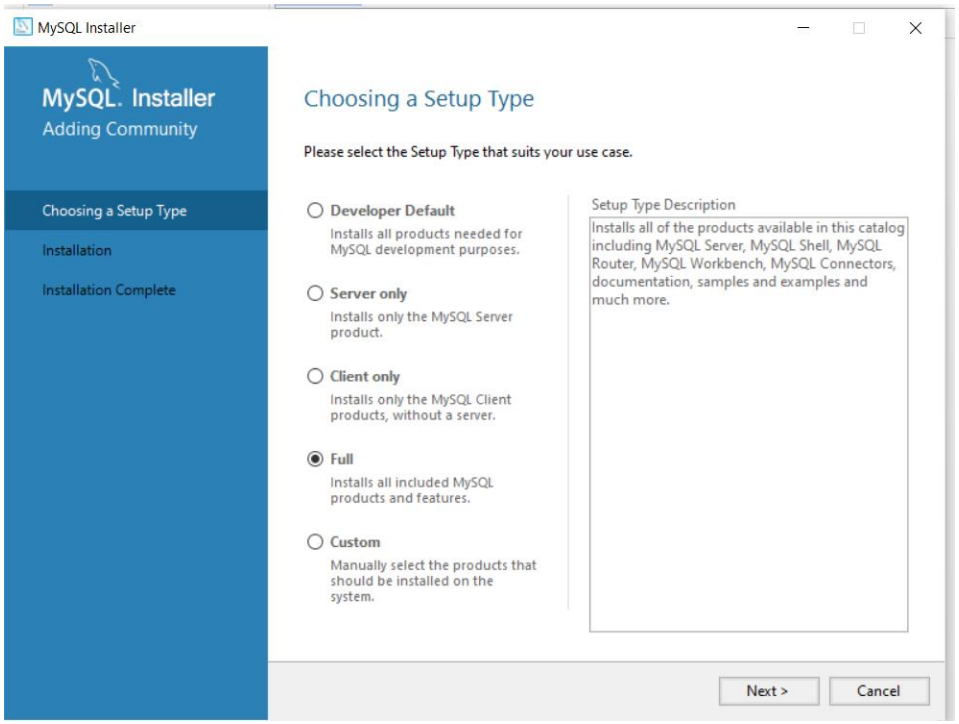
Working with MySQL and Python

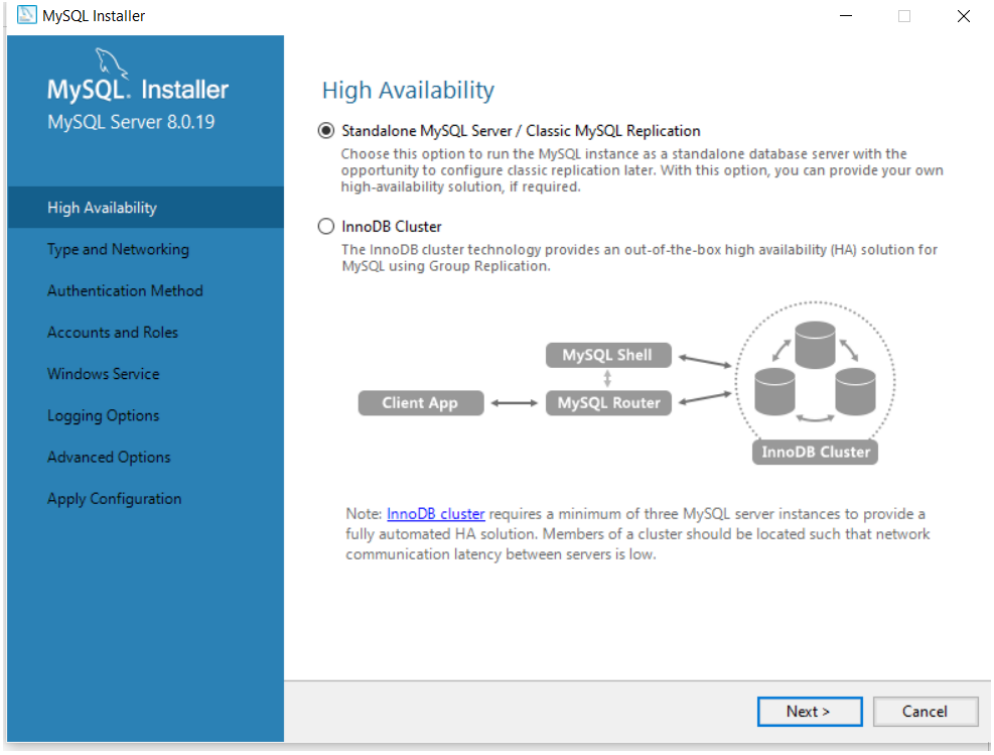
Installing MySQL Workbench

- Download MYSQL application. Go to page : https://dev.mysql.com/downloads/installer/
- Click on the link highlighted below.

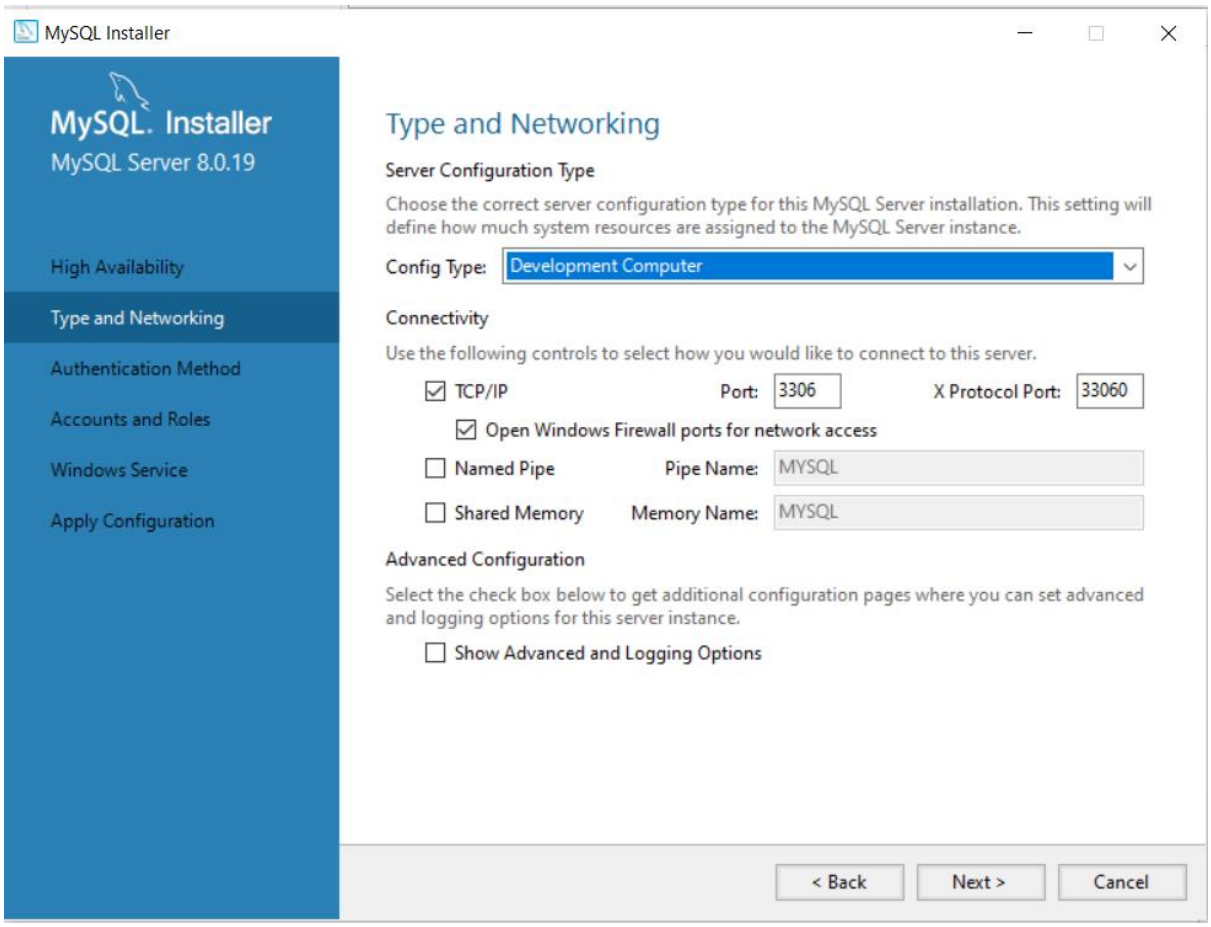
- Once downloaded, install the application. Follow the instructions and continue with installation.

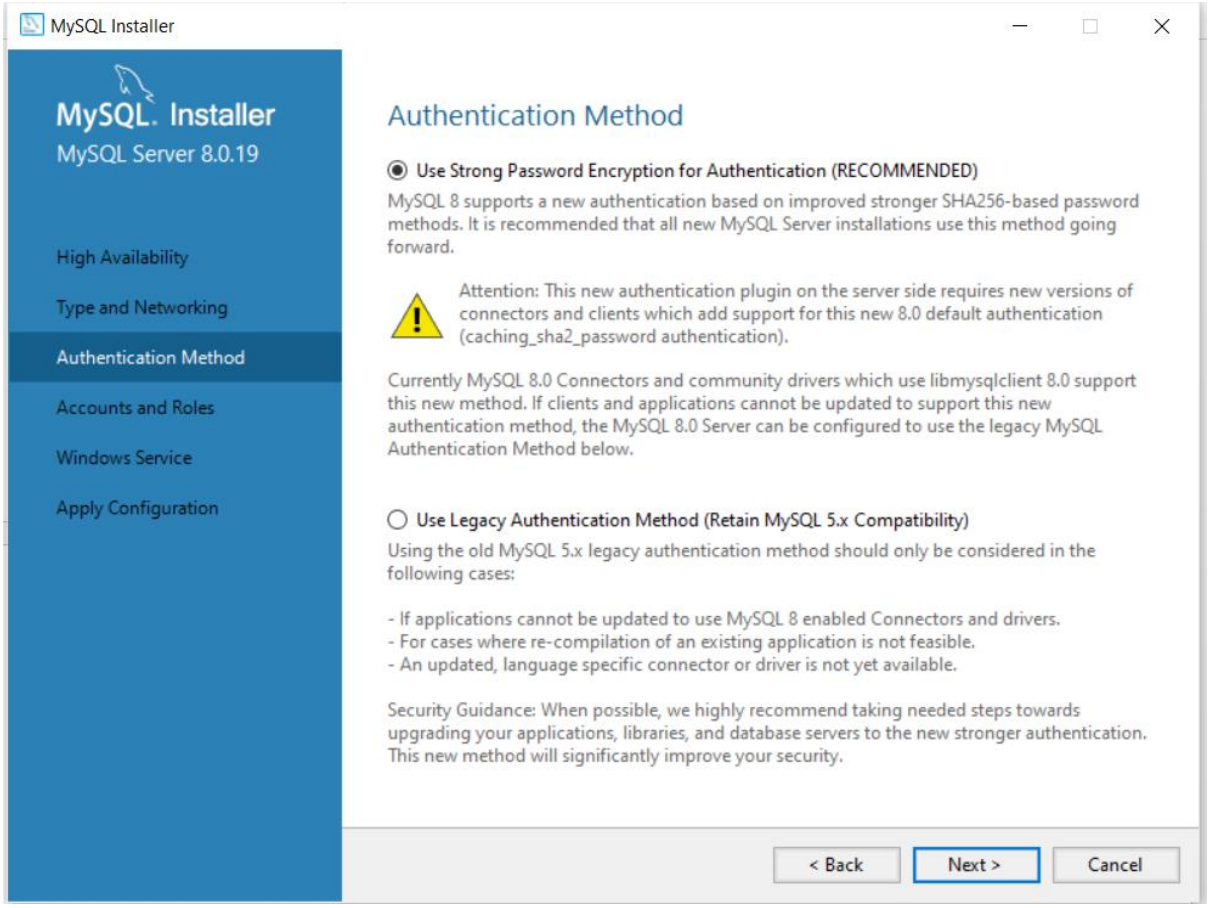


- Select Standalone MySQL server option



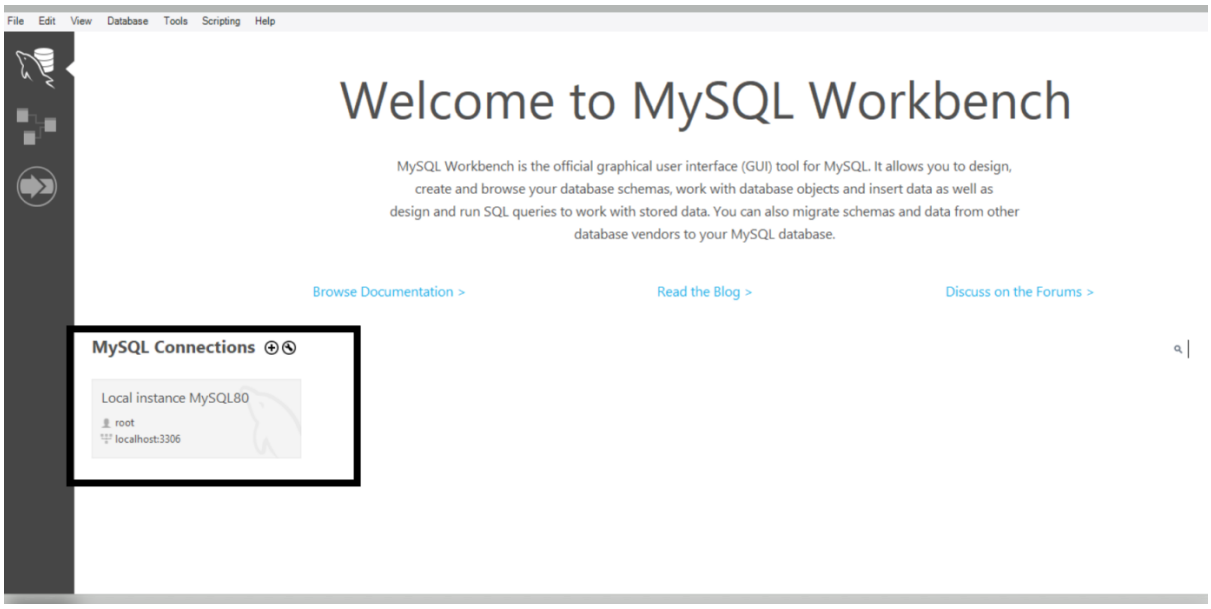
- Keep the default values for “Type and Networking” section



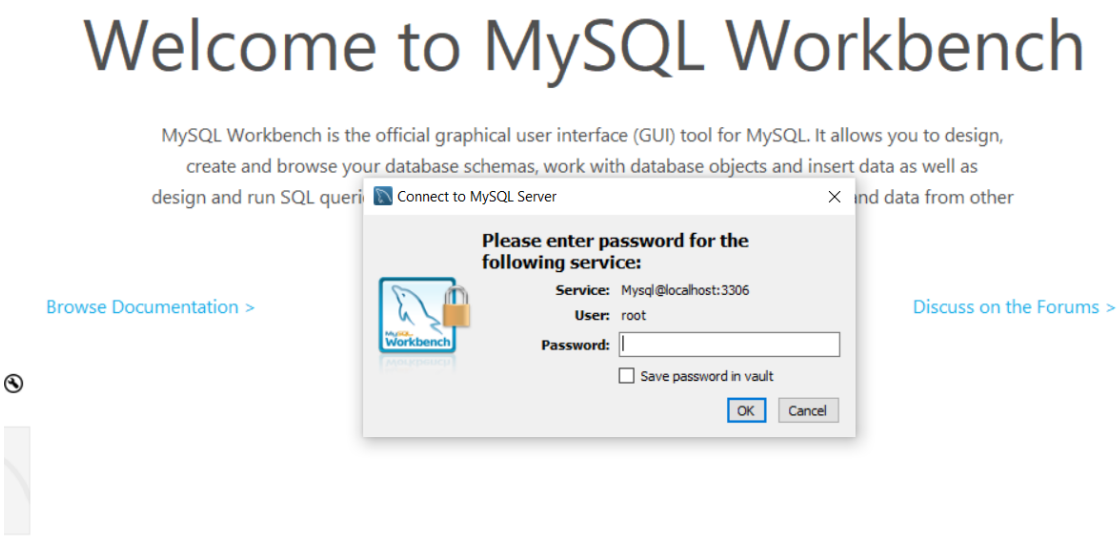


- Finish the installation by pressing next.

- Once the installation is complete, open the MYSQL workbench and click on the local instance connection. The window will look something like this:

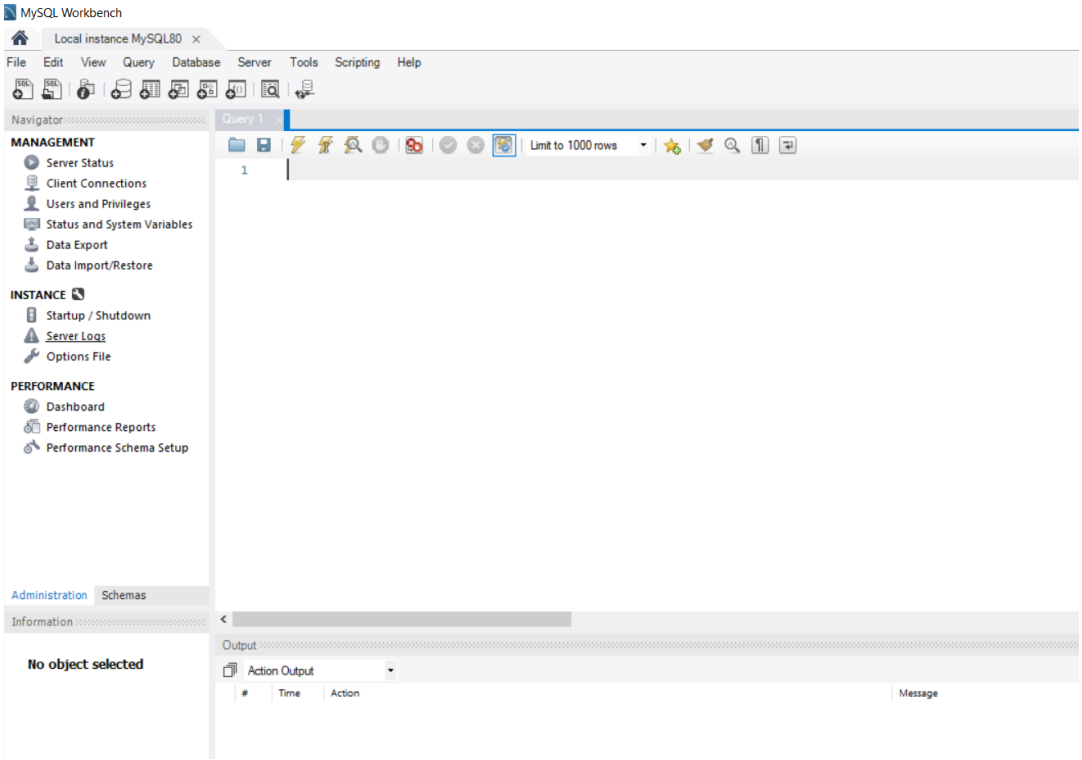


- Provide the password that you setup during installation:



<u>Remember the user name mentioned above as we will need it to connect python to Mysql.</u>

- Once the connection is established, you will see a window like this:



Connecting MySql With Python

Let's use python to connect with this database.

- First we need to install "mysql-connector-python" package to establish a connection with Mysql.

  "pip install mysql-conector-python"

```
(pyMysql) D:\Project_\PythonToMySql>pip install mysql-connector-python
Collecting mysql-connector-python
  Using cached mysql_connector_python-8.0.19-cp36-cp36m-win_amd64.whl (4
Requirement already satisfied: protobuf==3.6.1 in c:\programdata\anacond
Requirement already satisfied: dnspython==1.16.0 in c:\programdata\anaco
Requirement already satisfied: six>=1.9 in c:\programdata\anaconda3\envs
Requirement already satisfied: setuptools in c:\programdata\anaconda3\en
Installing collected packages: mysql-connector-python
Successfully installed mysql-connector-python-8.0.19
```

- Once the package is installed, we can go ahead with establishing the connection.

```
import mysql.connector as connection

try:
    mydb = connection.connect(host="localhost", user="root", passwd="password",use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())
    mydb.close()
except Exception as e:
    print(str(e))
```

- Enter the details as shown above, your mysql server is running locally so **host** is "localhost",

  enter the **username** and **password** as was setup during installation.

  <u>Note: "use_pure" argument forces mysqlConnector to user pure python connection instead of C extensions which leads to SSL error.</u>

- To check if the connection is established, we can use **print (mydb.is_connected)**. It will return **TRUE** if the connection is established else **FALSE**.

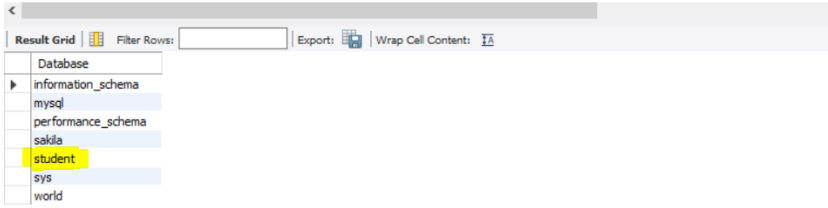
```
Debugger    Console
C:\ProgramData\Anaconda3\envs\pyMysql\python.exe "C:\Pr
pydev debugger: process 684 is connecting

Connected to pydev debugger (build 193.5662.61)
True
```

- Our connection is established now.
- Let's start with creating a database with name Student.

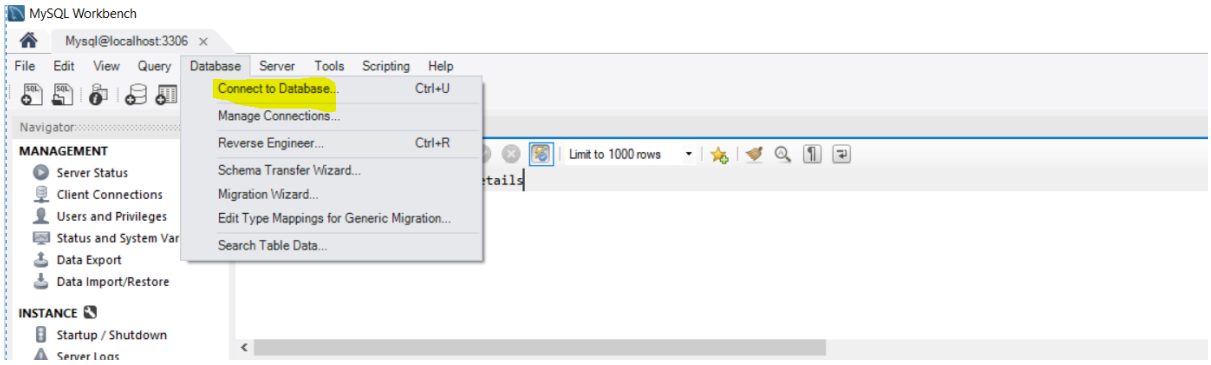
```python
import mysql.connector as connection

try:
    mydb = connection.connect(host="localhost", user="root", passwd="mysql",use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())

    query = "Create database Student;"
    cursor = mydb.cursor() #create a cursor to execute queries
    cursor.execute(query)
    print("Database Created!!")
    mydb.close()
except Exception as e:
    mydb.close()
    print(str(e))
```

```
Run: createDatabase
C:\ProgramData\Anaconda3\envs\MySQL\python.exe D:/Project_/MySQL/createDatabase.py
True
Database Created!!

Process finished with exit code 0
```

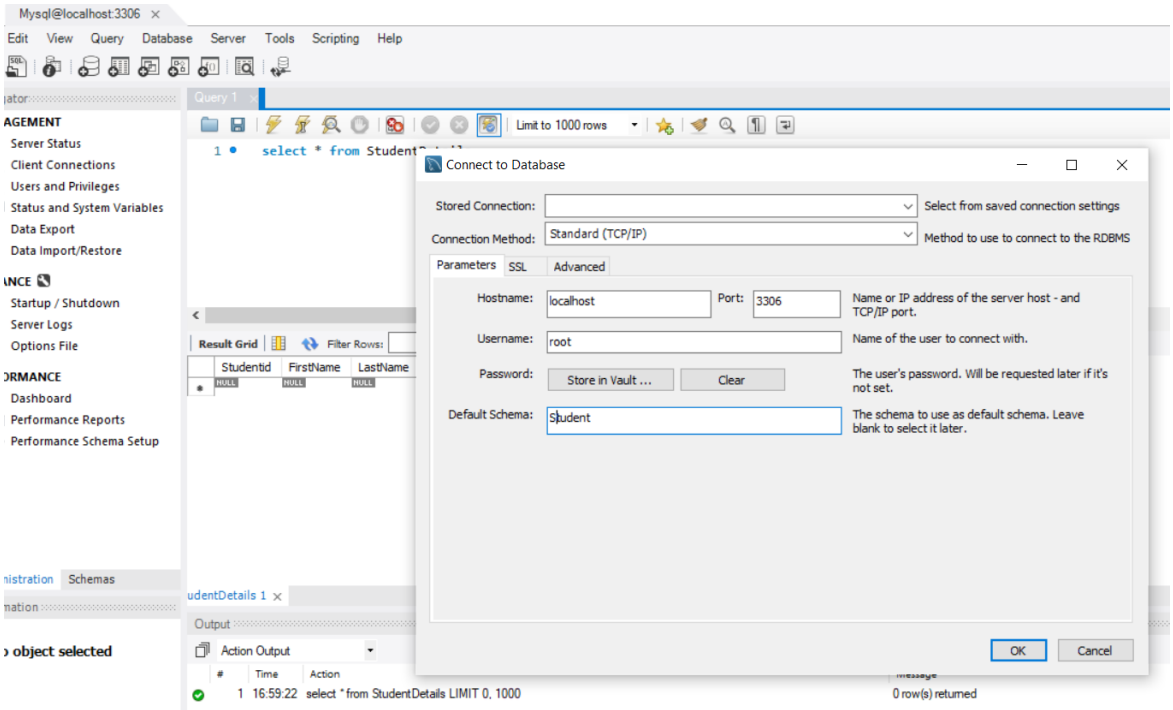
- Let’s check if database is created in our MySQL Workbench.



- Great! Database is created.
- Let’s start with creating tables. Let’s first connect to the created database in our workbench so that we can view the tables, once we create them from python.



- Give the database name:

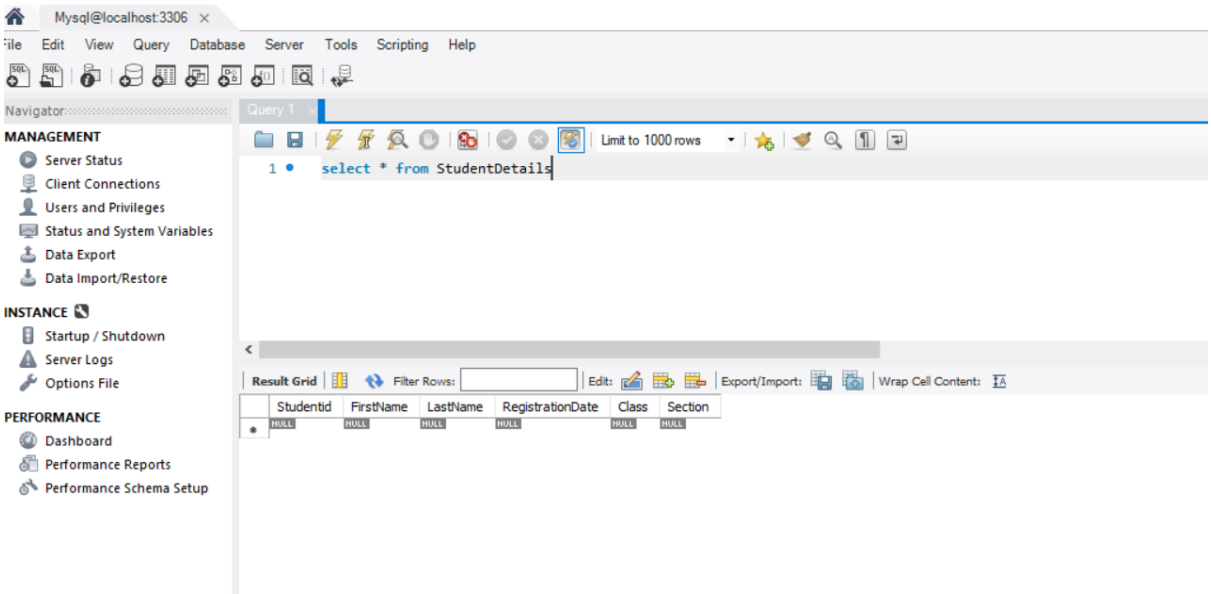


- Now we are connected to the created database. Let's start with creating tables.

```python
import mysql.connector as connection

try:
    mydb = connection.connect(host="localhost", database = 'Student',user="root", passwd="mysql",use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())

    query = "CREATE TABLE StudentDetails (Studentid INT(10) AUTO_INCREMENT PRIMARY KEY,FirstName VARCHAR(60)," \
            "LastName VARCHAR(60), RegistrationDate DATE,Class Varchar(20), Section Varchar(10))"

    cursor = mydb.cursor() #create a cursor to execute queries
    cursor.execute(query)
    print("Table Created!!")
    mydb.close()
except Exception as e:
    mydb.close()
    print(str(e))
```

- We need to pass an **additional parameter, database name, while connecting to server**. We have passed "Student" database in which we are going to create the table.

- Let's see if the table is connected in our Mysql.



- Our table is now created in the mentioned database.

- Let’s start with inserting values in our table:

```python
import mysql.connector as connection

try:
    mydb = connection.connect(host="localhost", database = 'Student',user="root", passwd="mysql",use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())

    query = "INSERT INTO StudentDetails VALUES (1120,'Rohit','Sharma','1999-03-21','Tenth','B')"

    cursor = mydb.cursor() #create a cursor to execute queries
    cursor.execute(query)
    print("Values inserted into the table!!")
    mydb.commit()
    mydb.close()
except Exception as e:
    mydb.close()
    print(str(e))
```

```
C:\ProgramData\Anaconda3\envs\MySQL\python.exe "C:\Program Files\JetBrains\PyCharm Community Edition 2019.3.1\plugins\python-ce\helpers\pydev\pydevd.py" --multiproc --q
pydev debugger: process 8920 is connecting

Connected to pydev debugger (build 193.5662.61)
True
Values inserted intothe table!!

Process finished with exit code 0
```

- Let’s check if the values are inserted:

```
select * from StudentDetails
```

Studentid	FirstName	LastName	RegistrationDate	Class	Section
1120	Rohit	Sharma	1999-03-21	Tenth	B
NULL	NULL	NULL	NULL	NULL	NULL

- Let's now **insert values into a new table in a new database from a file**.
- We are loading all the values in the file "glass. Data" into our table.
- We created a new database named "Glass Data" and a new table "Glass Data" in it.
- We are reading each row from the file and inserting into the table.

```
try:
    mydb = connection.connect(host="localhost", user="root", passwd="mysql",use_pure=True)
    #check if the connection is established
    print(mydb.is_connected())
    #create a new database
    query = "Create database GlassData;"
    cursor = mydb.cursor() #create a cursor to execute queries
    cursor.execute(query)
    print("Database Created!!")
    mydb.close() #close the connection

    #Establish a new connection to the database created above
    mydb = connection.connect(host="localhost", database = 'GlassData',user="root", passwd="mysql", use_pure=True)

    #create a new table to store glass data
    query = "CREATE TABLE IF NOT EXISTS GlassData (Index Number INT(10),RI float(10,5), Na float(10,5), Mg float(10,5),Al float(10,5)," \
            " Si float(10,5), K float(10,5), Ca float(10,5), Ba float(10,5), Fe float(10,5), Class INT(5))"
    cursor = mydb.cursor()  # create a cursor to execute queries
    cursor.execute(query)
    print("Table Created!!")

    #read from the file
    with open('glass.data', "r") as f:
        next(f)
        glass_data = csv.reader(f, delimiter="\n")
        for line in enumerate(glass_data):
            for list_ in (line[1]):
                cursor.execute('INSERT INTO GlassData values ({values})'.format(values=(list_)))
    print("Values inserted!!")
    mydb.commit()
    cursor.close()
    mydb.close()
```

```
try
Run: insertFromFile
C:\ProgramData\Anaconda3\envs\MySQL\python.exe D:/Project_/MySQL/insertFromFile.py
True
Database Created!!
Table Created!!
Values inserted!!

Process finished with exit code 0
```

- Let's check if the values are inserted in the table.

Query 1

Limit to 1000 rows

```
select * from GlassData.GlassData
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Index_Number	RI	Na	Mg	Al	Si	K	Ca	Ba	Fe	Class
1	1.52101	13.64000	4.49000	1.10000	71.78000	0.06000	8.75000	0.00000	0.00000	1
2	1.51761	13.89000	3.60000	1.36000	72.73000	0.48000	7.83000	0.00000	0.00000	1
3	1.51618	13.53000	3.55000	1.54000	72.99000	0.39000	7.78000	0.00000	0.00000	1
4	1.51766	13.21000	3.69000	1.29000	72.61000	0.57000	8.22000	0.00000	0.00000	1
5	1.51742	13.27000	3.62000	1.24000	73.08000	0.55000	8.07000	0.00000	0.00000	1
6	1.51596	12.79000	3.61000	1.62000	72.97000	0.64000	8.07000	0.00000	0.26000	1
7	1.51743	13.30000	3.60000	1.14000	73.09000	0.58000	8.17000	0.00000	0.00000	1
8	1.51756	13.15000	3.61000	1.05000	73.24000	0.57000	8.24000	0.00000	0.00000	1
9	1.51918	14.04000	3.58000	1.37000	72.08000	0.56000	8.30000	0.00000	0.00000	1
10	1.51755	13.00000	3.60000	1.36000	72.99000	0.57000	8.40000	0.00000	0.11000	1
11	1.51571	12.72000	3.46000	1.56000	73.20000	0.67000	8.09000	0.00000	0.24000	1

GlassData 9 | Read Only

- The values are inserted.

Let's see some other commands:

1) **Selecting from table**

Project

MySQL D:\Project_\MySQL
- checkListOfDatabases.py
- connectToMysql.py
- createDatabase.py
- createTableInDB.py
- Download MYSQL application.docx
- glass.data
- insertFromFile.py
- insertToTable.py
- selectFromDbIntoDataframe.py
- ~$wnload MYSQL application.docx
- ~WRL3524.tmp

External Libraries

Scratches and Consoles

insertFromFile.py | selectFromDbIntoDataframe.py

```python
import mysql.connector as connection
import pandas as pandas

try:
    mydb = connection.connect(host="localhost", database = 'GlassData',user="root", passwd="mysql",use_pure=True)
    #check if the connection is established
    print(mydb.is_connected())
    query = "Select * from GlassData;"
    cursor = mydb.cursor() #create a cursor to execute queries
    cursor.execute(query)
    for result in cursor.fetchall():
        print(result)
    mydb.close() #close the connection

except Exception as e:
    #mydb.close()
    print(str(e))
```

Result:

```
selectFromDbIntoDataframe
C:\ProgramData\Anaconda3\envs\MySQL\python.exe D:/Project_/MySQL/selectFromDbIntoDataframe.py
True
(1, 1.52101, 13.64, 4.49, 1.1, 71.78, 0.06, 8.75, 0.0, 0.0, 1)
(2, 1.51761, 13.89, 3.6, 1.36, 72.73, 0.48, 7.83, 0.0, 0.0, 1)
(3, 1.51618, 13.53, 3.55, 1.54, 72.99, 0.39, 7.78, 0.0, 0.0, 1)
(4, 1.51766, 13.21, 3.69, 1.29, 72.61, 0.57, 8.22, 0.0, 0.0, 1)
(5, 1.51742, 13.27, 3.62, 1.24, 73.08, 0.55, 8.07, 0.0, 0.0, 1)
(6, 1.51596, 12.79, 3.61, 1.62, 72.97, 0.64, 8.07, 0.0, 0.26, 1)
(7, 1.51743, 13.3, 3.6, 1.14, 73.09, 0.58, 8.17, 0.0, 0.0, 1)
(8, 1.51756, 13.15, 3.61, 1.05, 73.24, 0.57, 8.24, 0.0, 0.0, 1)
(9, 1.51918, 14.04, 3.58, 1.37, 72.08, 0.56, 8.3, 0.0, 0.0, 1)
(10, 1.51755, 13.0, 3.6, 1.36, 72.99, 0.57, 8.4, 0.0, 0.11, 1)
(11, 1.51571, 12.72, 3.46, 1.56, 73.2, 0.67, 8.09, 0.0, 0.24, 1)
(12, 1.51763, 12.8, 3.66, 1.27, 73.01, 0.6, 8.56, 0.0, 0.0, 1)
(13, 1.51589, 12.88, 3.43, 1.4, 73.28, 0.69, 8.05, 0.0, 0.24, 1)
(14, 1.51748, 12.86, 3.56, 1.27, 73.21, 0.54, 8.38, 0.0, 0.17, 1)
(15, 1.51763, 12.61, 3.59, 1.31, 73.29, 0.58, 8.5, 0.0, 0.0, 1)
(16, 1.51761, 12.81, 3.54, 1.23, 73.24, 0.58, 8.39, 0.0, 0.0, 1)
(17, 1.51784, 12.68, 3.67, 1.16, 73.11, 0.61, 8.7, 0.0, 0.0, 1)
(18, 1.52196, 14.36, 3.85, 0.89, 71.36, 0.15, 9.15, 0.0, 0.0, 1)
(19, 1.51911, 13.9, 3.73, 1.18, 72.12, 0.06, 8.89, 0.0, 0.0, 1)
(20, 1.51735, 13.02, 3.54, 1.69, 72.73, 0.54, 8.44, 0.0, 0.07, 1)
(21, 1.5175, 12.82, 3.55, 1.49, 72.75, 0.54, 8.52, 0.0, 0.19, 1)
(22, 1.51966, 14.77, 3.75, 0.29, 72.02, 0.03, 9.0, 0.0, 0.0, 1)
(23, 1.51736, 12.78, 3.62, 1.29, 72.79, 0.59, 8.7, 0.0, 0.0, 1)
(24, 1.51751, 12.81, 3.57, 1.35, 73.02, 0.62, 8.59, 0.0, 0.0, 1)
(25, 1.5172, 13.38, 3.5, 1.15, 72.85, 0.5, 8.43, 0.0, 0.0, 1)
(26, 1.51764, 12.98, 3.54, 1.21, 73.0, 0.65, 8.53, 0.0, 0.0, 1)
(27, 1.51793, 13.21, 3.48, 1.41, 72.64, 0.59, 8.43, 0.0, 0.0, 1)
```

- Let’s try to store all the select values into a Dataframe.

```
MySQL / selectIntoDataframe.py
Project
MySQL D:\Project_\MySQL
checkListOfDatabases.py
connectToMysql.py
createDatabase.py
createTableInDB.py
Download MYSQL application.docx
glass.data
insertFromFile.py
insertToTable.py
selectFromDb.py
selectIntoDataframe.py
~$wnload MYSQL application.docx
~WRL3524.tmp
External Libraries
Scratches and Consoles
selectIntoDataframe.py
import mysql.connector as connection
import pandas as pandas

try:

    mydb = connection.connect(host="localhost", database='GlassData', user="root", passwd="mysql", use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())
    query = "Select * from GlassData;"
    result_dataFrame = pandas.read_sql(query,mydb)
    print(result_dataFrame)

    mydb.close()  # close the connection

except Exception as e:
    #mydb.close()
    print(str(e))
```

We can use **pandas.read_sql** to store the values in a dataframe.

Let’s see the result:

```
True
     Index_Number       RI     Na    Mg    Al  ...     K    Ca    Ba   Fe  Class
0               1  1.52101  13.64  4.49  1.10  ...  0.06  8.75  0.00  0.0      1
1               2  1.51761  13.89  3.60  1.36  ...  0.48  7.83  0.00  0.0      1
2               3  1.51618  13.53  3.55  1.54  ...  0.39  7.78  0.00  0.0      1
3               4  1.51766  13.21  3.69  1.29  ...  0.57  8.22  0.00  0.0      1
4               5  1.51742  13.27  3.62  1.24  ...  0.55  8.07  0.00  0.0      1
..            ...      ...    ...   ...   ...  ...   ...   ...   ...  ...    ...
209           210  1.51623  14.14  0.00  2.88  ...  0.08  9.18  1.06  0.0      7
210           211  1.51685  14.92  0.00  1.99  ...  0.00  8.40  1.59  0.0      7
211           212  1.52065  14.36  0.00  2.02  ...  0.00  8.44  1.64  0.0      7
212           213  1.51651  14.38  0.00  1.94  ...  0.00  8.48  1.57  0.0      7
213           214  1.51711  14.23  0.00  2.08  ...  0.00  8.62  1.67  0.0      7

[214 rows x 11 columns]

Process finished with exit code 0
```

2) Update statement

```
import mysql.connector as connection
import pandas as pandas

try:

    mydb = connection.connect(host="localhost", database='Student', user="root", passwd="mysql", use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())
    query = "UPDATE studentdetails SET FirstName = 'Kumar', LastName = 'Gaurav' WHERE Studentid = 1122"
    cursor = mydb.cursor()  # create a cursor to execute queries
    cursor.execute(query)
    mydb.commit()

    #let's check if the value is updated in the table.
    query = "Select * from studentdetails where Studentid=1122;"
    cursor = mydb.cursor()  # create a cursor to execute queries
    cursor.execute(query)
    for result in cursor.fetchall():
        print(result)

    mydb.close()  # close the connection

except Exception as e:
    #mydb.close()
    print(str(e))
```

```
Run: updateTable
C:\ProgramData\Anaconda3\envs\MySQL\python.exe D:/Project_/MySQL/updateTable.py
True
(1122, 'Kumar', 'Gaurav', datetime.date(1999, 6, 11), 'Ninth', 'B')

Process finished with exit code 0
```

- Let’s check in MySql workbench:

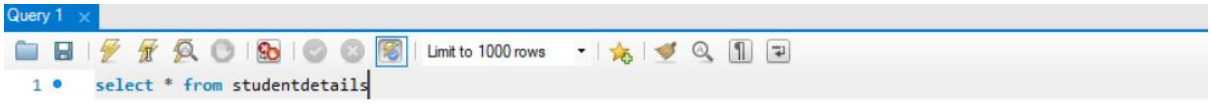
```
Query 1
select * from studentdetails
```

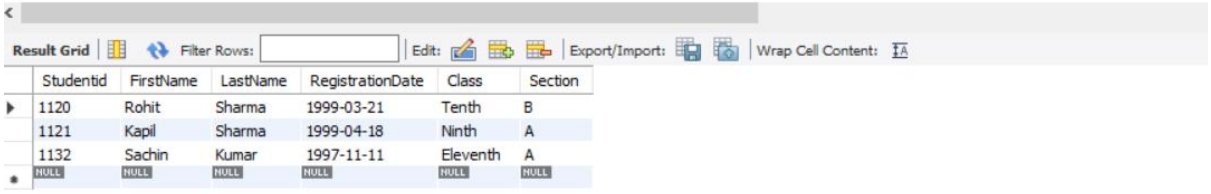
Studentid	FirstName	LastName	RegistrationDate	Class	Section
1120	Rohit	Sharma	1999-03-21	Tenth	B
1121	Kapil	Sharma	1999-04-18	Ninth	A
1122	Kumar	Gaurav	1999-06-11	Ninth	B
1132	Sachin	Kumar	1997-11-11	Eleventh	A
NULL	NULL	NULL	NULL	NULL	NULL

3) Delete statement

```
import mysql.connector as connection

try:

    mydb = connection.connect(host="localhost", database='Student', user="root", passwd="mysql", use_pure=True)
    # check if the connection is established
    print(mydb.is_connected())
    query = "DELETE FROM studentdetails WHERE Studentid = 1122"
    cursor = mydb.cursor()  # create a cursor to execute queries
    cursor.execute(query)
    mydb.commit()

    #let's check if the value is updated in the table.
    query = "Select * from studentdetails where Studentid=1122;"
    cursor = mydb.cursor()  # create a cursor to execute queries
    cursor.execute(query)
    for result in cursor.fetchall():
        print(result)

    mydb.close()  # close the connection

except Exception as e:
    #mydb.close()
    print(str(e))
```

- Let’s check in MySql workbench:





Studentid	FirstName	LastName	RegistrationDate	Class	Section
1120	Rohit	Sharma	1999-03-21	Tenth	B
1121	Kapil	Sharma	1999-04-18	Ninth	A
1132	Sachin	Kumar	1997-11-11	Eleventh	A
NULL	NULL	NULL	NULL	NULL	NULL

4) Group by, Order by