

2022년 IoT기반 스마트 솔루션 개발자 양성과정



# Programming : Python

## 17-MariaDB

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# SQL

- SQL [Structured Query Language]
- 관계형 데이터베이스 관리 시스템(RDBMS)의 데이터를 관리하기 위해 설계된 특수 목적의 프로그래밍 언어
- 자료의 검색과 관리, 데이터베이스 스키마 생성과 수정, 데이터베이스 객체 접근 조정 관리
- SQL 구문
  - 데이터 정의 언어 (DDL : Data Definition Language)
  - 데이터 조작 언어 (DML : Data Manipulation Language)
  - 데이터 제어 언어 (DCL : Data Control Language)



# mysql

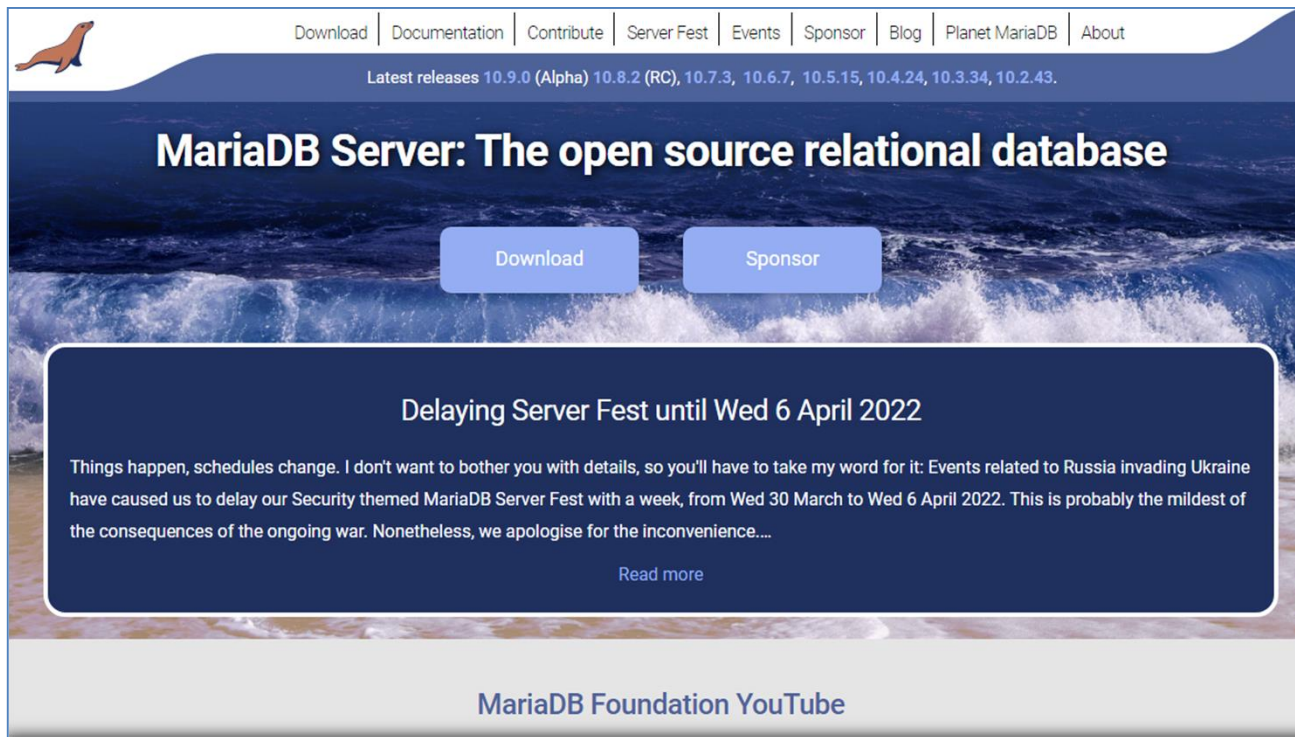
- <https://www.mysql.com/>



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# MariaDB

- <https://mariadb.org/>



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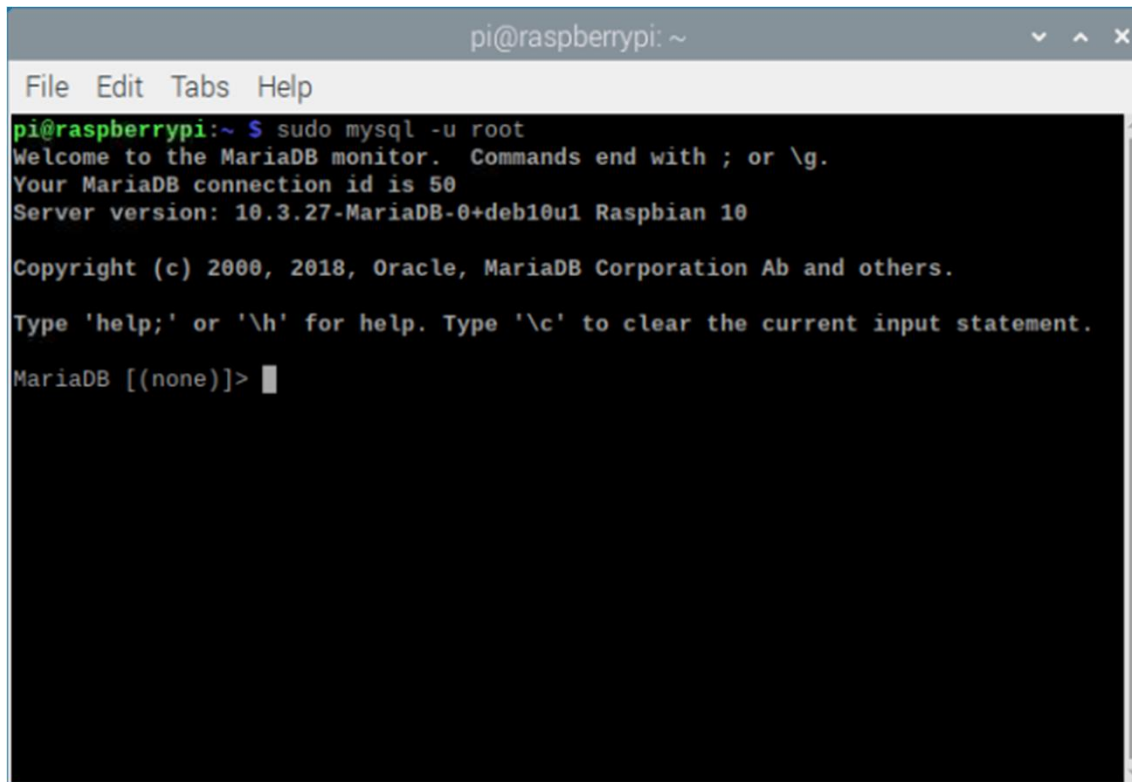
# Install mariadb-server, client

- `sudo apt-get install mariadb-server mariadb-client`

```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~ $ sudo apt-get install mariadb-server mariadb-client  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl  
  libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libencode-locale-perl  
  libfcgi-perl libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl  
  libhttp-date-perl libhttp-message-perl libio-html-perl  
  liblwp-mediatypes-perl libmariadb3 libreadline5 libsigsegv2  
  libterm-readkey-perl libtimedate-perl liburi-perl mariadb-client-10.3  
  mariadb-client-core-10.3 mariadb-common mariadb-server-10.3  
  mariadb-server-core-10.3 mysql-common socat  
Suggested packages:  
  gawk-doc libclone-perl libmldbm-perl libnet-daemon-perl  
  libsql-statement-perl libdata-dump-perl libipc-sharedcache-perl libwww-perl  
  mailx mariadb-test tinycal  
The following NEW packages will be installed:  
  galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl  
  libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libencode-locale-perl  
  libfcgi-perl libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl  
  libhttp-date-perl libhttp-message-perl libio-html-perl  
  liblwp-mediatypes-perl libmariadb3 libreadline5 libsigsegv2  
  libterm-readkey-perl libtimedate-perl liburi-perl mariadb-client
```



# sudo mysql -u root



```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~ $ sudo mysql -u root  
Welcome to the MariaDB monitor.  Commands end with ; or \g.  
Your MariaDB connection id is 50  
Server version: 10.3.27-MariaDB-0+deb10u1 Raspbian 10  
  
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
MariaDB [(none)]> █
```



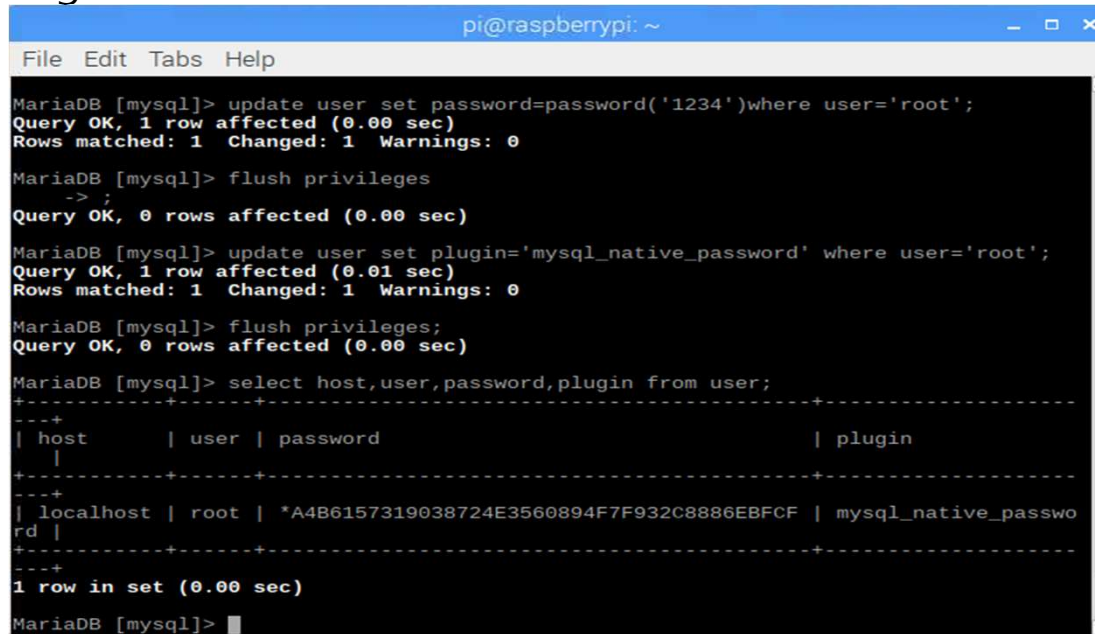
# use mysql

```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~ $ sudo mysql -u root  
Welcome to the MariaDB monitor.  Commands end with ; or \g.  
Your MariaDB connection id is 31  
Server version: 10.5.15-MariaDB-0+deb11u1 Raspbian 11  
  
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.  
  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
  
MariaDB [(none)]> use mysql  
Reading table information for completion of table and column names  
You can turn off this feature to get a quicker startup with -A  
  
Database changed  
MariaDB [mysql]> |
```



# user, password, plugin

[mysql]> update user set password=password('1234') where user='root';  
[mysql]> flush privileges  
[mysql]> update user set plugin='mysql\_native\_password' where user='root';  
[mysql]> flush privileges



```
pi@raspberrypi: ~  
File Edit Tabs Help  
MariaDB [mysql]> update user set password=password('1234')where user='root';  
Query OK, 1 row affected (0.00 sec)  
Rows matched: 1 Changed: 1 Warnings: 0  
  
MariaDB [mysql]> flush privileges  
-> ;  
Query OK, 0 rows affected (0.00 sec)  
  
MariaDB [mysql]> update user set plugin='mysql_native_password' where user='root';  
Query OK, 1 row affected (0.01 sec)  
Rows matched: 1 Changed: 1 Warnings: 0  
  
MariaDB [mysql]> flush privileges;  
Query OK, 0 rows affected (0.00 sec)  
  
MariaDB [mysql]> select host,user,password,plugin from user;  
+-----+-----+-----+-----+  
+-----+-----+-----+-----+  
| host      | user | password | plugin |  
+-----+-----+-----+-----+  
| localhost | root | *A4B6157319038724E3560894F7F932C8886EBFCF | mysql_native_passwo  
rd |  
+-----+-----+-----+-----+  
1 row in set (0.00 sec)  
MariaDB [mysql]>
```





# SQL DLM구문

- 보기
  - show databases;
  - show tables;
  - select \* from [tb];
- 생성
  - create database [db];
  - create table [tb] (fd type, fd type.....);
  - insert into [tb] values(val, val, val.....);
- 삭제
  - drop database [db];
  - drop table [tb];
  - delete from [tb] where [cond.];



# Create database, table

```
pi@raspberrypi: ~  
File Edit Tabs Help  
MariaDB [(none)]> create database test;  
Query OK, 1 row affected (0.00 sec)  
  
MariaDB [(none)]> use test;  
Database changed  
MariaDB [test]> show databases;  
+-----+  
| Database |  
+-----+  
| information_schema |  
| mysql |  
| performance_schema |  
| test |  
+-----+  
4 rows in set (0.00 sec)  
  
MariaDB [test]> create table weather(date char(8),time char(8),temp int,humi int);  
Query OK, 0 rows affected (0.04 sec)  
  
MariaDB [test]> show tables;  
+-----+  
| Tables_in_test |  
+-----+  
| weather |  
+-----+  
1 row in set (0.00 sec)
```



# Insert field data

```
pi@raspberrypi: ~  
File Edit Tabs Help  
MariaDB [test]> insert into weather values("20181015","14:12:25",16,68);  
Query OK, 1 row affected (0.01 sec)  
MariaDB [test]> insert into weather values("20181015","14:12:30",16,69);  
Query OK, 1 row affected (0.00 sec)  
MariaDB [test]> insert into weather values("20181015","14:12:35",17,70);  
Query OK, 1 row affected (0.01 sec)  
MariaDB [test]> select * from weather;  
+-----+-----+-----+-----+  
| date      | time      | temp | humi |  
+-----+-----+-----+-----+  
| 20181014 | 12:36:45 | 14   | 72   |  
| 20181012 | 12:36:55 | 15   | 73   |  
| 20181014 | 12:37:05 | 115  | 72   |  
| 20181015 | 14:12:10 | 15   | 65   |  
| 20181015 | 14:12:15 | 15   | 65   |  
| 20181015 | 14:12:20 | 15   | 65   |  
| 20181015 | 14:12:25 | 16   | 68   |  
| 20181015 | 14:12:30 | 16   | 69   |  
| 20181015 | 14:12:35 | 17   | 70   |  
+-----+-----+-----+-----+  
9 rows in set (0.00 sec)  
MariaDB [test]> 
```



# Select \* from [tb] where [cond]

```
pi@raspberrypi: ~  
File Edit Tabs Help  
MariaDB [test]> select * from weather where date='20181015';  
+-----+-----+-----+-----+  
| date      | time      | temp | humi |  
+-----+-----+-----+-----+  
| 20181015  | 14:12:10  | 15   | 65   |  
| 20181015  | 14:12:15  | 15   | 65   |  
| 20181015  | 14:12:20  | 15   | 65   |  
| 20181015  | 14:12:25  | 16   | 68   |  
| 20181015  | 14:12:30  | 16   | 69   |  
| 20181015  | 14:12:35  | 17   | 70   |  
+-----+-----+-----+-----+  
6 rows in set (0.00 sec)  
MariaDB [test]> █
```



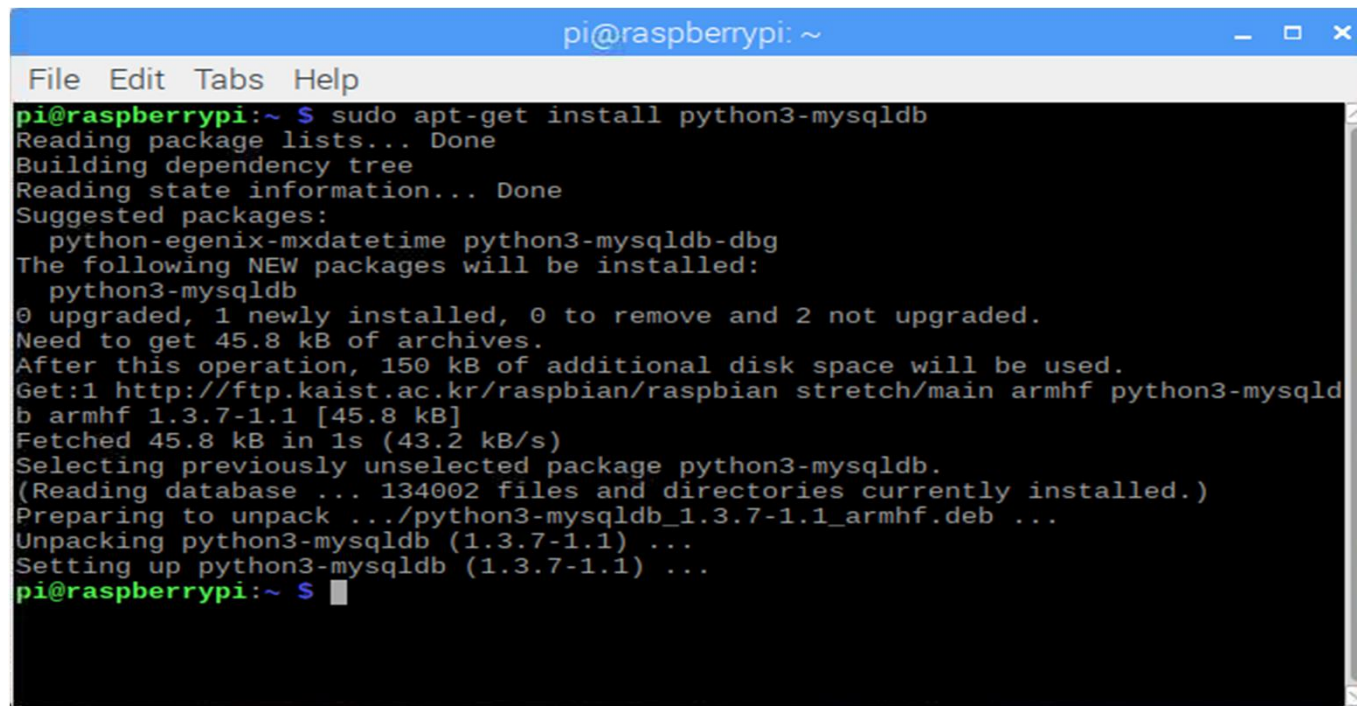
# Drop database

```
pi@raspberrypi: ~  
File Edit Tabs Help  
MariaDB [test]> select * from weather where date='20181015';  
+-----+-----+-----+-----+  
| date      | time      | temp | humi |  
+-----+-----+-----+-----+  
| 20181015 | 14:12:10 | 15   | 65   |  
| 20181015 | 14:12:15 | 15   | 65   |  
| 20181015 | 14:12:20 | 15   | 65   |  
| 20181015 | 14:12:25 | 16   | 68   |  
| 20181015 | 14:12:30 | 16   | 69   |  
| 20181015 | 14:12:35 | 17   | 70   |  
+-----+-----+-----+-----+  
6 rows in set (0.00 sec)  
  
MariaDB [test]> drop database test  
-> ;  
Query OK, 1 row affected (0.03 sec)  
  
MariaDB [(none)]> 
```



# Install python3-mysqldb

- `$ sudo apt-get install python3-mysqldb`



```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~ $ sudo apt-get install python3-mysqldb  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Suggested packages:  
  python-egenix-mxdatetime python3-mysqldb-dbg  
The following NEW packages will be installed:  
  python3-mysqldb  
0 upgraded, 1 newly installed, 0 to remove and 2 not upgraded.  
Need to get 45.8 kB of archives.  
After this operation, 150 kB of additional disk space will be used.  
Get:1 http://ftp.kaist.ac.kr/raspbian/raspbian stretch/main armhf python3-mysqldb armhf 1.3.7-1.1 [45.8 kB]  
Fetched 45.8 kB in 1s (43.2 kB/s)  
Selecting previously unselected package python3-mysqldb.  
(Reading database ... 134002 files and directories currently installed.)  
Preparing to unpack .../python3-mysqldb_1.3.7-1.1_armhf.deb ...  
Unpacking python3-mysqldb (1.3.7-1.1) ...  
Setting up python3-mysqldb (1.3.7-1.1) ...  
pi@raspberrypi:~ $
```



# Ex1 : Create DataBase

```
mySQL-1.py ✕
1  import MySQLdb
2
3  dbase=MySQLdb.connect(host='localhost', user='root', passwd="1234")
4  mycursor=dbase.cursor()
5
6  dbname=input ("database name : ")
7  try:
8      sql="create database " + dbname + ";"
9      print (sql)
10     mycursor.execute(sql)
11     dbase.commit()
12     mycursor.execute("show databases")
13
14     for x in mycursor:
15         print (x)
16
17 finally:
18     dbase.close()
19
```



# Ex1 : Run

```
Shell
>>> %Run mySQL-1.py
database name : testdbase
create database testdbase;
('information_schema',)
('mysql',)
('performance_schema',)
('testDB',)
('testDbase',)
('testdbase',)

>>> %Reset
```

```
pi@raspberrypi: ~
File Edit Tabs Help
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| testDB |
+-----+
4 rows in set (0.00 sec)

MariaDB [mysql]> show databases
-> ;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| testDB |
| testDbase |
| testdbase |
+-----+
6 rows in set (0.00 sec)

MariaDB [mysql]>
```





## Ex2 : Create Table, field

```
mySQL-2.py *  
1  import MySQLdb  
2  
3  dbase=MySQLdb.connect(host='localhost', user='root', passwd="1234",db="testDB"  
4  mycursor=dbase.cursor()  
5  
6  try:  
7      sql="create table randnum(Time char(8),Random int, evenOdd int);"  
8      print (sql)  
9      mycursor.execute(sql)  
10     dbase.commit()  
11  
12     mycursor.execute("show tables")  
13     for x in mycursor:  
14         print (x)  
15  
16 finally:  
17     dbase.close()  
18
```



## Ex2 : Run

Shell

```
('mysql',)  
( 'performance_schema', )  
( 'testDB', )  
( 'testDbase', )  
( 'testdbase', )  
  
>>> %Run mySQL-2.py  
  
create table randnum(Time char(8),Random int, evenOdd int);  
( 'randnum', )  
  
>>>
```



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## Ex3 : Insert into table

```
mySQL-3.py x
1  import MySQLdb
2  from time import localtime, strftime, sleep
3  import random
4
5  dbase=MySQLdb.connect(host='localhost', user='root', passwd="1234",db="testDB")
6  mycursor=dbase.cursor()
7
8  try:
9      for k in range(100):
10         dtime=strftime("%H:%M:%S",localtime())
11         rand=random.randrange(0,101)
12         even=rand % 2
13         sql="""insert into randnum(Time,Random,evenOdd) values( "%s", %d, %d);"""\
14             %(dtime,rand,even)
15         print (sql)
16         mycursor.execute(sql)
17         sleep(1)
18
19     dbase.commit()
20
21 finally:
22     dbase.close()
```



## Ex3 : run

```
Shell
insert into randnum(Time,Random,evenOdd) values( "18:10:01", 80, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:02", 46, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:03", 68, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:04", 93, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:05", 29, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:06", 67, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:07", 7, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:08", 16, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:09", 100, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:10", 5, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:11", 93, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:12", 78, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:13", 22, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:14", 71, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:15", 86, 0);
insert into randnum(Time,Random,evenOdd) values( "18:10:16", 77, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:17", 41, 1);
insert into randnum(Time,Random,evenOdd) values( "18:10:18", 70, 0);
>>>
```



## Ex4 : select \* from [tb]

```
mySQL-4.py
1  import MySQLdb
2  from time import localtime, strftime, sleep
3  import random
4
5  dbase=MySQLdb.connect(host='localhost', user='root', passwd="1234", db="testDB")
6  mycursor=dbase.cursor()
7
8  try:
9      while True:
10         sql=input ("SQL: ")
11         mycursor.execute(sql)
12
13         for x in mycursor:
14             print (x)
15
16 finally:
```



## Ex4 : Run

```
Shell
{ 10.10.10, 10, 0 }
SQL: select * from randnum where evenOdd=1;
('18:10:40', 43, 1)
('18:10:42', 81, 1)
('18:10:43', 31, 1)
('18:10:44', 47, 1)
('18:10:45', 91, 1)
('18:10:51', 79, 1)
('18:10:52', 85, 1)
('18:10:53', 11, 1)
('18:10:54', 11, 1)
('18:10:55', 77, 1)
('18:10:56', 33, 1)
('18:10:03', 53, 1)
('18:10:07', 89, 1)
('18:10:08', 87, 1)
('18:10:09', 19, 1)
```



## 실습 : TCP Chat DB

