98	
3					2660.72	
4					2554.99	
5					2501.69	
6					2431.95	
7					2377.09	
8					2269.99	
9					2259.99	
10					2200.00	
11					2116.72	
12					2064.99	
13					2042.69	
14					2009.46	
15					1994.49	
16					1908.73	
17					1904.70	
18					1899.99	
19					1850.00	
20					1844.89	
21					1805.97	
22					1756.00	
23					1751.99	
24					1708.86	
25					1704.37	
26					1676.98	
27					1666.61	
28					1639.99	
29					1638.89	
30					1499.89	

G.Skill Ripjaws V Series	645.20
Kingston	644.00
G.Skill Ripjaws V Series	640.99
G.Skill Ripjaws V Series	640.99
Kingston HyperX Predator	635.99
Supermicro X10SDV-8C-1LN4F	948.99
Intel DP35DPM	789.79
Asus X99-E-10G WS	649.00
Asus ROG MAXIMUS IX EXTREME	573.99
Asus RAMPAGE V EXTREME	572.96
Asus Z10PE-D8 WS	561.59
Samsung MZ-75E4T0B	1499.99
Intel SSDPECM040T401	8867.99
Samsung MZ-V6P2T0BW	1199.99
Samsung MZ-V6P1T0BW	579.99
(188 rows)	

(16) 查询产品表 products 中的产品名 product_name 和定价 list_price, 要求其定价高于产品种类 1 中的所有定价。

```
SELECT product_name,list_price
FROM products
WHERE list_price > ALL(
    SELECT list_price
    FROM products
    WHERE category_id = 1
);
```

```
sales=# SELECT product_name,list_price
FROM products
WHERE list_price > ALL(
    SELECT list_price
    FROM products
    WHERE category_id = 1
);
```

sales-#	sales-#	sales(#	sales(#	sales(#	sales(#	product_name	list_price
-----	-----	-----	-----	-----	-----		
PNY	VCQP6000-PB		5499.99				
PNY	VCQM6000-24GB-PB		4139.00				
Intel	SSDPECM040T401		8867.99				
(3 rows)							

(17) 查询产品表 products 中的产品名 product_name 和定价

list_price, 要求其定价低于产品种类的所
有平均定价。

```
SELECT product_name,list_price
FROM products
WHERE list_price < ALL(
    SELECT AVG(list_price)
    FROM products
    GROUP BY category_id
);
```

product_name	list_price
ASRock C2750D4I	401.98
Gigabyte X299 AORUS Gaming 7	399.99
MSI X99A GODLIKE GAMING	399.99
MSI X299 GAMING M7 ACK	397.42
Supermicro MBD-X10DRI-O	394.99
Asus MAXIMUS IX FORMULA	388.99
Asus X99-DELUXE II	383.98
ASRock Fatal1ty X299 Professional Gaming i9	382.98
ASRock EP2C612 WS	358.49
ASRock Z270 SuperCarrier	353.98
Asus MAXIMUS VIII EXTREME/ASSEMBLY	353.98
Asus STRIX X299-E GAMING	349.99
Gigabyte X299 AORUS Ultra Gaming	343.99
Asus TUF X299 MARK 1	339.99
Asus Z170-WS	338.99
MSI X299 GAMING PRO CARBON AC	337.81
MSI X99A XPOWER GAMING TITANIUM	329.99
Asus ROG STRIX X99 GAMING	319.99
Asus SABERTOOTH X99	312.67
Asus PRIME X299-A	309.85
Gigabyte GA-X99-UD5 WIFI	305.00
ASRock EP2C602-4L/D16	301.99
MSI Z170A KRAIT GAMING 3X	299.89
MSI Z170 Krait Gaming	299.89
MSI Z170A KRAIT GAMING	299.89
Asus MAXIMUS IX CODE	298.98
Asus Sabertooth 990FX	295.72
MSI X99A WORKSTATION	289.97
Intel DG43RK	289.79
Asus VANGUARD B85	287.00
EVGA Z270 Classified K	283.98

```

Seagate ST31000340NS - FFP | 43.99
Crucial CT525MX300SSD4 | 150.99
Western Digital WD2500AAJS | 16.99
Western Digital WD20EZRX | 67.34
Western Digital WDS256G1X0C | 109.99

...skipping 1 line
Kingston SV300S37A/120G | 59.87
(81 rows)

```

(18) 查询 contacts 表和 employees 表中的所有 last_name, 并以 last_name 升序显示。

```
SELECT last_name
```

```
FROM(
```

```
    SELECT last_name FROM contacts
```

```
    UNION
```

```
    SELECT last_name FROM employees
```

```
)
```

```
ORDER BY last_name ASC;
```

```

sales=# SELECT last_name
FROM(
    SELECT last_name FROM contacts
    UNION
    SELECT last_name FROM employees
)
ORDER BY last_name ASC;sales-# sales(# sales(# sales(# sales(# sales-#
last_name
-----
Abbott
Alexander
Allison
Alston
Arnold
Atkinson
Avila
Bailey
Baldwin
Ball
Barnes
Barnett
Barrera
Barry

```

```
WILKINS  
Wilkinson  
Williamson  
Wilson  
Wolf  
Wong  
Wood  
Woods  
(357 rows)
```

(19) 查询 contacts 表和 employees 表中的所有 last_name，并以 last_name 升序显示。

实现要求：保留重复+UNION ALL（必须）+其它查询方法（如果找到）

```
SELECT last_name  
  
FROM(  
  
    SELECT last_name FROM contacts  
  
    UNION ALL  
  
    SELECT last_name FROM employees  
  
)  
  
ORDER BY last_name ASC;
```

```
sales=# SELECT last_name  
FROM(  
    SELECT last_name FROM contacts  
    UNION ALL  
    SELECT last_name FROM employees  
)  
ORDER BY last_name ASC;sales=# sales(# sales(# sales(# sales(# sales-#  
last_name  
-----  
Abbott  
Alexander  
Allison  
Alston  
Arnold  
Atkinson  
Atkinson  
Avila  
Bailey  
Baldwin  
Ball  
Barnes  
Barnett  
Barnett
```

```
Williamson  
Wilson  
Wolf  
Wong  
Wood  
Woods  
Woods  
(426 rows)
```

(20) 查询同时出现在 contacts 表和 employees 表中的所有 last_name。

实现要求：INTERSECT（必须）+其它查询方法（如果找到）

```
SELECT last_name FROM contacts
```

```
INTERSECT
```

```
SELECT last_name FROM employees;
```

```
sales=# SELECT last_name FROM contacts
INTERSECT
SELECT last_name FROM employees;
sales-# sales-#  last_name
-----
Stone
Webb
Henry
Brooks
Flores
Cruz
Mason
Simmons
Cole
Murray
Wallace
Ford
Butler
Woods
Sanders
Myers
Robertson
Ferguson
Grant
Henderson
West
Rose
Ortiz
Hayes
Jordan
Nichols
Bryant
Spencer
McDonald
(29 rows)
```

(21) 查询在产品表 products 中而不在库存表 inventories 中的产品号 product_id。

实现要求：MINUS/EXCEPT（必须）+其它查询方法（如果找到）

```
SELECT product_id FROM products
```

```
EXCEPT
```

```
SELECT product_id FROM inventories;
```

```
sales=# SELECT product_id FROM products
EXCEPT
SELECT product_id FROM inventories;
sales-# sales-# product_id
-----
      158
       86
       77
       97
       16
      118
      178
      153
      111
      187
       83
      179
      209
      143
       59
       10
       85
      192
      253
       48
      113

       1
      215
      127
       45
      266

...skipping 1 line
(80 rows)
```

(3) 思考:

- 当查询所需要的数据不能直接获得时,就需要使用子查询;如查询没有一个订单的顾客姓名;
- 区别: 1. 不相关子查询中子查询的条件不依赖于父查询;相关子查询中的子查询依赖父查询; 2. 相关子查询中的每查询一条记录,需要重新做一次子查询;非相关子查询中子查询只需要进行一次; 3. 相关子查询可以嵌套多层,但是嵌套层越多,效率越低;非相关子查询不可以嵌套,效率 较高;
- 当子查询需要用到父查询的信息的时候就要用到相关自查询;

- 基于派生表的查询可以转换成一般查询；

3.实验总结

3.1 完成的工作

打开数据库

输入 SQL 语句

3.2 对实验的认识

掌握了复杂的查询，懂得了连接查询和子查询

3.3 遇到的困难及解决方法

无