



数据库系统课程实验报告

实验名称:	实验二
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1.实验目的

- 掌握数据库的特点
- 学习数据的插入

2.实验内容和步骤

4.2 实验内容

- (1) 理解 Sales 数据库中各表及各表之间的联系
- (2) 创建新用户、数据库和模式；--新用户名建议用自己名字的拼音
- (3) 分别创建 12 张表，创建时不添加约束。
- (4) 修改 12 张表的结构，根据上图添加相应的约束，如主码、外码。
- (5) 为 12 张表插入示例数据。
- (6) 分别查询 12 张表的数据。
- (7) 完成上述任务后删除用户、数据库、模式和所有的表。

(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=#
```

(2) 创建新用户、数据库、模式。

1.创建新用户

```
postgres=# CREATE USER yipei WITH PASSWORD "CYP917..";  
CREATE ROLE
```

2.赋予权限

```
postgres=# GRANT ALL PRIVILEGES TO yipei;  
ALTER ROLE
```

3.新建数据库

```
postgres=# CREATE DATABASE Sales OWNER yipei;  
CREATE DATABASE
```

4.进入数据库

```

[omm@ecs-4904 ~]$ gsql -d sales -p 26000 -U yipei;
Password for user yipei:
gsql ((OpenGauss 2.0.0 build 78689da9) compiled at 2021-03-31 21:03:52 commit
last mr )
Non-SSL connection (SSL connection is recommended when requiring high-security)
Type "help" for help.

sales=>

```

5.新建 SCHEMA

```

sales=> CREATE SCHEMA yipei AUTHORIZATION yipei;
CREATE SCHEMA

```

(3) 创建表

Employees 表

```

sales=> CREATE TABLE employees(
employee_id NUMBER,
first_name VARCHAR2(255),
last_name VARCHAR2(255),
email VARCHAR2(255),
phone VARCHAR2(20),
hire_date DATE,
manager_id NUMBER,
job_title VARCHAR2(255)

```

其他类似，省略

(4) 修改表结构，添加主键和外键

1.先加入全部主键

格式：ALTER TABLE 表名 ADD CONSTRAINT 约束名 PRIMARY
KEY(列名);

```

sales=> ALTER TABLE orders ADD CONSTRAINT orders_PK PRIMARY KEY
(order_id);
NOTICE: ALTER TABLE / ADD PRIMARY KEY will create implicit ind
ex "orders_pk" for table "orders"
ALTER TABLE

```

类似操作省略

2.加入外键：

格式: ALTER TABLE 表名 ADD CONSTRAINT 约束名 FOREIGN KEY(列名) REFERENCES 外键表名(外键列名);

特别注意: 自己给自己设定外键要先声明唯一, 否则报 there is no unique constraint matching given keys for referenced table "employees"错

```
sales=> ALTER TABLE employees ADD UNIQUE(manager_id);
NOTICE: ALTER TABLE / ADD UNIQUE will create implicit index "employees_manager_id_key" for table "employees"
ALTER TABLE
sales=> ALTER TABLE employees ADD CONSTRAINT fk_employees_manager FOREIGN KEY(manager_id) REFERENCES employees(manager_id);
ALTER TABLE
```

类似操作省略

(5) 导入数据

1.将 csv 文件导入云文档中, 为该文件夹授予权限

```
[root@ecs-4904 ~]# sudo chmod 777 -R '/home/omm/src'
```

2.将数据拷贝, 从没有外键的开始逐个导入

```
sales=> \copy regions from '/home/omm/src/regions.csv' with (delimiter ',', IGNORE_EXTRA_DATA 'on' );
ERROR: duplicate key value violates unique constraint "regions_pk"
DETAIL: Key (region_id)=(1) already exists.
CONTEXT: COPY regions, line 5: ""
sales=> SELECT * FROM REGIONS;
 region_id |      region_name
-----+-----
1 | Europe
2 | Americas
3 | Asia
4 | Middle East and Africa
(4 rows)
```

类似操作省略

(6) 查询 12 个表

Employees 表

35	Carter	Gonzales	carter.gonzales@example.com	650.127.1854	2016-08-26 00:00:00	23	Stock Clerk
36	Felix	Bryant	felix.bryant@example.com	650.127.1734	2016-12-12 00:00:00	23	Stock Clerk
37	Ibrahim	Alexander	ibrahim.alexander@example.com	650.127.1634	2016-02-08 00:00:00	23	Stock Clerk
38	Sonny	Russell	sonny.russell@example.com	650.121.1234	2016-07-14 00:00:00	24	Stock Clerk
39	Kian	Griffin	kian.griffin@example.com	650.121.2034	2016-10-26 00:00:00	24	Stock Clerk
40	Caleb	Diaz	caleb.diaz@example.com	650.121.2019	2016-02-12 00:00:00	24	Stock Clerk
25	Ronnie	Perry	ronnie.perry@example.com	650.123.5234	2016-11-16 00:00:00	1	Stock Manager
24	Callum	Jenkins	callum.jenkins@example.com	650.123.4234	2016-10-10 00:00:00	1	Stock Manager
23	Jackson	Coleman	jackson.coleman@example.com	650.123.3234	2016-05-01 00:00:00	1	Stock Manager
22	Liam	Henderson	liam.henderson@example.com	650.123.2234	2016-04-10 00:00:00	1	Stock Manager
21	Jaxon	Ross	jaxon.ross@example.com	650.123.1234	2016-07-18 00:00:00	1	Stock Manager

Orders 表

78	2	Pending	64	2015-12-14 00:00:00
84	3	Shipped	64	2015-12-01 00:00:00
85	4	Pending	55	2016-12-01 00:00:00
86	5	Pending	60	2016-11-30 00:00:00
88	6	Shipped	61	2017-11-01 00:00:00
89	7	Shipped	55	2015-10-27 00:00:00
90	8	Pending	55	2015-10-28 00:00:00
91	9	Pending	56	2016-10-28 00:00:00
92	44	Shipped	59	2015-10-28 00:00:00
95	45	Shipped	59	2016-09-19 00:00:00
96	46	Shipped	56	2016-09-14 00:00:00
97	47	Canceled	60	2016-07-12 00:00:00
98	48	Shipped	55	2017-03-18 00:00:00
99	49	Shipped	60	2017-01-07 00:00:00
100	16	Pending	54	2017-01-05 00:00:00
103	17	Pending	64	2016-02-08 00:00:00
104	18	Shipped	60	2017-02-01 00:00:00

Order_items 表

Customers 表Products 表Contacts 表

```

286 | Thi | Maxwell | thi.maxwell@entergy.com | +41 71 012 3561 | 286
287 | Aleshia | Reese | aleshia.reese@adp.com | +41 4 012 3563 | 287
288 | Dorotha | Wong | dorotha.wong@firstdata.com | +41 6 012 3565 | 288
289 | Estela | Donovan | estela.donovan@blackrock.com | +41 7 012 3567 | 289
290 | Hassan | Rivers | hassan.rivers@westrock.com | +41 31 012 3569 | 290
291 | Jen | McMahon | jen.mcmahon@voya.com | +41 68 012 3571 | 291
292 | Barbie | Carter | barbie.carter@sherwin.com | +41 5 012 3573 | 292
293 | Cleo | English | cleo.english@hiltonworldwide.com | +41 8 012 3575 | 293
294 | Liana | Pena | liana.pena@corning.com | +41 1 012 3577 | 294
295 | Francina | Slater | francina.slater@rrdonnelley.com | +41 9 012 3579 | 295
296 | Josie | Steele | josie.steele@stanleyblackanddecker.com | +41 69 012 3581 | 296
297 | Maryrose | Roberson | maryrose.roberson@xcelenergy.com | +41 70 012 3583 | 297
298 | Elly | Salinas | elly.salinas@kiewit.com | +41 80 012 3587 | 298
299 | Ginny | Carlson | genny.carlson@orate.murphyusa.com | +41 80 012 3589 | 299
300 | Mozelle | Schneider | mozelle.schneider@cbre.com | +41 80 012 3595 | 300
301 | Adam | Jacobs | adam.jacobs@univag.com | +41 80 012 3599 | 301
302 | Vernia | Hayes | vernia.hayes@drhorton.com | +41 80 012 3701 | 302
303 | Ismael | Solomon | ismael.solomon@elcompanies.com | +41 80 012 3703 | 303
304 | Ivey | Rutledge | ively.rutledge@praxair.com | +41 80 012 3709 | 304
305 | Jame | Terrell | jame.terrell@biogen.com | +41 80 012 3711 | 305
306 | Daina | Combs | daina.combs@mosaicco.com | +41 80 012 3715 | 306
307 | Lashunda | Davidson | lashunda.davidson@statestreet.com | +41 80 012 3717 | 307
308 | Arlette | Thornton | arlette.thornton@unum.com | +41 80 012 3719 | 308
309 | Darron | Robertson | darron.robertson@reynoldsameric.com | +41 80 012 3723 | 309
310 | Maple | Barnett | maple.barnett@core-mark.com | +41 80 012 3725 | 310
311 | Charlesie | Carey | charlesie.carey@grouplauto.com | +41 80 012 3731 | 311
312 | Frank | Shannon | frank.shannon@henryschein.com | +41 80 012 3733 | 312
313 | Josiah | Beasley | josiah.beasley@hertz.com | +41 80 012 3735 | 313
314 | Annabelle | Butler | annabelle.butler@thrivent.com | +41 80 012 3737 | 314
315 | Ed | Mueller | ed.mueller@nscorp.com | +41 80 012 3739 | 315
316 | Colleen | Estrada | colleen.estrada@rgare.com | +41 80 012 3741 | 316
317 | Nikia | Kent | nikia.kent@pseg.com | +41 80 012 3745 | 317
318 | Amber | Brady | amber.brady@c-a-m.com | +41 80 012 3837 | 318
319 | Wendell | Massey | wendell.massey@bbt.com | +41 80 012 3839 | 319
(319 rows)

```

Product_categories 表

```

sales=> select * from Product_categories;
category_id | category_name
-----+-----
1 | CPU
2 | Video Card
3 | RAM
4 | Mother Board
5 | Storage
(5 rows)

```

Inventories 表

```

168 | 8 | 56
174 | 8 | 86
175 | 8 | 86
182 | 8 | 128
184 | 8 | 128
185 | 8 | 129
188 | 8 | 137
189 | 8 | 137
190 | 8 | 137
191 | 8 | 138
193 | 8 | 138
195 | 8 | 139
196 | 8 | 139

...skipping 1 line
199 | 8 | 141
200 | 8 | 141
201 | 8 | 142
203 | 8 | 142
204 | 8 | 142
205 | 8 | 142
207 | 8 | 121
(1112 rows)

```

Warehouses 表


```
sales=> select * from Warehouses;
```

warehouse_id	warehouse_name	location_id
1	Southlake, Texas	5
2	San Francisco	6
3	New Jersey	7
4	Seattle, Washington	8
5	Toronto	9
6	Sydney	13
7	Mexico City	23
8	Beijing	11
9	Bombay	12

(9 rows)

Locations 表

```
sales=> select * from Locations;
```

location_id	address	postal_code	city	state	country_id
1	1297 Via Cola di Rie	00989	Roma		IT
2	93891 Calle della Testa	10934	Venice		IT
3	2017 Shinjuku-ku	1689	Tokyo	Tokyo Prefecture	JP
4	9450 Kamiya-cho	6823	Hiroshima		JP
5	2014 Jabberwocky Rd	26192	Southlake	Texas	US
6	2011 Interiors Blvd	99236	South San Francisco	California	US
7	2807 Zagora St	58090	South Brunswick	New Jersey	US
8	2804 Charade Rd	98199	Seattle	Washington	US
9	147 Spadina Ave	M5V 2L7	Toronto	Ontario	CA
10	6092 Boxwood St	Y5W 9T2	Whitehorse	Yukon	CA
11	40-5-12 Laogianggen	190518	Beijing		CN
12	1298 Vileparle (E)	490231	Bombay	Maharashtra	IN
13	12-98 Victoria Street	2981	Sydney	New South Wales	AU
14	198 Clementi North	540198	Singapore		SG
15	8284 Arthur St		London		UK
16	Magdalen Centre, The Oxford Science Park	OX9 9ZB	Oxford	Oxford	UK
17	9702 Chester Road	09629850293	Stretford	Manchester	UK
18	Schwanthalerstr. 7031	80925	Munich	Bavaria	DE
19	Rue Frei Caneca 1360	01307-002	Sao Paulo	Sao Paulo	BR
20	20 Rue des Corps-Saints	1730	Geneva	Geneve	CH
21	Murtenstrasse 921	3095	Bern	BE	CH
22	Pieter Breughelstraat 837	3029SK	Utrecht	Utrecht	NL
23	Mariano Escobedo 9991	11932	Mexico City	Distrito Federal,	MX

(23 rows)

Countries 表

```
sales=> select * from countries;
country_id | country_name | region_id
-----+-----+-----
AR | Argentina | 2
AU | Australia | 3
BE | Belgium | 1
BR | Brazil | 2
CA | Canada | 2
CH | Switzerland | 1
CN | China | 3
DE | Germany | 1
DK | Denmark | 1
EG | Egypt | 4
FR | France | 1
IL | Israel | 4
IN | India | 3
IT | Italy | 1
JP | Japan | 3
KW | Kuwait | 4
ML | Malaysia | 3
MX | Mexico | 2
NG | Nigeria | 4
NL | Netherlands | 1
SG | Singapore | 3
UK | United Kingdom | 1
US | United States of America | 2
ZM | Zambia | 4
ZW | Zimbabwe | 4
(25 rows)
```

Regions 表

```
sales=> select * from Regions;
region_id | region_name
-----+-----
1 | Europe
2 | Americas
3 | Asia
4 | Middle East and Africa
(4 rows)
```

(7) 删除表，模式，数据库，用户

按照外键顺序删除，或者直接使用 CASCADE 删除表

```
sales=> drop table regions cascade;
DROP TABLE
```

删除模式

```

sales=> drop schema yipei cascade;
NOTICE: drop cascades to 11 other objects
DETAIL: drop cascades to table employees
drop cascades to table orders
drop cascades to table order_items
drop cascades to table customers
drop cascades to table products
drop cascades to table contacts
drop cascades to table product_categories
drop cascades to table inventories
drop cascades to table warehouses
drop cascades to table locations
drop cascades to table countries
DROP SCHEMA

```

删除数据库

```

postgres=# drop database sales;
DROP DATABASE

```

删除用户

```

postgres=# drop user yipei;
DROP ROLE

```

3.实验总结

3.1 完成的工作

先以 root 登入，换成 omm 进入数据库；

创建用户，模式，sales 数据库；

切换用户加入新的数据库，新建新表；

设置约束；

导入数据；

查询；

删除表，数据库，模式，用户；

3.2 对实验的认识

掌握了数据库的基本用法；基本的 sql 语句；数据如何导入数据

库

3.3 遇到的困难及解决方法

在数据导入数据库之前，要先给文件夹权限，否则将无法访问改该文件。