**JSC “Kazakh British Technical University”**
**School of Mathematic and Cybernetics**

Analysis of Data Bases

# Laboratory Work #10 (Python)

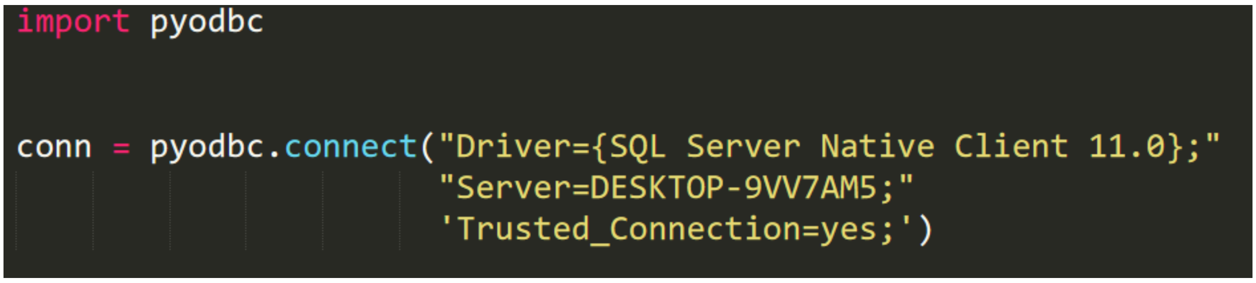
**Prepared by: Maratuly Temirbolat**

**Almaty 2021**

**SHORT DESCRIPTION:**

**The task of the Laboratory Work is to create queries using 5 Stored Procedures, 7 Triggers, 8 Functions. Then it is required to compile the queries using Python and show as well as write the results in console and file respectively.**

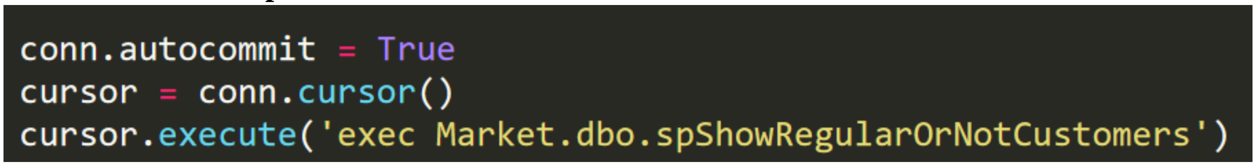
**The whole exercises were compiled in Sublime with Python (Version 3) extension. As long as we needed to use python we had to connect it to the sql server (especially to our server with the corresponded driver). The whole procedure is done here:**



```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')
```

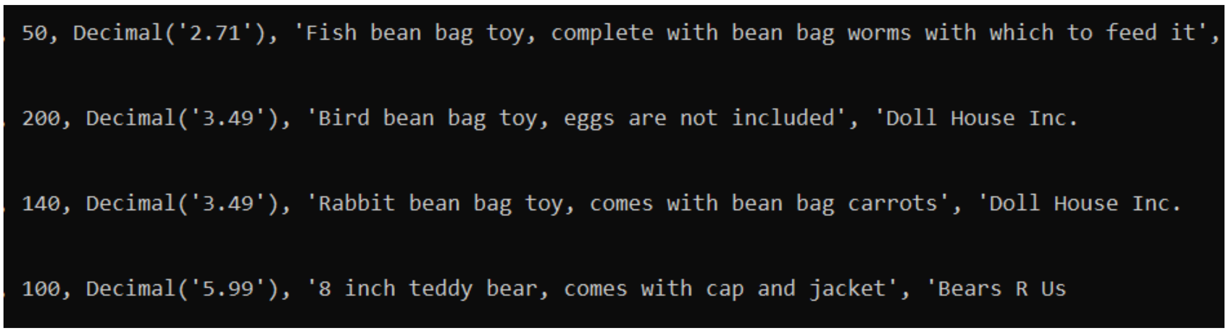
**"import pyodbc" means that we import the already installed (manually) library in order to connect to our SQL Server (For MySQL we use another different library). Then we connect to server by 'connect' function where we fill the Driver, Server as well as connection by ourselves. Congratulations ! We have connected to our Database.**

**The next step:**



```
conn.autocommit = True
cursor = conn.cursor()
cursor.execute('exec Market.dbo.spShowRegularOrNotCustomers')
```

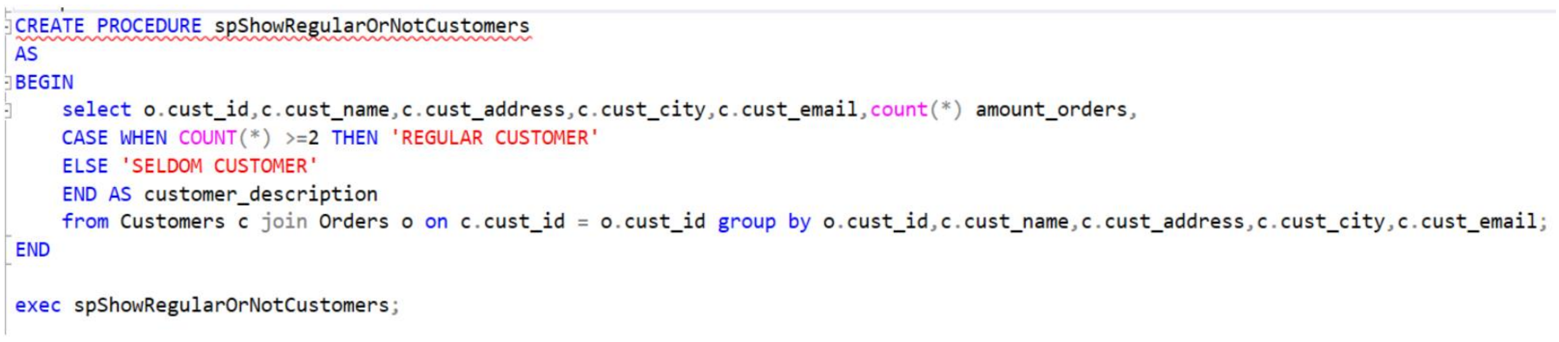
**Here we also use internal variable 'autocommit' and assign the True value that means we want to commit all the queries automatically (without it won't work). As we finished let's keep moving on, we create variable, here 'cursor' and assign the value of the function 'cursor' which means if we change 'cursor' variable we change 'conn' and we can use the built in function by calling 'cursor' for the further work! It is very convenient than call each time 'conn.cursor()' instead of just 'cursor'. The Last row is responsible for queries executions. We just type above created variable, here it is 'cursor' and use function 'execute' in brackets of which we need to write our query that we want to execute. Here it is exec spShowRegularOrNotCustomers. By the way, we have to use prefix 'Name of the database' and 'dbo' before the names of the tables , functions, procedures and so on since we did not type which database we want to use (I did not manage to handle this problem). Then the whole result of the query is written into cursor variable which we then just show or write into the file. However, there is one problem with type casting. So, let's overcome it by using map casting it into the list! Then we just use loop 'for' to go through the list 'var_fix' and then just show each variable under each index casting it into the string.**



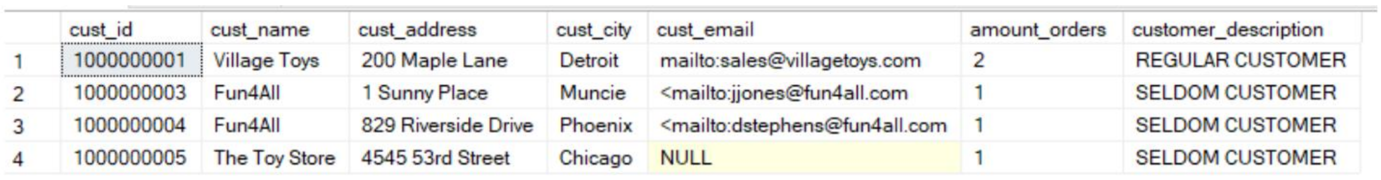
```
50, Decimal('2.71'), 'Fish bean bag toy, complete with bean bag worms with which to feed it',

200, Decimal('3.49'), 'Bird bean bag toy, eggs are not included', 'Doll House Inc.

140, Decimal('3.49'), 'Rabbit bean bag toy, comes with bean bag carrots', 'Doll House Inc.

100, Decimal('5.99'), '8 inch teddy bear, comes with cap and jacket', 'Bears R Us
```

## Queries with 5 Procedures:

1. Create a stored procedure that shows the customers and regularities of their visits to the market. The customer is said to be ‘REGULAR CUSTOMER’ if he/she bought at least 2 things, otherwise ‘SELDOM CUSTOMER’. Show all the info with this description.
**SQL code with expected and needed output:**

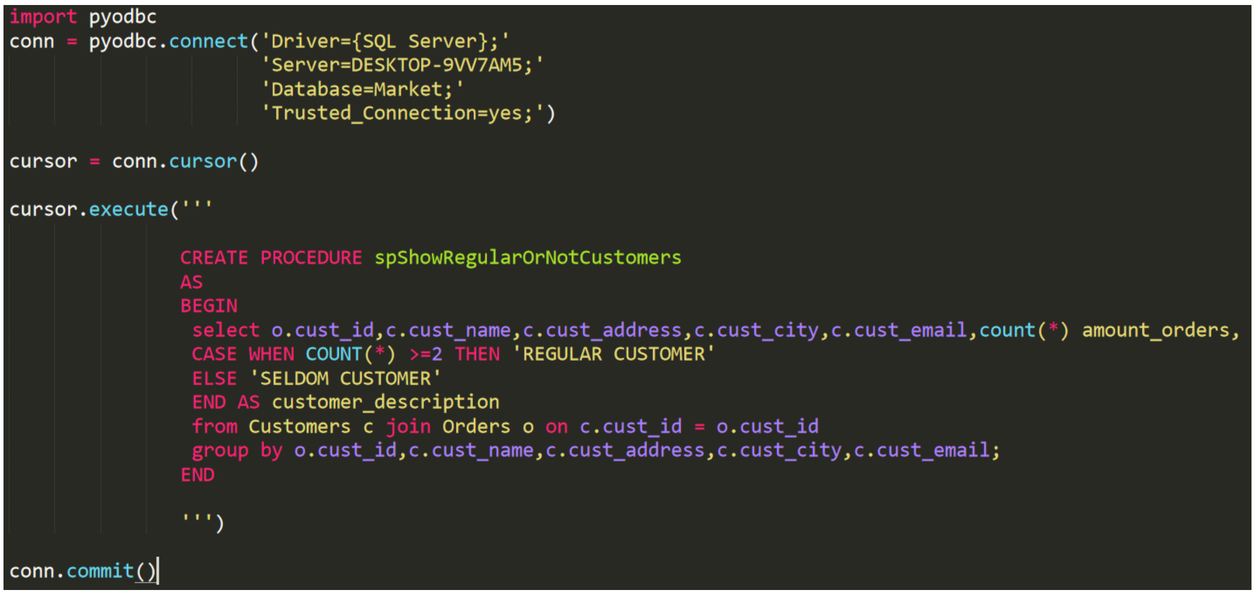


```sql
CREATE PROCEDURE spShowRegularOrNotCustomers
AS
BEGIN
    select o.cust_id,c.cust_name,c.cust_address,c.cust_city,c.cust_email,count(*) amount_orders,
    CASE WHEN COUNT(*) >=2 THEN 'REGULAR CUSTOMER'
    ELSE 'SELDOM CUSTOMER'
    END AS customer_description
    from Customers c join Orders o on c.cust_id = o.cust_id group by o.cust_id,c.cust_name,c.cust_address,c.cust_city,c.cust_email;
END

exec spShowRegularOrNotCustomers;
```



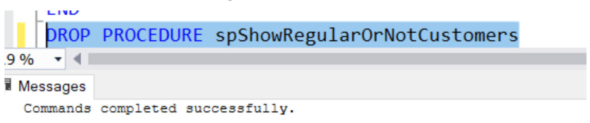
| | cust_id | cust_name | cust_address | cust_city | cust_email | amount_orders | customer_description |
|---|---|---|---|---|---|---|---|
| 1 | 1000000001 | Village Toys | 200 Maple Lane | Detroit | mailto:sales@villagetoys.com | 2 | REGULAR CUSTOMER |
| 2 | 1000000003 | Fun4All | 1 Sunny Place | Muncie | <mailto:jjones@fun4all.com | 1 | SELDOM CUSTOMER |
| 3 | 1000000004 | Fun4All | 829 Riverside Drive | Phoenix | <mailto:dstephens@fun4all.com | 1 | SELDOM CUSTOMER |
| 4 | 1000000005 | The Toy Store | 4545 53rd Street | Chicago | NULL | 1 | SELDOM CUSTOMER |

**The python code for creation the Procedure:**



```python
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE PROCEDURE spShowRegularOrNotCustomers
               AS
               BEGIN
                select o.cust_id,c.cust_name,c.cust_address,c.cust_city,c.cust_email,count(*) amount_orders,
                CASE WHEN COUNT(*) >=2 THEN 'REGULAR CUSTOMER'
                ELSE 'SELDOM CUSTOMER'
                END AS customer_description
                from Customers c join Orders o on c.cust_id = o.cust_id
                group by o.cust_id,c.cust_name,c.cust_address,c.cust_city,c.cust_email;
               END

               ''')

conn.commit()
```

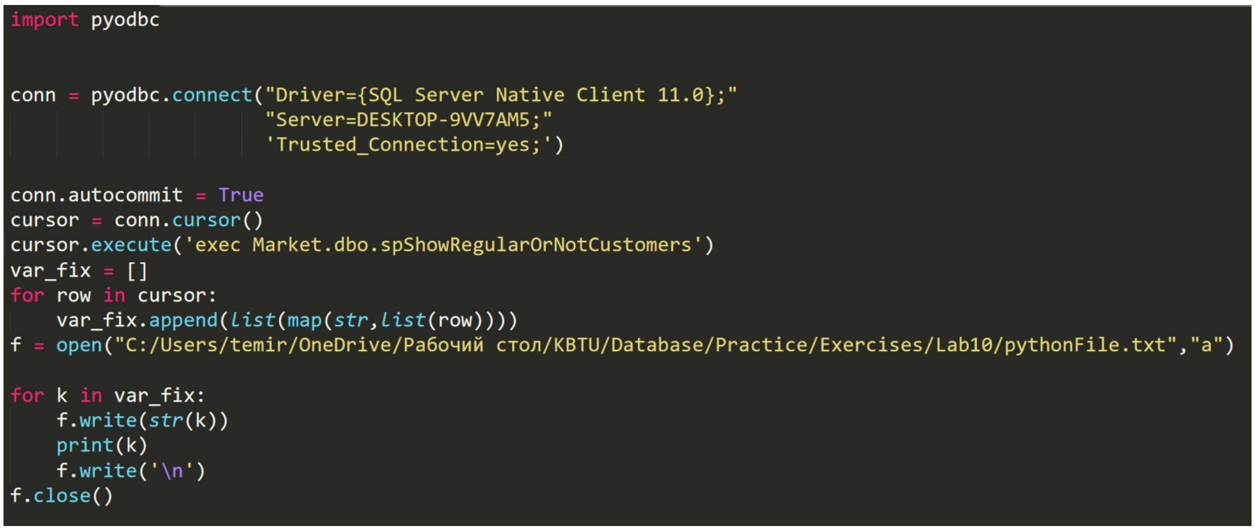
**Be aware that we have already deleted the Procedure in advance:**



```sql
DROP PROCEDURE spShowRegularOrNotCustomers
```

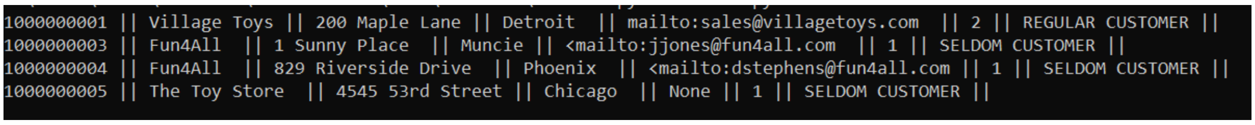
```
Commands completed successfully.
```

**The python code with appropriate output in console and in txt file which is also created during the compilation of the Python code:**



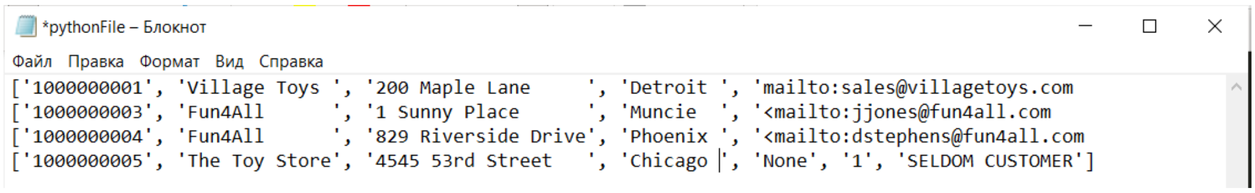
```python
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

conn.autocommit = True
cursor = conn.cursor()
cursor.execute('exec Market.dbo.spShowRegularOrNotCustomers')
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    f.write(str(k))
    print(k)
    f.write('\n')
f.close()
```

**The result in console which is the same but not beautiful:**



```
1000000001 || Village Toys || 200 Maple Lane || Detroit  || mailto:sales@villagetoys.com  || 2 || REGULAR CUSTOMER ||
1000000003 || Fun4All   || 1 Sunny Place  || Muncie || <mailto:jjones@fun4all.com  || 1 || SELDOM CUSTOMER ||
1000000004 || Fun4All   || 829 Riverside Drive  || Phoenix  || <mailto:dstephens@fun4all.com || 1 || SELDOM CUSTOMER ||
1000000005 || The Toy Store  || 4545 53rd Street || Chicago  || None || 1 || SELDOM CUSTOMER ||
```

**The same result in txt file although looks more structured**

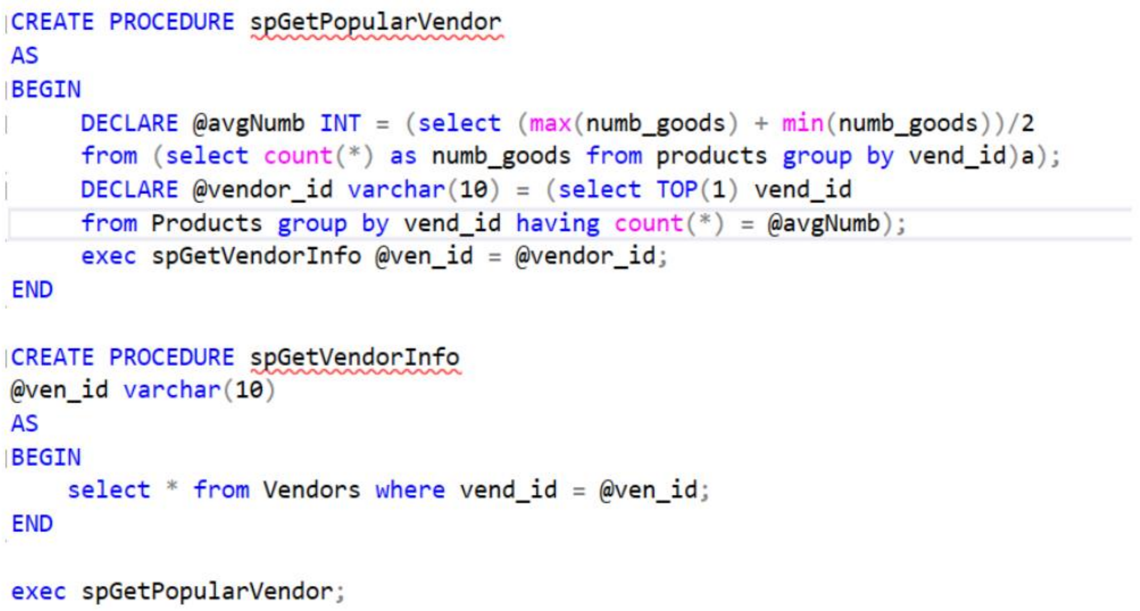


*pythonFile – Блокнот

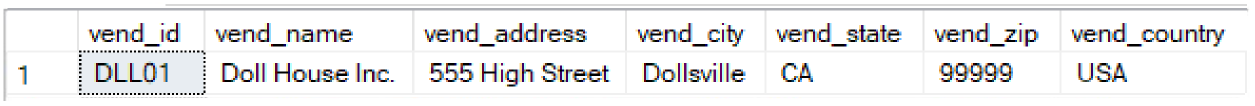
Файл  Правка  Формат  Вид  Справка

```
['1000000001', 'Village Toys ', '200 Maple Lane     ', 'Detroit ', 'mailto:sales@villagetoys.com
['1000000003', 'Fun4All      ', '1 Sunny Place      ', 'Muncie  ', '<mailto:jjones@fun4all.com
['1000000004', 'Fun4All      ', '829 Riverside Drive', 'Phoenix ', '<mailto:dstephens@fun4all.com
['1000000005', 'The Toy Store', '4545 53rd Street   ', 'Chicago ', 'None', '1', 'SELDOM CUSTOMER']
```

2. Investigate a stored procedure that illustrates the most popular seller among all of the them. Use two procedures if it is necessary then show all the info about this vendor
**SQL code with expected and needed output:**

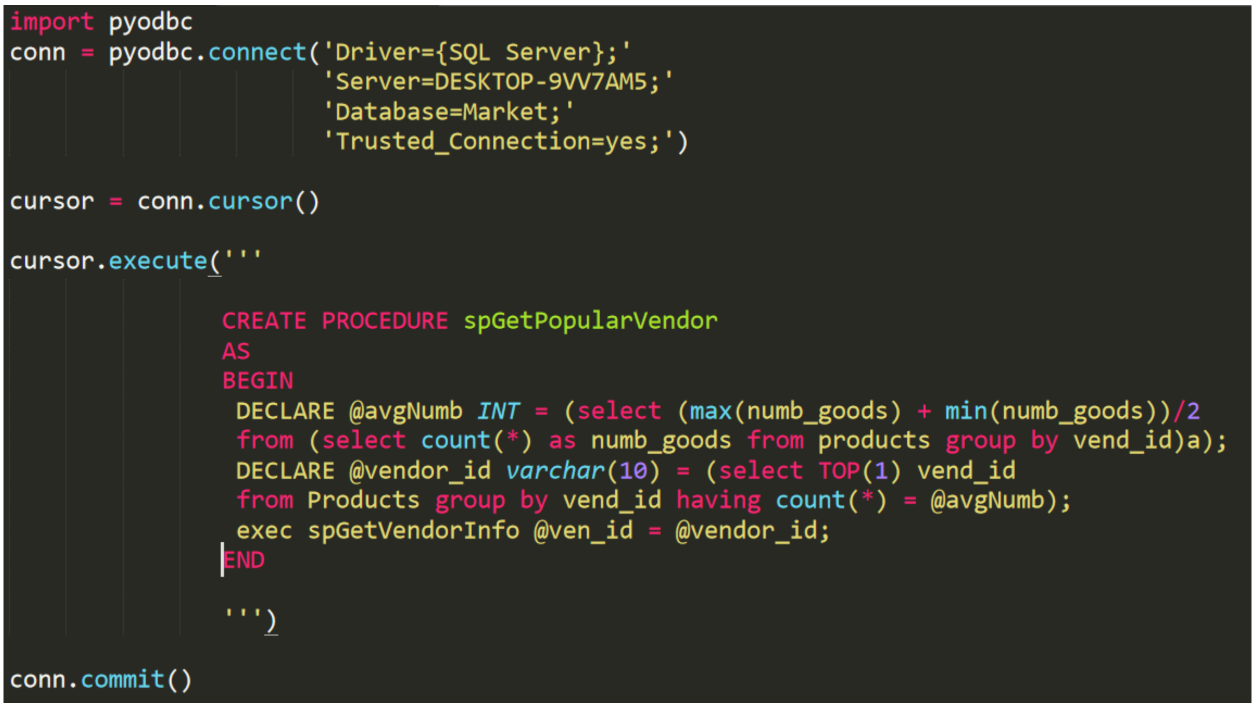


```sql
CREATE PROCEDURE spGetPopularVendor
AS
BEGIN
      DECLARE @avgNumb INT = (select (max(numb_goods) + min(numb_goods))/2
      from (select count(*) as numb_goods from products group by vend_id)a);
      DECLARE @vendor_id varchar(10) = (select TOP(1) vend_id
      from Products group by vend_id having count(*) = @avgNumb);
      exec spGetVendorInfo @ven_id = @vendor_id;
END

CREATE PROCEDURE spGetVendorInfo
@ven_id varchar(10)
AS
BEGIN
     select * from Vendors where vend_id = @ven_id;
END

exec spGetPopularVendor;
```

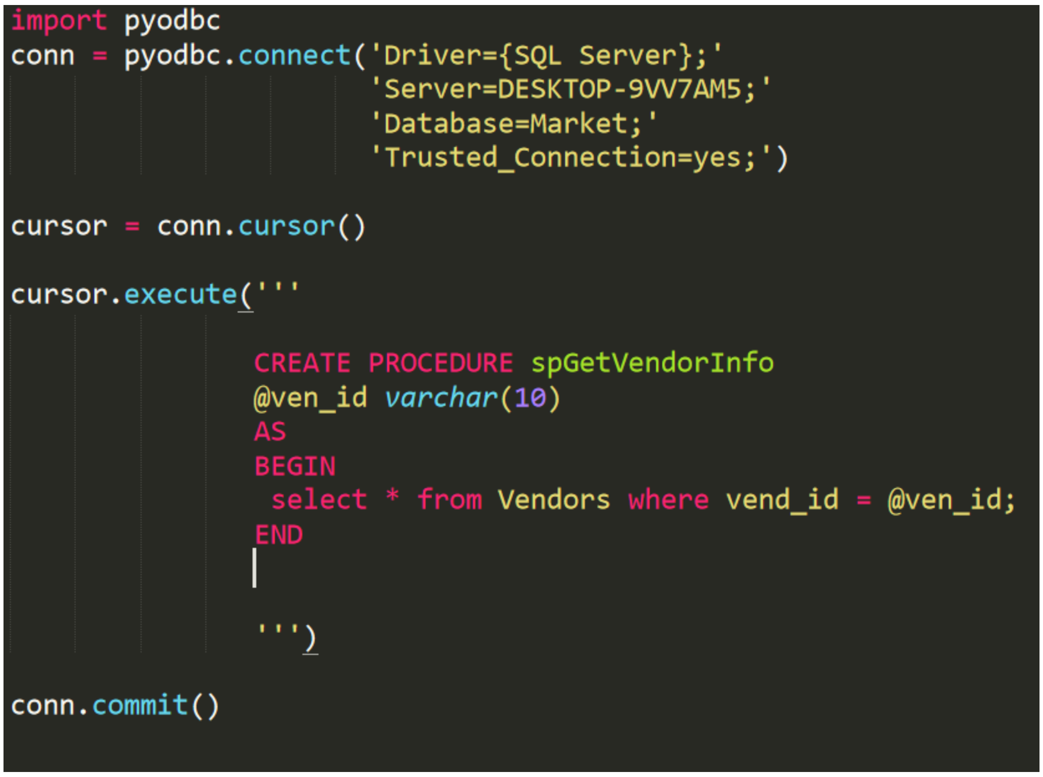


| | vend_id | vend_name | vend_address | vend_city | vend_state | vend_zip | vend_country |
|---|---|---|---|---|---|---|---|
| 1 | DLL01 | Doll House Inc. | 555 High Street | Dollsville | CA | 99999 | USA |

**The python code to create the procedures:**

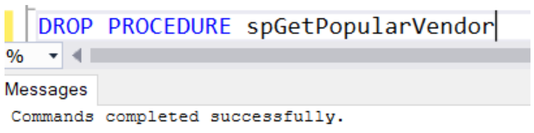


```
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE PROCEDURE spGetPopularVendor
               AS
               BEGIN
                DECLARE @avgNumb INT = (select (max(numb_goods) + min(numb_goods))/2
                from (select count(*) as numb_goods from products group by vend_id)a);
                DECLARE @vendor_id varchar(10) = (select TOP(1) vend_id
                from Products group by vend_id having count(*) = @avgNumb);
                exec spGetVendorInfo @ven_id = @vendor_id;
               END

               ''')

conn.commit()
```



```
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE PROCEDURE spGetVendorInfo
               @ven_id varchar(10)
               AS
               BEGIN
                select * from Vendors where vend_id = @ven_id;
               END


               ''')

conn.commit()
```

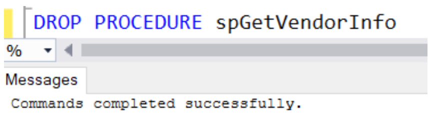
**Be aware that we have already deleted the Procedures in advance:**



```
DROP PROCEDURE spGetPopularVendor
```

Messages

```
Commands completed successfully.
```

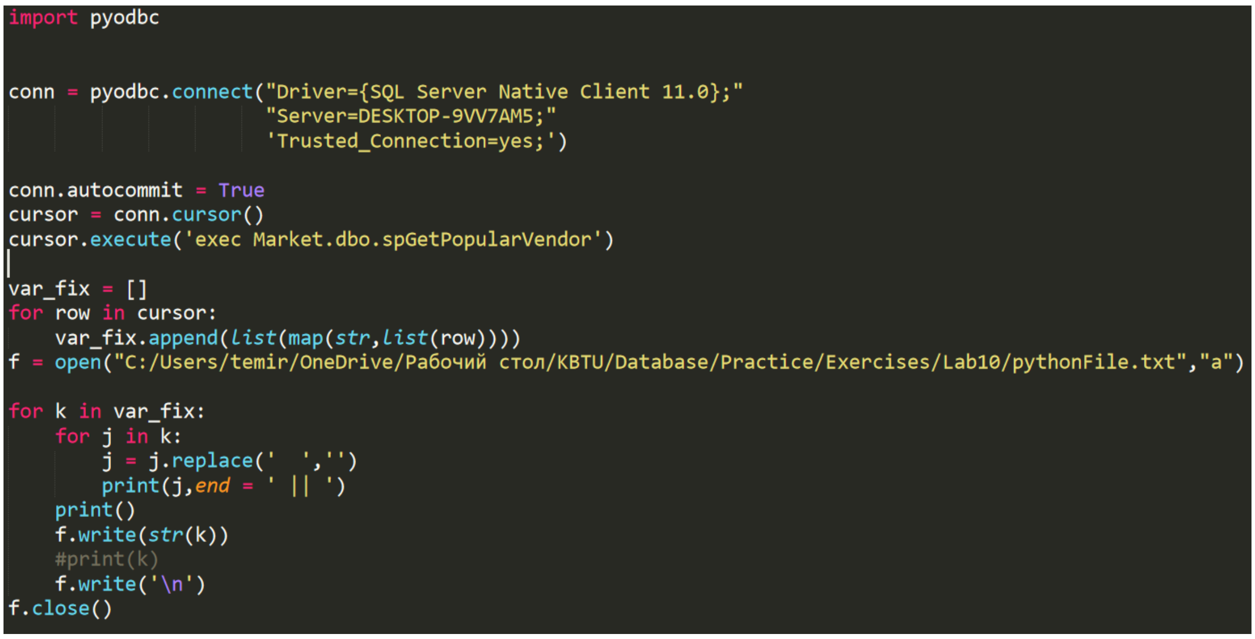


```
DROP PROCEDURE spGetVendorInfo
```

Messages

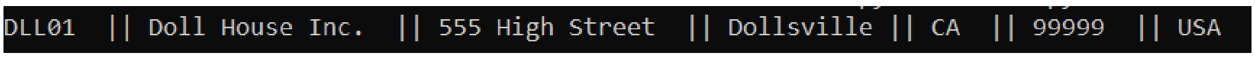
```
Commands completed successfully.
```

**The python code with appropriate output in console and in txt file which is also created during the compilation of the Python code:**



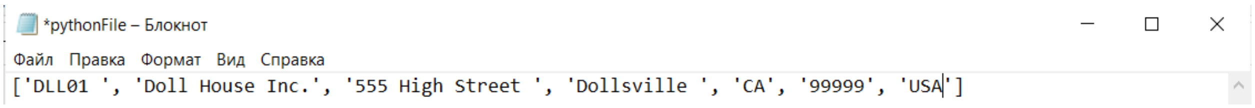
```python
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

conn.autocommit = True
cursor = conn.cursor()
cursor.execute('exec Market.dbo.spGetPopularVendor')

var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
    #print(k)
    f.write('\n')
f.close()
```

**The result in console:**



```
DLL01   || Doll House Inc.  || 555 High Street  || Dollsville || CA  || 99999  || USA
```

**The result in txt file:**

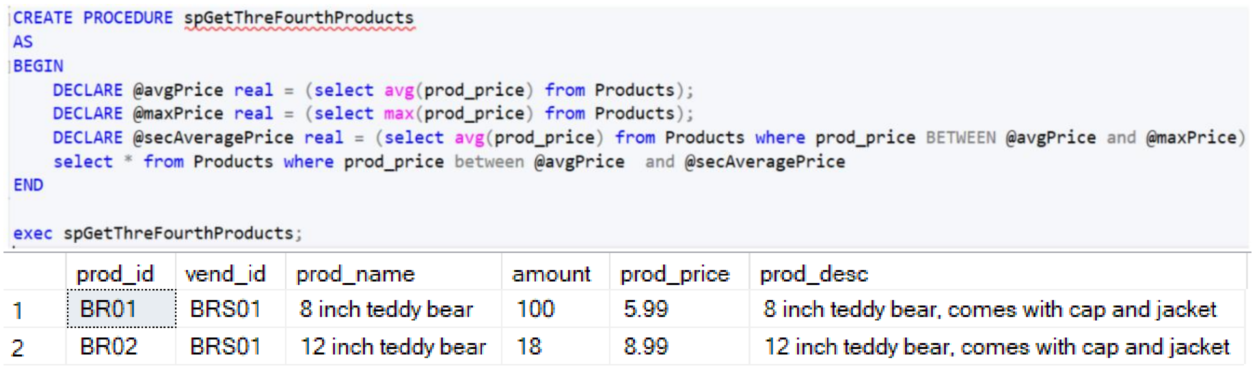


*pythonFile – Блокнот

Файл  Правка  Формат  Вид  Справка

```
['DLL01 ', 'Doll House Inc.', '555 High Street ', 'Dollsville ', 'CA', '99999', 'USA']
```

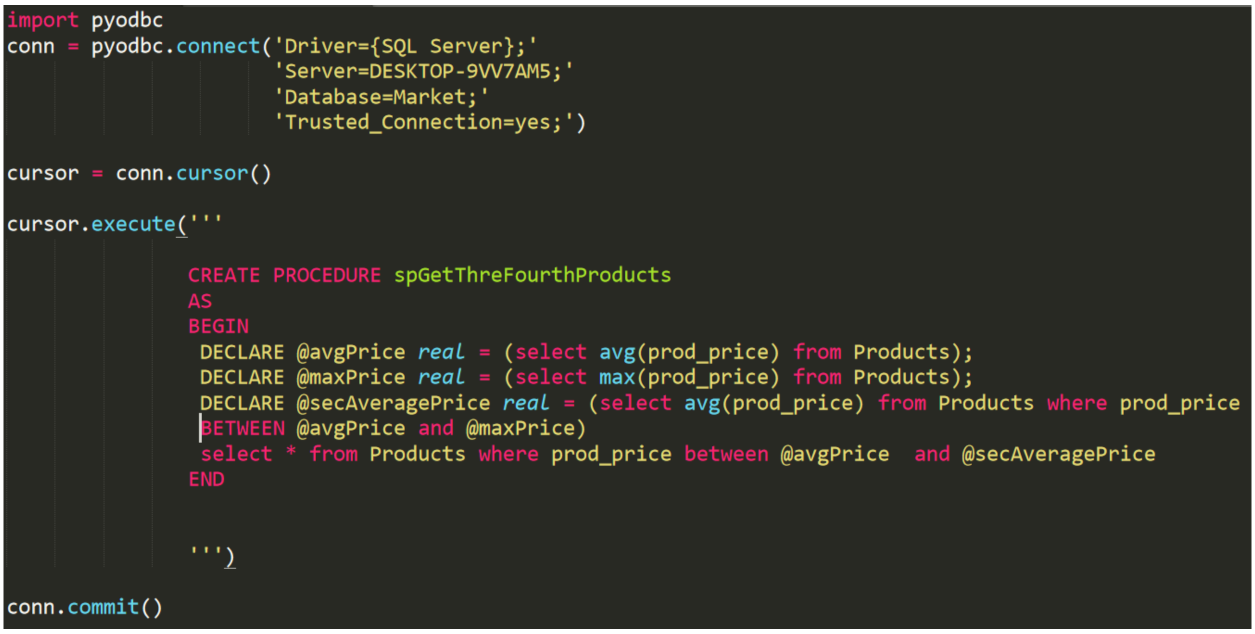
3. Provide a stored procedure that shows all the products whoes price is located between average price and second higher average price of the products. The second higher average price is located exactly in the middle of the mean value and max value price of the products. **SQL code with expected and needed output:**



```sql
CREATE PROCEDURE spGetThreFourthProducts
AS
BEGIN
    DECLARE @avgPrice real = (select avg(prod_price) from Products);
    DECLARE @maxPrice real = (select max(prod_price) from Products);
    DECLARE @secAveragePrice real = (select avg(prod_price) from Products where prod_price BETWEEN @avgPrice and @maxPrice)
    select * from Products where prod_price between @avgPrice  and @secAveragePrice
END

exec spGetThreFourthProducts;
```

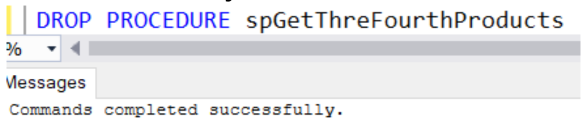
|  | prod_id | vend_id | prod_name | amount | prod_price | prod_desc |
|---|---|---|---|---|---|---|
| 1 | BR01 | BRS01 | 8 inch teddy bear | 100 | 5.99 | 8 inch teddy bear, comes with cap and jacket |
| 2 | BR02 | BRS01 | 12 inch teddy bear | 18 | 8.99 | 12 inch teddy bear, comes with cap and jacket |

**The Python code for creation stored Procedure:**



```
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE PROCEDURE spGetThreFourthProducts
               AS
               BEGIN
                DECLARE @avgPrice real = (select avg(prod_price) from Products);
                DECLARE @maxPrice real = (select max(prod_price) from Products);
                DECLARE @secAveragePrice real = (select avg(prod_price) from Products where prod_price
                BETWEEN @avgPrice and @maxPrice)
                select * from Products where prod_price between @avgPrice  and @secAveragePrice
               END


               ''')

conn.commit()
```

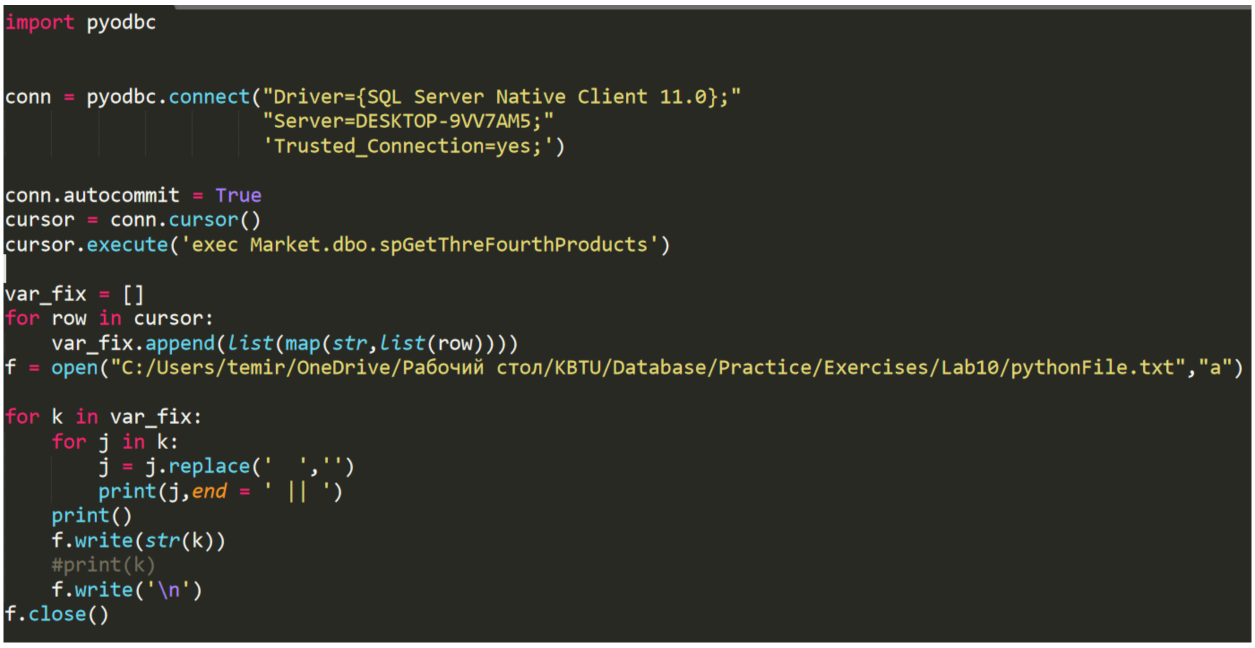
**Be aware that we have already deleted the Procedure in advance:**



```
DROP PROCEDURE spGetThreFourthProducts
```

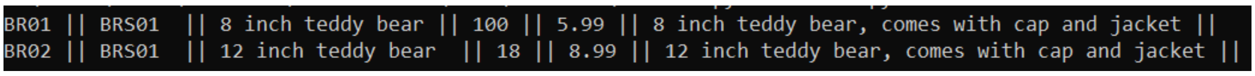
```
Commands completed successfully.
```

**The python code with appropriate output in console and in txt file which is also created during the compilation of the Python code:**



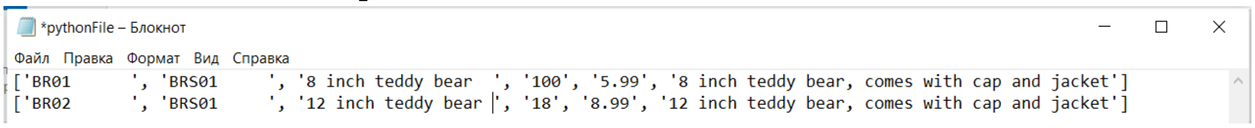
```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

conn.autocommit = True
cursor = conn.cursor()
cursor.execute('exec Market.dbo.spGetThreFourthProducts')

var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
    #print(k)
    f.write('\n')
f.close()
```

**The Console output:**



```
BR01 || BRS01  || 8 inch teddy bear || 100 || 5.99 || 8 inch teddy bear, comes with cap and jacket ||
BR02 || BRS01  || 12 inch teddy bear  || 18 || 8.99 || 12 inch teddy bear, comes with cap and jacket ||
```

**The file txt output:**



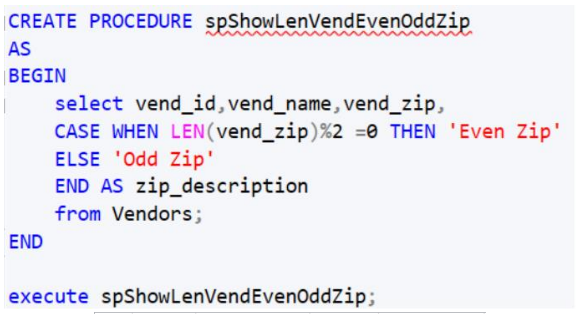
*pythonFile – Блокнот

Файл  Правка  Формат  Вид  Справка

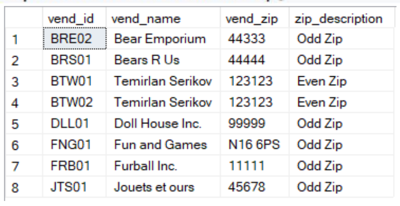
```
['BR01      ', 'BRS01     ', '8 inch teddy bear  ', '100', '5.99', '8 inch teddy bear, comes with cap and jacket']
['BR02      ', 'BRS01     ', '12 inch teddy bear ', '18', '8.99', '12 inch teddy bear, comes with cap and jacket']
```

4. Create a stored procedure that shows all the id, name, zip as well as description of all the vendors. The description must indicate whether or not the length of the zip ODD or Even.

**SQL code with expected and needed output:**

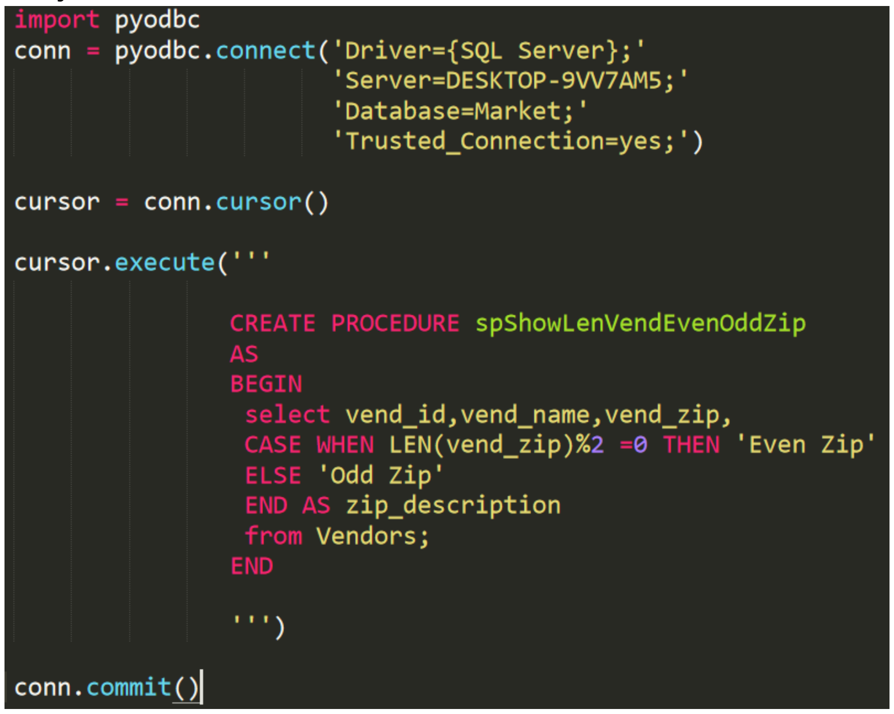


```sql
CREATE PROCEDURE spShowLenVendEvenOddZip
AS
BEGIN
    select vend_id,vend_name,vend_zip,
    CASE WHEN LEN(vend_zip)%2 =0 THEN 'Even Zip'
    ELSE 'Odd Zip'
    END AS zip_description
    from Vendors;
END

execute spShowLenVendEvenOddZip;
```



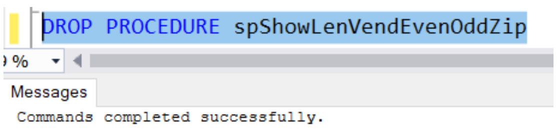
| | vend_id | vend_name | vend_zip | zip_description |
|---|---|---|---|---|
| 1 | BRE02 | Bear Emporium | 44333 | Odd Zip |
| 2 | BRS01 | Bears R Us | 44444 | Odd Zip |
| 3 | BTW01 | Temirlan Serikov | 123123 | Even Zip |
| 4 | BTW02 | Temirlan Serikov | 123123 | Even Zip |
| 5 | DLL01 | Doll House Inc. | 99999 | Odd Zip |
| 6 | FNG01 | Fun and Games | N16 6PS | Odd Zip |
| 7 | FRB01 | Furball Inc. | 11111 | Odd Zip |
| 8 | JTS01 | Jouets et ours | 45678 | Odd Zip |

**The Python code for creation:**



```python
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE PROCEDURE spShowLenVendEvenOddZip
               AS
               BEGIN
                select vend_id,vend_name,vend_zip,
                CASE WHEN LEN(vend_zip)%2 =0 THEN 'Even Zip'
                ELSE 'Odd Zip'
                END AS zip_description
                from Vendors;
               END

               ''')

conn.commit()
```

**Be sure that we deleted the Procedure in advance:**

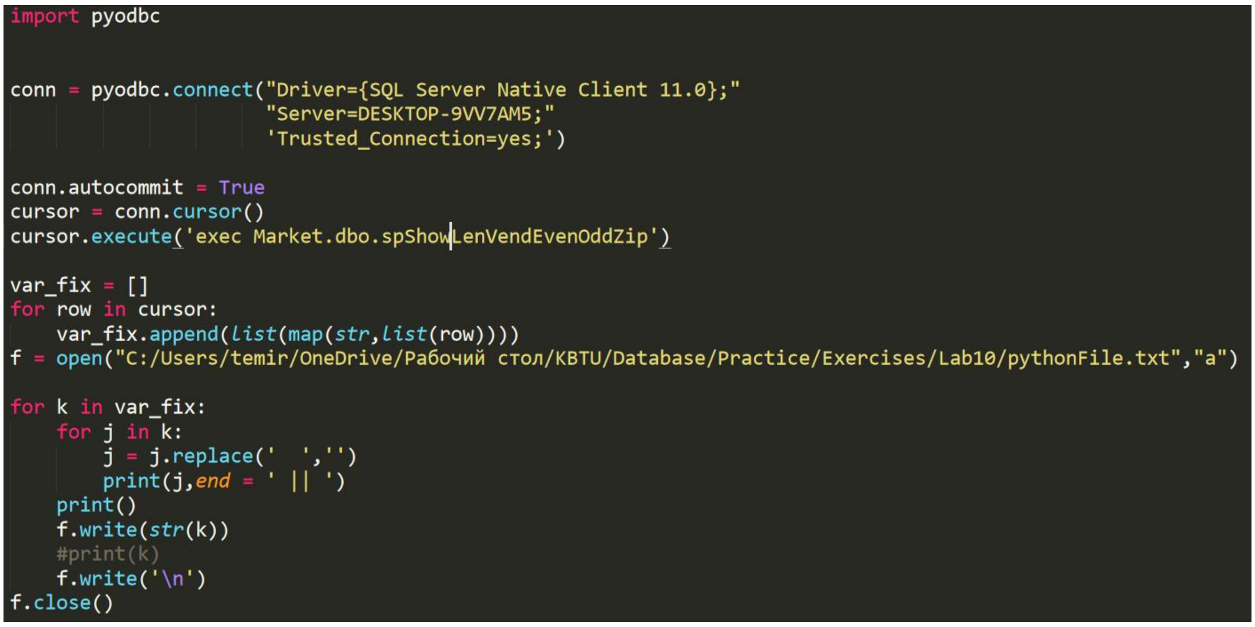


```
DROP PROCEDURE spShowLenVendEvenOddZip
```

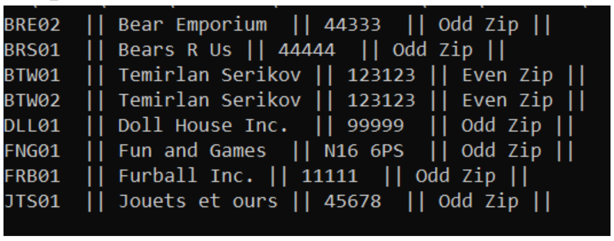
Messages

```
Commands completed successfully.
```

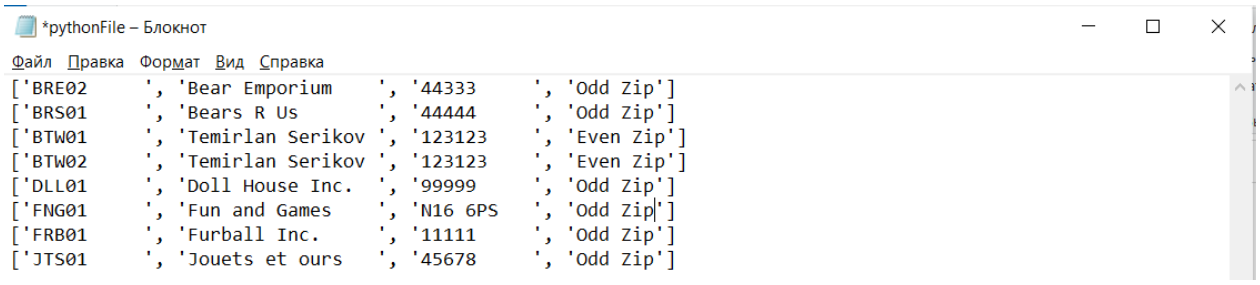
**The Python code:**


```python
import pyodbc

conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

conn.autocommit = True
cursor = conn.cursor()
cursor.execute('exec Market.dbo.spShowLenVendEvenOddZip')

var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
    #print(k)
    f.write('\n')
f.close()
```

**The console output:**


```
BRE02   || Bear Emporium   || 44333   || Odd Zip ||
BRS01   || Bears R Us || 44444   || Odd Zip ||
BTW01   || Temirlan Serikov || 123123 || Even Zip ||
BTW02   || Temirlan Serikov || 123123 || Even Zip ||
DLL01   || Doll House Inc.   || 99999   || Odd Zip ||
FNG01   || Fun and Games   || N16 6PS   || Odd Zip ||
FRB01   || Furball Inc. || 11111   || Odd Zip ||
JTS01   || Jouets et ours || 45678   || Odd Zip ||
```

**The txt file output:**


*pythonFile – Блокнот

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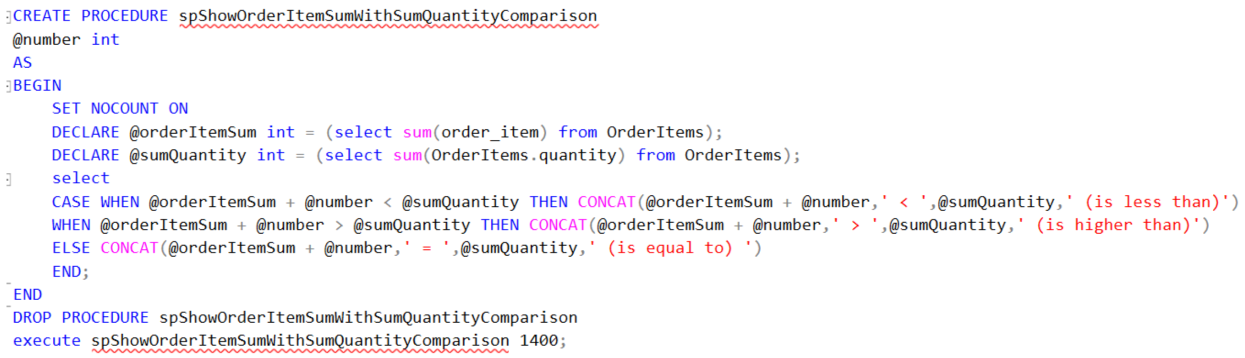
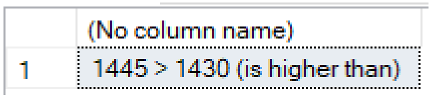
```
['BRE02     ', 'Bear Emporium     ', '44333     ', 'Odd Zip']
['BRS01     ', 'Bears R Us        ', '44444     ', 'Odd Zip']
['BTW01     ', 'Temirlan Serikov  ', '123123    ', 'Even Zip']
['BTW02     ', 'Temirlan Serikov  ', '123123    ', 'Even Zip']
['DLL01     ', 'Doll House Inc.   ', '99999     ', 'Odd Zip']
['FNG01     ', 'Fun and Games     ', 'N16 6PS   ', 'Odd Zip']
['FRB01     ', 'Furball Inc.      ', '11111     ', 'Odd Zip']
['JTS01     ', 'Jouets et ours    ', '45678     ', 'Odd Zip']
```

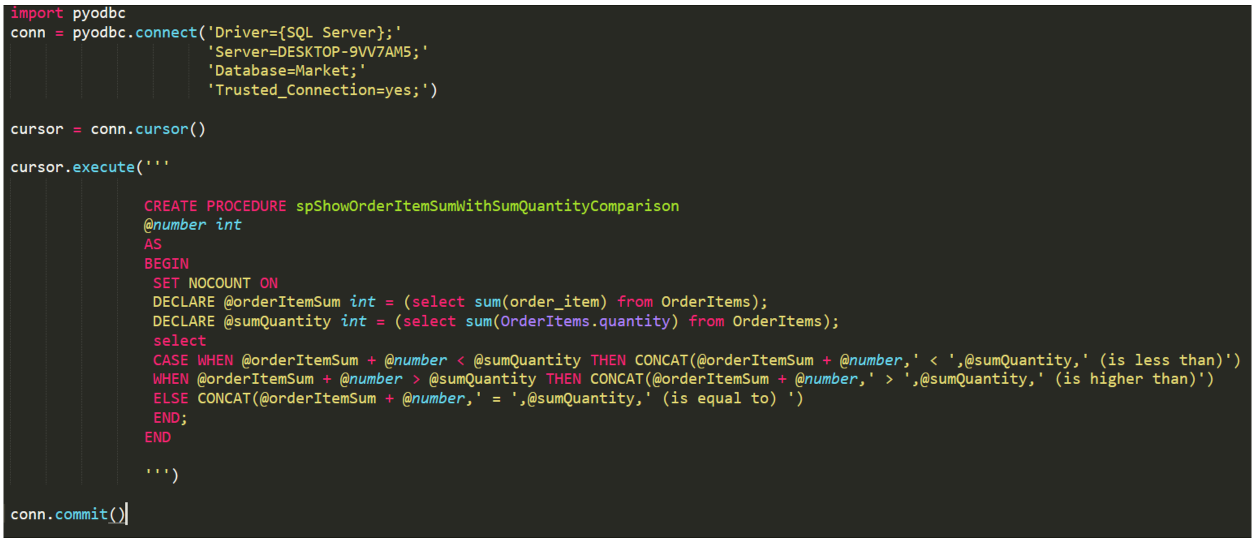
5. Create a stored procedure which takes any integer number and selects the sum of the whole items + given number less,equal or higher than the total sum of the whole quantities of the items. See solution below.
**SQL part with expected and required output:**


```sql
CREATE PROCEDURE spShowOrderItemSumWithSumQuantityComparison
@number int
AS
BEGIN
    SET NOCOUNT ON
    DECLARE @orderItemSum int = (select sum(order_item) from OrderItems);
    DECLARE @sumQuantity int = (select sum(OrderItems.quantity) from OrderItems);
    select
    CASE WHEN @orderItemSum + @number < @sumQuantity THEN CONCAT(@orderItemSum + @number,' < ',@sumQuantity,' (is less than)')
    WHEN @orderItemSum + @number > @sumQuantity THEN CONCAT(@orderItemSum + @number,' > ',@sumQuantity,' (is higher than)')
    ELSE CONCAT(@orderItemSum + @number,' = ',@sumQuantity,' (is equal to) ')
    END;
END
DROP PROCEDURE spShowOrderItemSumWithSumQuantityComparison
execute spShowOrderItemSumWithSumQuantityComparison 1400;
```



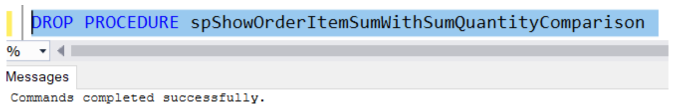
|   | (No column name) |
|---|---|
| 1 | 1445 > 1430 (is higher than) |

**The python code for creation PROCEDURE:**



```
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE PROCEDURE spShowOrderItemSumWithSumQuantityComparison
               @number int
               AS
               BEGIN
                SET NOCOUNT ON
                DECLARE @orderItemSum int = (select sum(order_item) from OrderItems);
                DECLARE @sumQuantity int = (select sum(OrderItems.quantity) from OrderItems);
                select
                CASE WHEN @orderItemSum + @number < @sumQuantity THEN CONCAT(@orderItemSum + @number,' < ',@sumQuantity,' (is less than)')
                WHEN @orderItemSum + @number > @sumQuantity THEN CONCAT(@orderItemSum + @number,' > ',@sumQuantity,' (is higher than)')
                ELSE CONCAT(@orderItemSum + @number,' = ',@sumQuantity,' (is equal to) ')
                END;
               END

               ''')

conn.commit()
```

**Be aware that we deleted the PROCEDURE IN ADVANCE:**

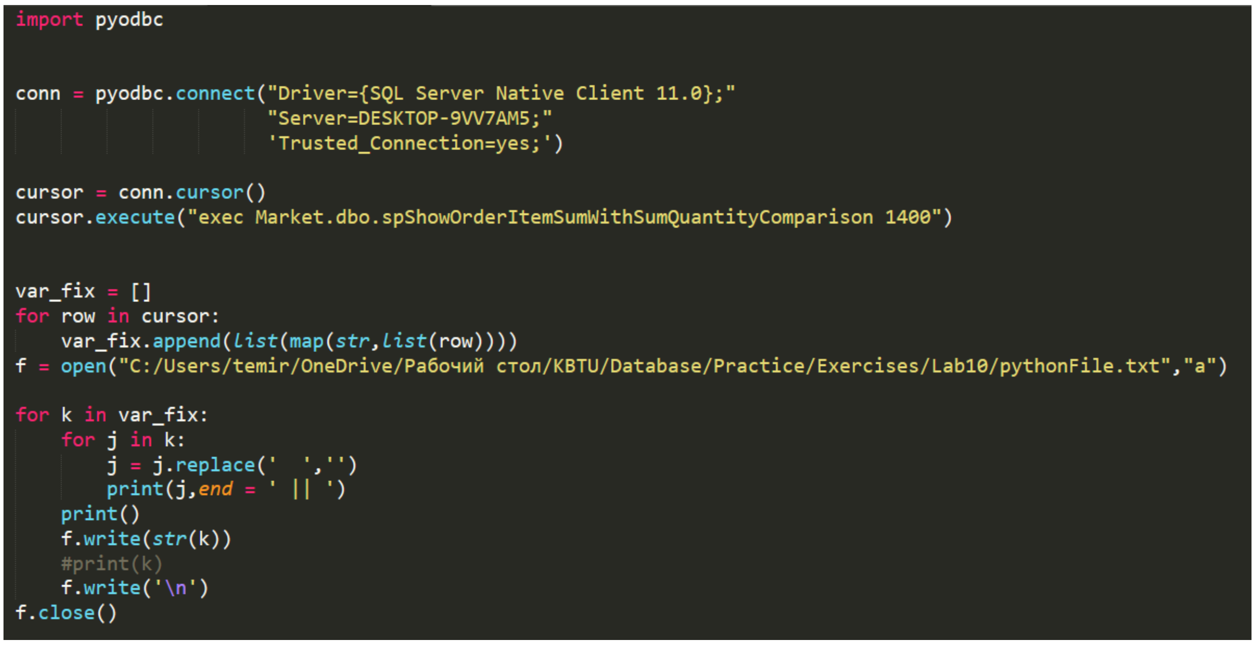


```
DROP PROCEDURE spShowOrderItemSumWithSumQuantityComparison
```

Messages

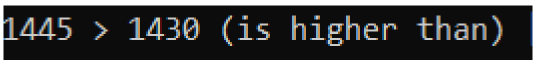
```
Commands completed successfully.
```

**The python code to execute the procedure:**



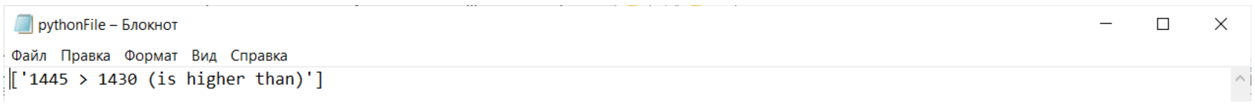
```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

cursor = conn.cursor()
cursor.execute("exec Market.dbo.spShowOrderItemSumWithSumQuantityComparison 1400")


var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
    #print(k)
    f.write('\n')
f.close()
```

**The result in console:**



```
1445 > 1430 (is higher than)
```

**The result in txt file:**



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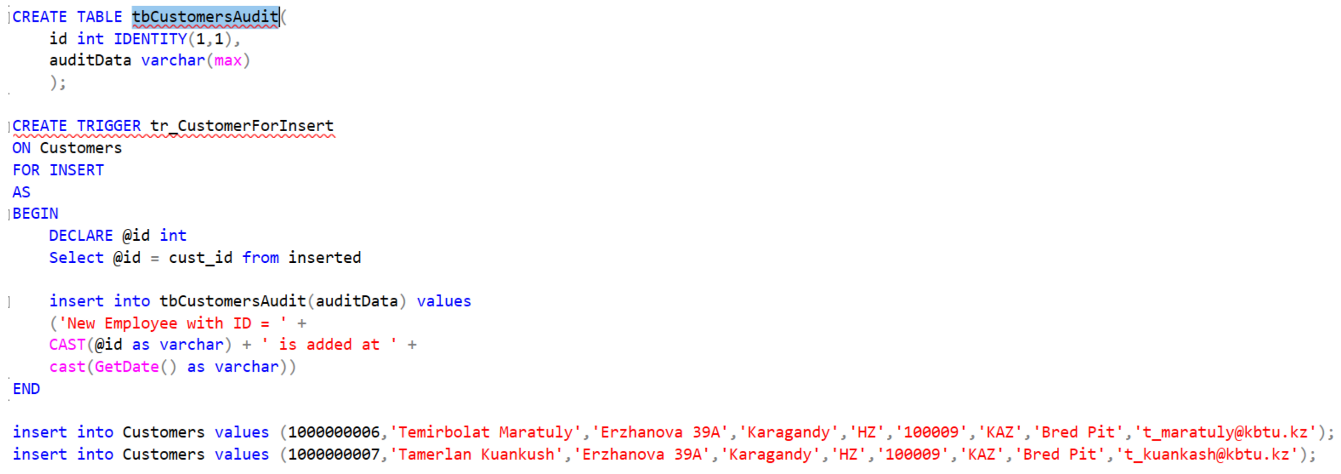
Файл Правка Формат Вид Справка

```
['1445 > 1430 (is higher than)']
```

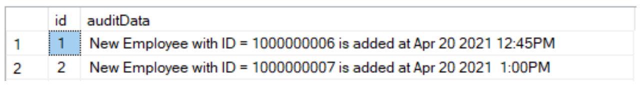
## 7 queries for Triggers (Very Interesting)

**6.** Create a new table and call it tbCustomersAudit with 2 columns: id int with identity starting from 1 as well having step 1 and auditData varchar(max). As you finished, create a trigger that would add the information about Customer who was inserted into the Customers table with his/her id and time when he was added.

**SQL code with appropriate output:**

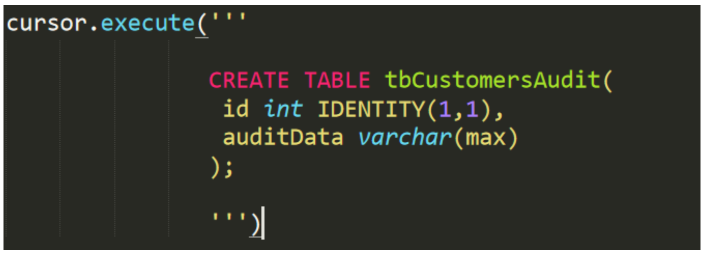


```
CREATE TABLE tbCustomersAudit(
    id int IDENTITY(1,1),
    auditData varchar(max)
    );

CREATE TRIGGER tr_CustomerForInsert
ON Customers
FOR INSERT
AS
BEGIN
    DECLARE @id int
    Select @id = cust_id from inserted

    insert into tbCustomersAudit(auditData) values
    ('New Employee with ID = ' +
    CAST(@id as varchar) + ' is added at ' +
    cast(GetDate() as varchar))
END

insert into Customers values (1000000006,'Temirbolat Maratuly','Erzhanova 39A','Karagandy','HZ','100009','KAZ','Bred Pit','t_maratuly@kbtu.kz');
insert into Customers values (1000000007,'Tamerlan Kuankush','Erzhanova 39A','Karagandy','HZ','100009','KAZ','Bred Pit','t_kuankash@kbtu.kz');
```

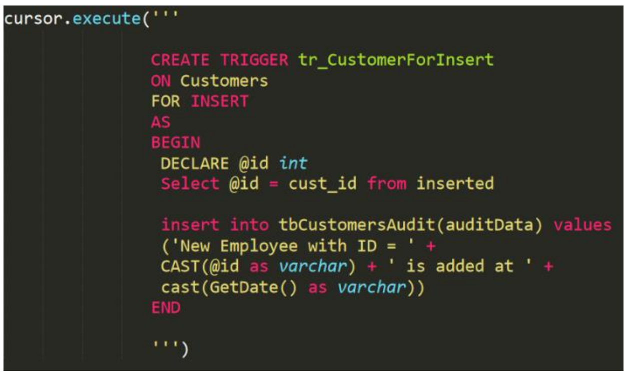


| | id | auditData |
|---|---|---|
| 1 | 1 | New Employee with ID = 1000000006 is added at Apr 20 2021 12:45PM |
| 2 | 2 | New Employee with ID = 1000000007 is added at Apr 20 2021  1:00PM |

**The Python code for creation TABLE and Trigger:**

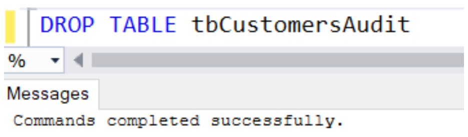


```
cursor.execute('''

          CREATE TABLE tbCustomersAudit(
           id int IDENTITY(1,1),
           auditData varchar(max)
          );

          ''')
```



```
cursor.execute('''

          CREATE TRIGGER tr_CustomerForInsert
          ON Customers
          FOR INSERT
          AS
          BEGIN
           DECLARE @id int
           Select @id = cust_id from inserted

           insert into tbCustomersAudit(auditData) values
           ('New Employee with ID = ' +
           CAST(@id as varchar) + ' is added at ' +
           cast(GetDate() as varchar))
          END

          ''')
```

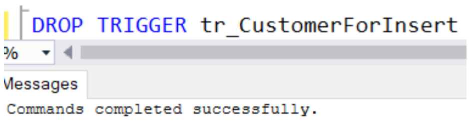
**Be aware that we have already deleted TABLE as well as Trigger in advance:**



```
DROP TABLE tbCustomersAudit
```

Messages

```
Commands completed successfully.
```

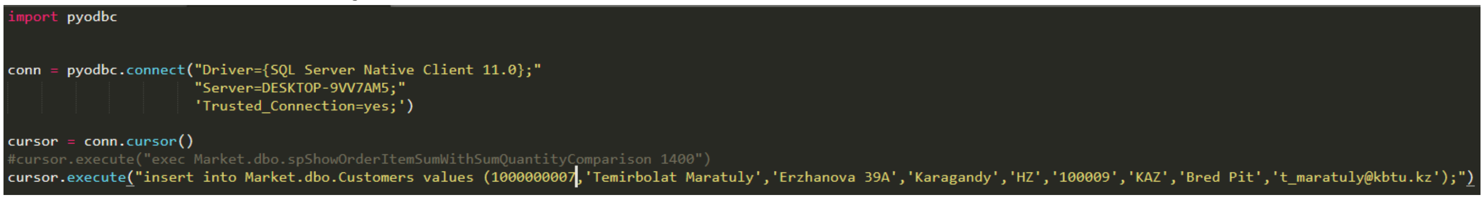


```
DROP TRIGGER tr_CustomerForInsert
```

Messages

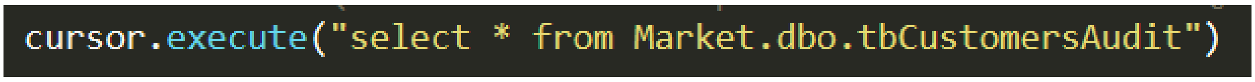
```
Commands completed successfully.
```

**The Python code to insert data:**



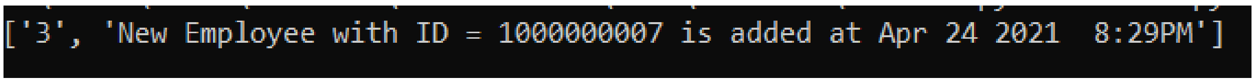
```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

cursor = conn.cursor()
#cursor.execute("exec Market.dbo.spShowOrderItemSumWithSumQuantityComparison 1400")
cursor.execute("insert into Market.dbo.Customers values (1000000007,'Temirbolat Maratuly','Erzhanova 39A','Karagandy','HZ','100009','KAZ','Bred Pit','t_maratuly@kbtu.kz');")
```

**The Python code to see Audit:**



```
cursor.execute("select * from Market.dbo.tbCustomersAudit")
```

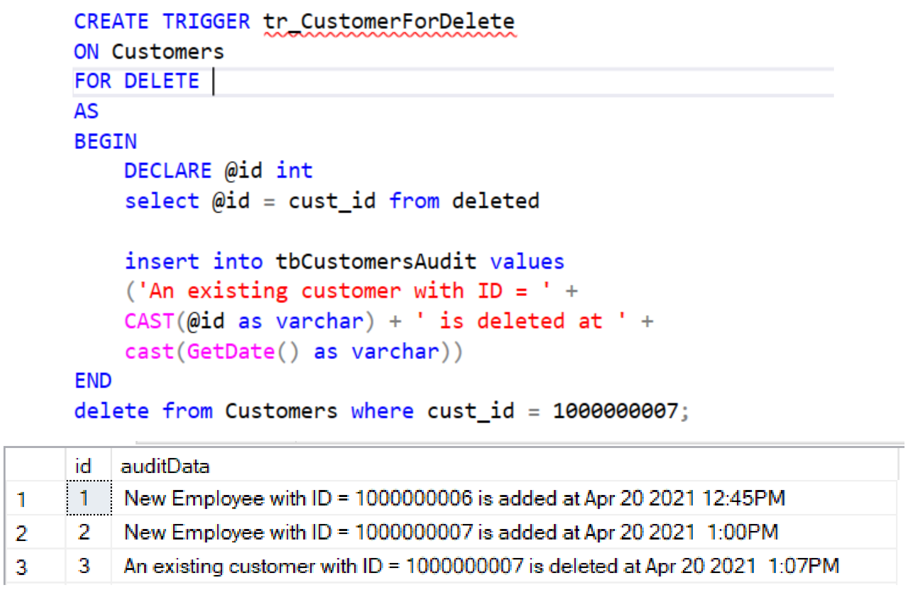
**The code output:**



```
['3', 'New Employee with ID = 1000000007 is added at Apr 24 2021  8:29PM']
```

7. Do about the same procedure as in 6-th exercise. However, you have to do it with DELETE Part and write the information down about activities into recently created table. Type "An existing customer with ID = … is deleted at … (TODAYS DATE)"

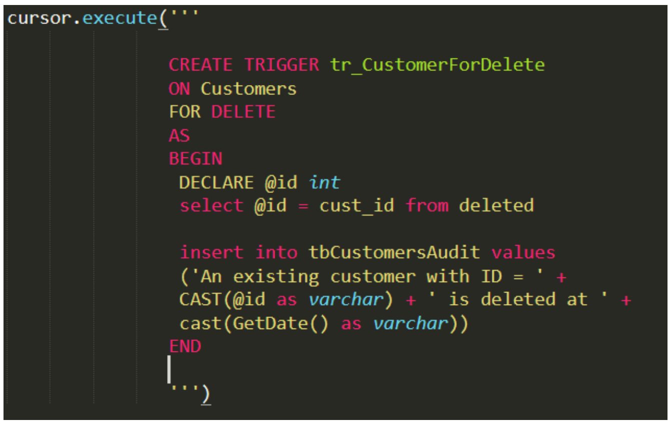
**SQL code with appropriate output:**



```
CREATE TRIGGER tr_CustomerForDelete
ON Customers
FOR DELETE
AS
BEGIN
    DECLARE @id int
    select @id = cust_id from deleted

    insert into tbCustomersAudit values
    ('An existing customer with ID = ' +
    CAST(@id as varchar) + ' is deleted at ' +
    cast(GetDate() as varchar))
END
delete from Customers where cust_id = 1000000007;
```

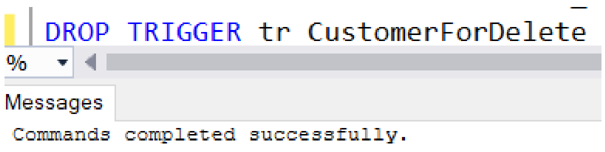
|   | id | auditData |
|---|---|---|
| 1 | 1 | New Employee with ID = 1000000006 is added at Apr 20 2021 12:45PM |
| 2 | 2 | New Employee with ID = 1000000007 is added at Apr 20 2021 1:00PM |
| 3 | 3 | An existing customer with ID = 1000000007 is deleted at Apr 20 2021 1:07PM |

**The Python code to create the trigger:**



```
cursor.execute('''

                CREATE TRIGGER tr_CustomerForDelete
                ON Customers
                FOR DELETE
                AS
                BEGIN
                 DECLARE @id int
                 select @id = cust_id from deleted

                 insert into tbCustomersAudit values
                 ('An existing customer with ID = ' +
                 CAST(@id as varchar) + ' is deleted at ' +
                 cast(GetDate() as varchar))
                END

                ''')
```

**Be aware that we had already removed Trigger in advance:**

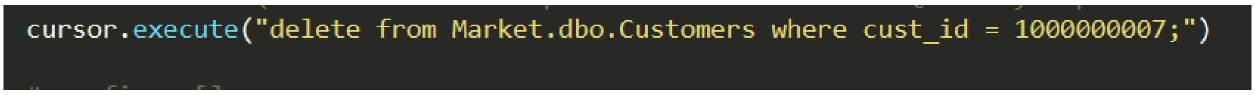


```
DROP TRIGGER tr_CustomerForDelete
```

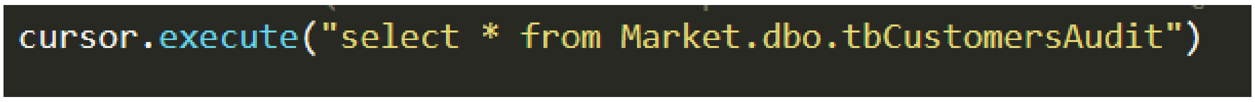
Messages

```
Commands completed successfully.
```

**The Python code to show the working principle:**

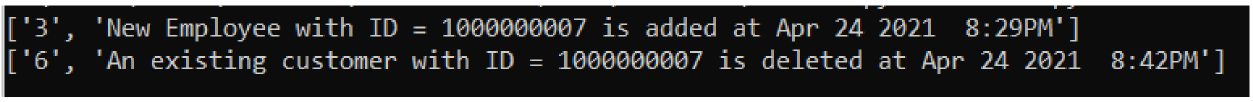


```
cursor.execute("delete from Market.dbo.Customers where cust_id = 1000000007;")
```



```
cursor.execute("select * from Market.dbo.tbCustomersAudit")
```

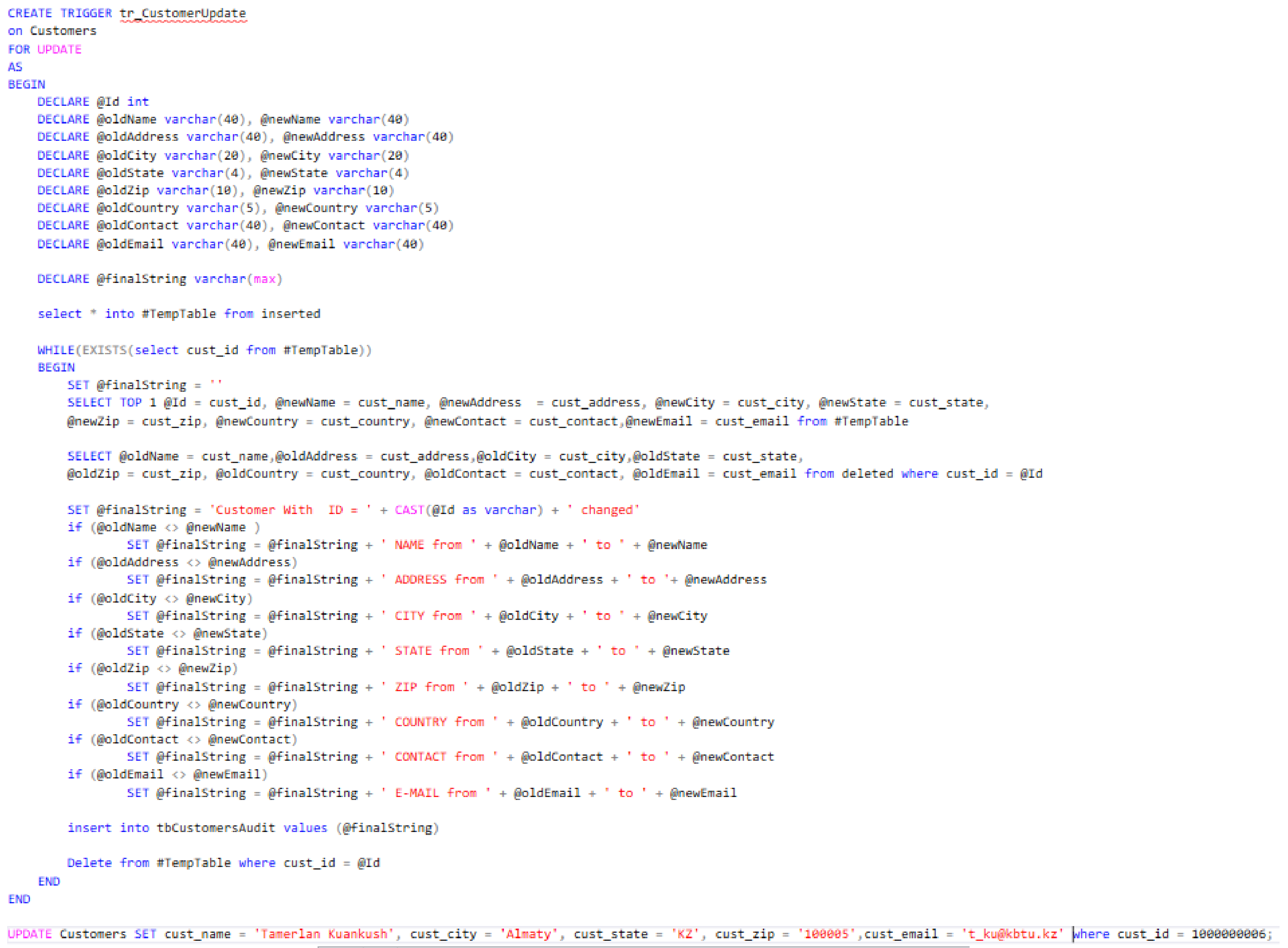
**The console output:**



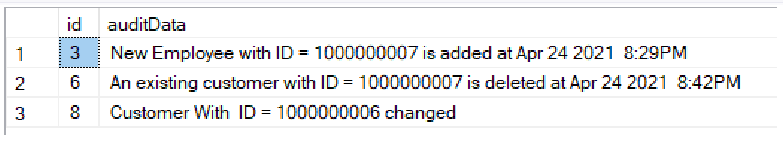
```
['3', 'New Employee with ID = 1000000007 is added at Apr 24 2021  8:29PM']
['6', 'An existing customer with ID = 1000000007 is deleted at Apr 24 2021  8:42PM']
```

8. Again. Create a Trigger that is responsible for indicating the information that customers changed about themselves and add this notification into the table that was create in 6-th exercise. The information would be too long because of the number of given attributes in the CUSTOMERS table.

**The SQL code with corresponded output:**

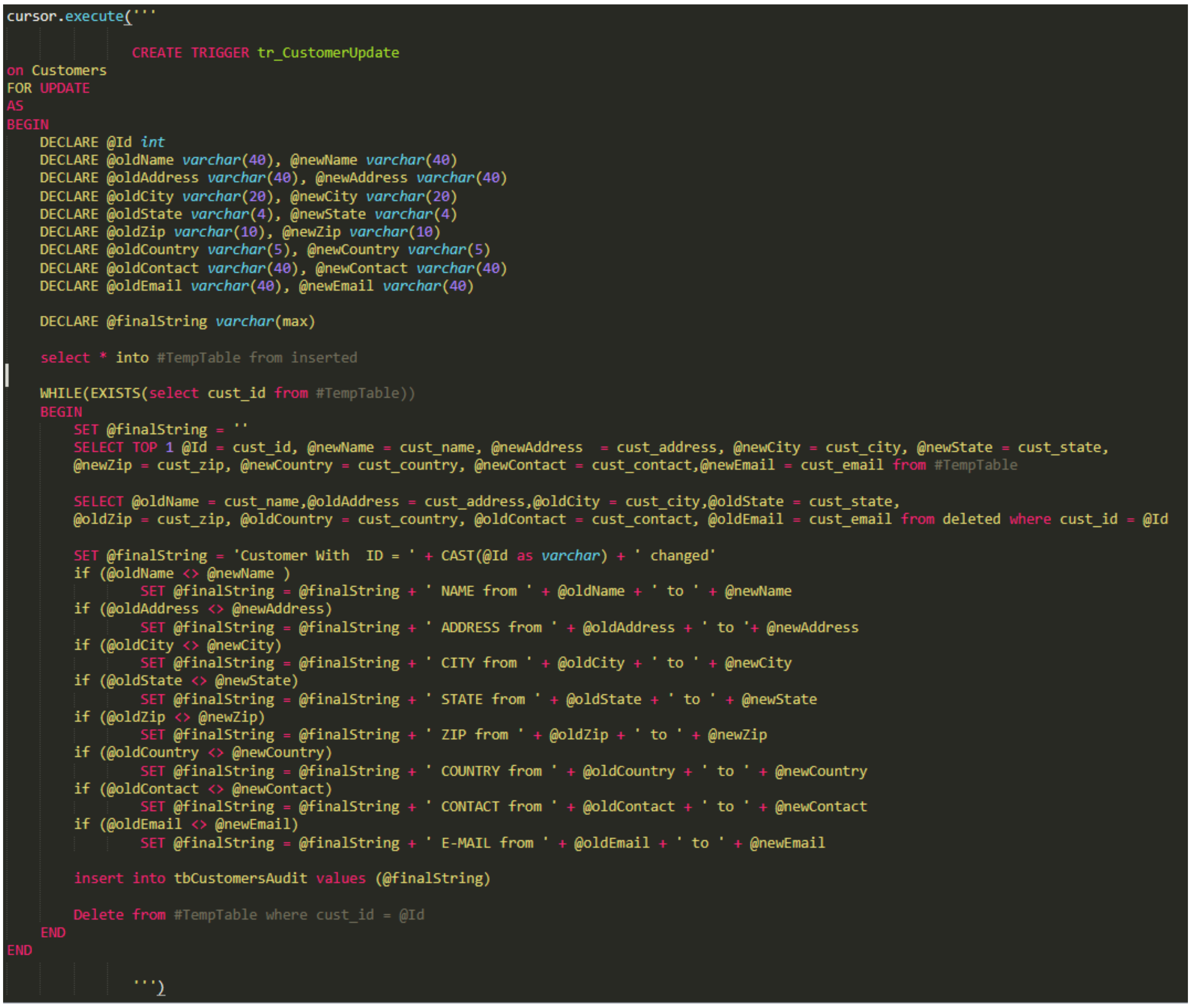


```sql
CREATE TRIGGER tr_CustomerUpdate
on Customers
FOR UPDATE
AS
BEGIN
    DECLARE @Id int
    DECLARE @oldName varchar(40), @newName varchar(40)
    DECLARE @oldAddress varchar(40), @newAddress varchar(40)
    DECLARE @oldCity varchar(20), @newCity varchar(20)
    DECLARE @oldState varchar(4), @newState varchar(4)
    DECLARE @oldZip varchar(10), @newZip varchar(10)
    DECLARE @oldCountry varchar(5), @newCountry varchar(5)
    DECLARE @oldContact varchar(40), @newContact varchar(40)
    DECLARE @oldEmail varchar(40), @newEmail varchar(40)

    DECLARE @finalString varchar(max)

    select * into #TempTable from inserted

    WHILE(EXISTS(select cust_id from #TempTable))
    BEGIN
        SET @finalString = ''
        SELECT TOP 1 @Id = cust_id, @newName = cust_name, @newAddress  = cust_address, @newCity = cust_city, @newState = cust_state,
        @newZip = cust_zip, @newCountry = cust_country, @newContact = cust_contact,@newEmail = cust_email from #TempTable

        SELECT @oldName = cust_name,@oldAddress = cust_address,@oldCity = cust_city,@oldState = cust_state,
        @oldZip = cust_zip, @oldCountry = cust_country, @oldContact = cust_contact, @oldEmail = cust_email from deleted where cust_id = @Id

        SET @finalString = 'Customer With  ID = ' + CAST(@Id as varchar) + ' changed'
        if (@oldName <> @newName )
                SET @finalString = @finalString + ' NAME from ' + @oldName + ' to ' + @newName
        if (@oldAddress <> @newAddress)
                SET @finalString = @finalString + ' ADDRESS from ' + @oldAddress + ' to '+ @newAddress
        if (@oldCity <> @newCity)
                SET @finalString = @finalString + ' CITY from ' + @oldCity + ' to ' + @newCity
        if (@oldState <> @newState)
                SET @finalString = @finalString + ' STATE from ' + @oldState + ' to ' + @newState
        if (@oldZip <> @newZip)
                SET @finalString = @finalString + ' ZIP from ' + @oldZip + ' to ' + @newZip
        if (@oldCountry <> @newCountry)
                SET @finalString = @finalString + ' COUNTRY from ' + @oldCountry + ' to ' + @newCountry
        if (@oldContact <> @newContact)
                SET @finalString = @finalString + ' CONTACT from ' + @oldContact + ' to ' + @newContact
        if (@oldEmail <> @newEmail)
                SET @finalString = @finalString + ' E-MAIL from ' + @oldEmail + ' to ' + @newEmail

        insert into tbCustomersAudit values (@finalString)

        Delete from #TempTable where cust_id = @Id
    END
END

UPDATE Customers SET cust_name = 'Tamerlan Kuankush', cust_city = 'Almaty', cust_state = 'KZ', cust_zip = '100005',cust_email = 't_ku@kbtu.kz' where cust_id = 1000000006;
```



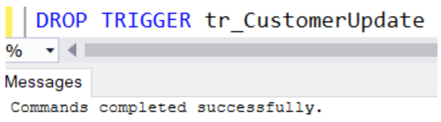
| | id | auditData |
|---|---|---|
| 1 | 3 | New Employee with ID = 1000000007 is added at Apr 24 2021  8:29PM |
| 2 | 6 | An existing customer with ID = 1000000007 is deleted at Apr 24 2021  8:42PM |
| 3 | 8 | Customer With  ID = 1000000006 changed |

**The Python code to create the Trigger:**



```
cursor.execute('''

               CREATE TRIGGER tr_CustomerUpdate
on Customers
FOR UPDATE
AS
BEGIN
    DECLARE @Id int
    DECLARE @oldName varchar(40), @newName varchar(40)
    DECLARE @oldAddress varchar(40), @newAddress varchar(40)
    DECLARE @oldCity varchar(20), @newCity varchar(20)
    DECLARE @oldState varchar(4), @newState varchar(4)
    DECLARE @oldZip varchar(10), @newZip varchar(10)
    DECLARE @oldCountry varchar(5), @newCountry varchar(5)
    DECLARE @oldContact varchar(40), @newContact varchar(40)
    DECLARE @oldEmail varchar(40), @newEmail varchar(40)

    DECLARE @finalString varchar(max)

    select * into #TempTable from inserted

    WHILE(EXISTS(select cust_id from #TempTable))
    BEGIN
        SET @finalString = ''
        SELECT TOP 1 @Id = cust_id, @newName = cust_name, @newAddress  = cust_address, @newCity = cust_city, @newState = cust_state,
        @newZip = cust_zip, @newCountry = cust_country, @newContact = cust_contact,@newEmail = cust_email from #TempTable

        SELECT @oldName = cust_name,@oldAddress = cust_address,@oldCity = cust_city,@oldState = cust_state,
        @oldZip = cust_zip, @oldCountry = cust_country, @oldContact = cust_contact, @oldEmail = cust_email from deleted where cust_id = @Id

        SET @finalString = 'Customer With  ID = ' + CAST(@Id as varchar) + ' changed'
        if (@oldName <> @newName )
                SET @finalString = @finalString + ' NAME from ' + @oldName + ' to ' + @newName
        if (@oldAddress <> @newAddress)
                SET @finalString = @finalString + ' ADDRESS from ' + @oldAddress + ' to '+ @newAddress
        if (@oldCity <> @newCity)
                SET @finalString = @finalString + ' CITY from ' + @oldCity + ' to ' + @newCity
        if (@oldState <> @newState)
                SET @finalString = @finalString + ' STATE from ' + @oldState + ' to ' + @newState
        if (@oldZip <> @newZip)
                SET @finalString = @finalString + ' ZIP from ' + @oldZip + ' to ' + @newZip
        if (@oldCountry <> @newCountry)
                SET @finalString = @finalString + ' COUNTRY from ' + @oldCountry + ' to ' + @newCountry
        if (@oldContact <> @newContact)
                SET @finalString = @finalString + ' CONTACT from ' + @oldContact + ' to ' + @newContact
        if (@oldEmail <> @newEmail)
                SET @finalString = @finalString + ' E-MAIL from ' + @oldEmail + ' to ' + @newEmail

        insert into tbCustomersAudit values (@finalString)

        Delete from #TempTable where cust_id = @Id
    END
END

               ''')
```

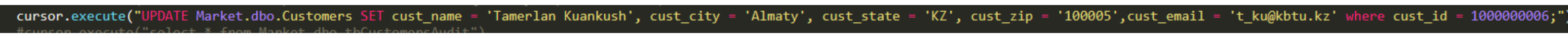
**Be sure That we had deleted the Trigger:**



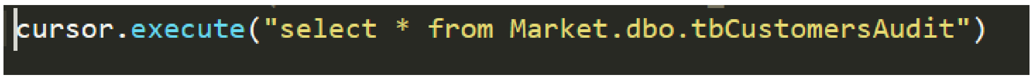
```
DROP TRIGGER tr_CustomerUpdate
```

```
Messages
 Commands completed successfully.
```

**The Python code to see the working principle of Trigger:**

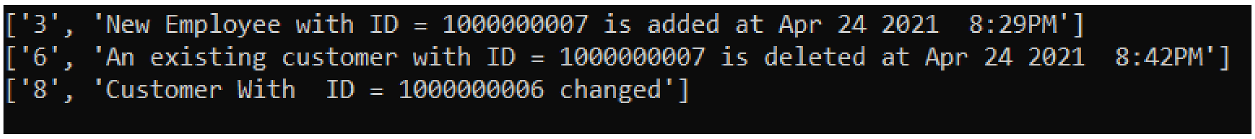


```
cursor.execute("UPDATE Market.dbo.Customers SET cust_name = 'Tamerlan Kuankush', cust_city = 'Almaty', cust_state = 'KZ', cust_zip = '100005',cust_email = 't_ku@kbtu.kz' where cust_id = 1000000006;"
#cursor.execute("select * from Market.dbo.tbCustomersAudit")
```



```
cursor.execute("select * from Market.dbo.tbCustomersAudit")
```

**The Python output in console:**



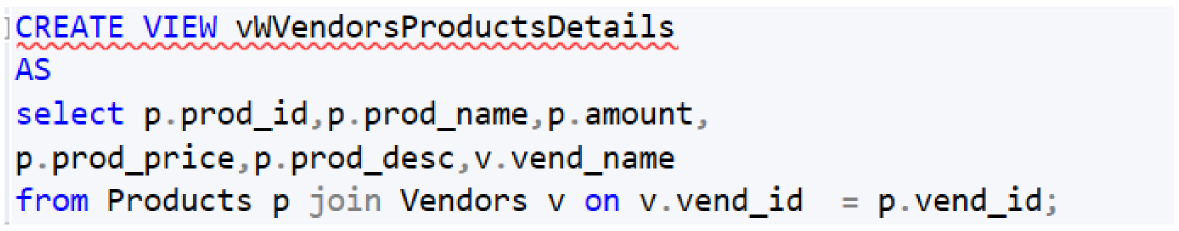
```
['3', 'New Employee with ID = 1000000007 is added at Apr 24 2021  8:29PM']
['6', 'An existing customer with ID = 1000000007 is deleted at Apr 24 2021  8:42PM']
['8', 'Customer With  ID = 1000000006 changed']
```

9. Wow, the previous task was quite unexpected but what if we additionally create a VIEW (virtual table) which contains the join(combination) of products and vendors. We need to use this combination as one table make some manipulations for it. If we write insert into nameOfTheView values we would obtain a mistake because it consists of the multiple

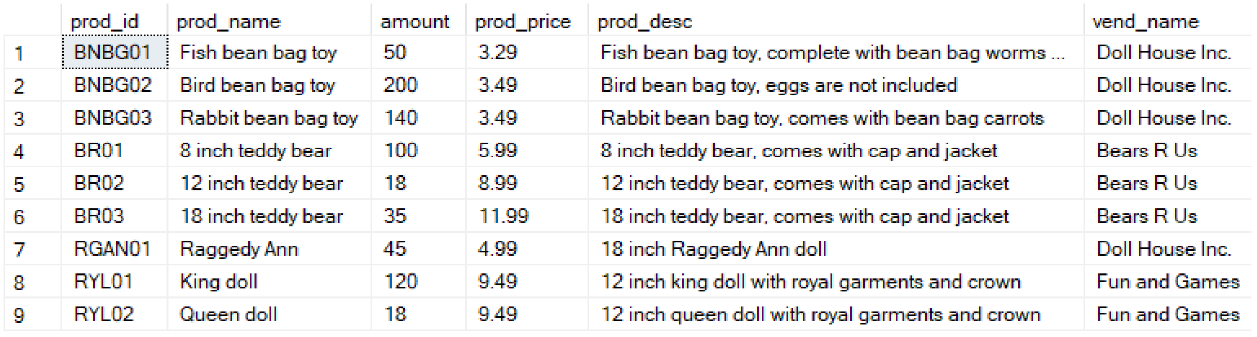
tables. So, for this purpose we use TRIGGER. However, we create it with INSTEAD of Insert to imitate the insert procedure.

**The SQL code with corresponded output:**

CREATED VIEW:

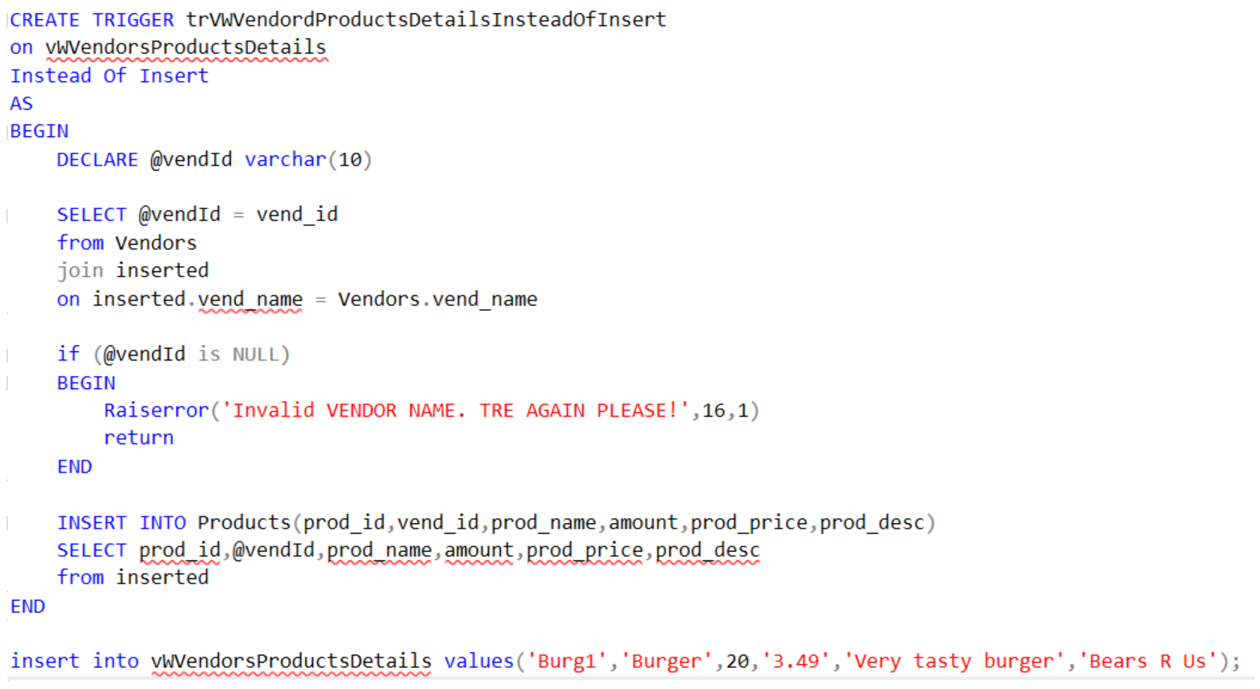


```
CREATE VIEW vWVendorsProductsDetails
AS
select p.prod_id,p.prod_name,p.amount,
p.prod_price,p.prod_desc,v.vend_name
from Products p join Vendors v on v.vend_id  = p.vend_id;
```

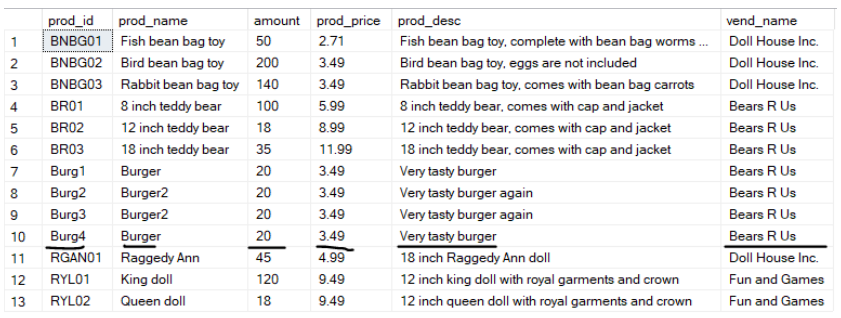


| | prod_id | prod_name | amount | prod_price | prod_desc | vend_name |
|---|---|---|---|---|---|---|
| 1 | BNBG01 | Fish bean bag toy | 50 | 3.29 | Fish bean bag toy, complete with bean bag worms ... | Doll House Inc. |
| 2 | BNBG02 | Bird bean bag toy | 200 | 3.49 | Bird bean bag toy, eggs are not included | Doll House Inc. |
| 3 | BNBG03 | Rabbit bean bag toy | 140 | 3.49 | Rabbit bean bag toy, comes with bean bag carrots | Doll House Inc. |
| 4 | BR01 | 8 inch teddy bear | 100 | 5.99 | 8 inch teddy bear, comes with cap and jacket | Bears R Us |
| 5 | BR02 | 12 inch teddy bear | 18 | 8.99 | 12 inch teddy bear, comes with cap and jacket | Bears R Us |
| 6 | BR03 | 18 inch teddy bear | 35 | 11.99 | 18 inch teddy bear, comes with cap and jacket | Bears R Us |
| 7 | RGAN01 | Raggedy Ann | 45 | 4.99 | 18 inch Raggedy Ann doll | Doll House Inc. |
| 8 | RYL01 | King doll | 120 | 9.49 | 12 inch king doll with royal garments and crown | Fun and Games |
| 9 | RYL02 | Queen doll | 18 | 9.49 | 12 inch queen doll with royal garments and crown | Fun and Games |

Create a TRIGGER FOR INSERT:

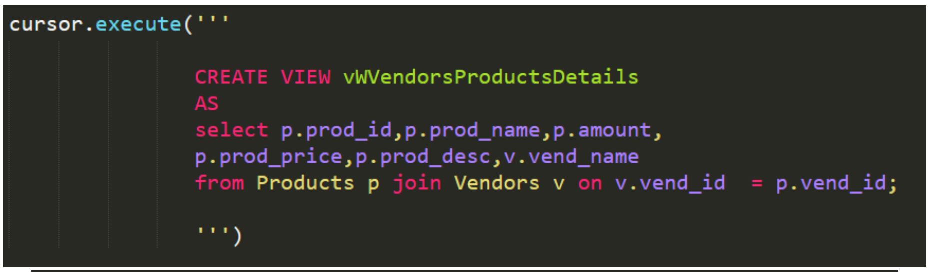


```
CREATE TRIGGER trVWVendordProductsDetailsInsteadOfInsert
on vWVendorsProductsDetails
Instead Of Insert
AS
BEGIN
    DECLARE @vendId varchar(10)

    SELECT @vendId = vend_id
    from Vendors
    join inserted
    on inserted.vend_name = Vendors.vend_name

    if (@vendId is NULL)
    BEGIN
        Raiserror('Invalid VENDOR NAME. TRE AGAIN PLEASE!',16,1)
        return
    END

    INSERT INTO Products(prod_id,vend_id,prod_name,amount,prod_price,prod_desc)
    SELECT prod_id,@vendId,prod_name,amount,prod_price,prod_desc
    from inserted
END

insert into vWVendorsProductsDetails values('Burg1','Burger',20,'3.49','Very tasty burger','Bears R Us');
```

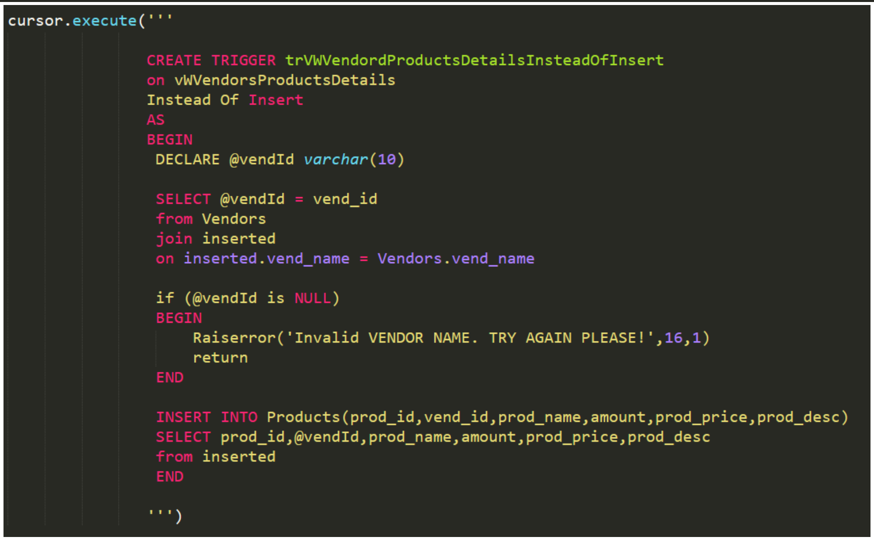


| | prod_id | prod_name | amount | prod_price | prod_desc | vend_name |
|---|---|---|---|---|---|---|
| 1 | BNBG01 | Fish bean bag toy | 50 | 2.71 | Fish bean bag toy, complete with bean bag worms ... | Doll House Inc. |
| 2 | BNBG02 | Bird bean bag toy | 200 | 3.49 | Bird bean bag toy, eggs are not included | Doll House Inc. |
| 3 | BNBG03 | Rabbit bean bag toy | 140 | 3.49 | Rabbit bean bag toy, comes with bean bag carrots | Doll House Inc. |
| 4 | BR01 | 8 inch teddy bear | 100 | 5.99 | 8 inch teddy bear, comes with cap and jacket | Bears R Us |
| 5 | BR02 | 12 inch teddy bear | 18 | 8.99 | 12 inch teddy bear, comes with cap and jacket | Bears R Us |
| 6 | BR03 | 18 inch teddy bear | 35 | 11.99 | 18 inch teddy bear, comes with cap and jacket | Bears R Us |
| 7 | Burg1 | Burger | 20 | 3.49 | Very tasty burger | Bears R Us |
| 8 | Burg2 | Burger2 | 20 | 3.49 | Very tasty burger again | Bears R Us |
| 9 | Burg3 | Burger2 | 20 | 3.49 | Very tasty burger again | Bears R Us |
| 10 | Burg4 | Burger | 20 | 3.49 | Very tasty burger | Bears R Us |
| 11 | RGAN01 | Raggedy Ann | 45 | 4.99 | 18 inch Raggedy Ann doll | Doll House Inc. |
| 12 | RYL01 | King doll | 120 | 9.49 | 12 inch king doll with royal garments and crown | Fun and Games |
| 13 | RYL02 | Queen doll | 18 | 9.49 | 12 inch queen doll with royal garments and crown | Fun and Games |

**The Python code to create View and Trigger:**

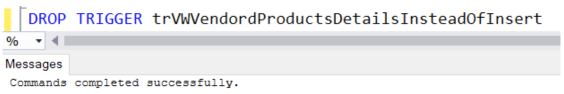


```
cursor.execute('''

                CREATE VIEW vWVendorsProductsDetails
                AS
                select p.prod_id,p.prod_name,p.amount,
                p.prod_price,p.prod_desc,v.vend_name
                from Products p join Vendors v on v.vend_id  = p.vend_id;

                ''')
```



```
cursor.execute('''

                CREATE TRIGGER trVWVendordProductsDetailsInsteadOfInsert
                on vWVendorsProductsDetails
                Instead Of Insert
                AS
                BEGIN
                 DECLARE @vendId varchar(10)

                 SELECT @vendId = vend_id
                 from Vendors
                 join inserted
                 on inserted.vend_name = Vendors.vend_name

                 if (@vendId is NULL)
                 BEGIN
                     Raiserror('Invalid VENDOR NAME. TRY AGAIN PLEASE!',16,1)
                     return
                 END

                 INSERT INTO Products(prod_id,vend_id,prod_name,amount,prod_price,prod_desc)
                 SELECT prod_id,@vendId,prod_name,amount,prod_price,prod_desc
                 from inserted
                 END

                ''')
```

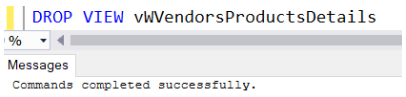
**Be aware that we deleted Trigger and View in advance:**



```
DROP TRIGGER trVWVendordProductsDetailsInsteadOfInsert
```

Messages

```
Commands completed successfully.
```

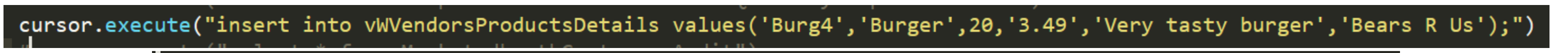


```
DROP VIEW vWVendorsProductsDetails
```

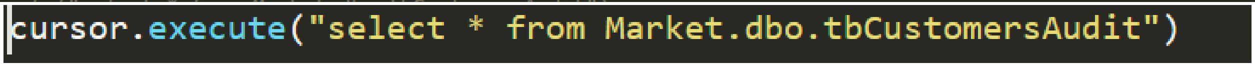
Messages

```
Commands completed successfully.
```

**The Python code to execute and see the result:**

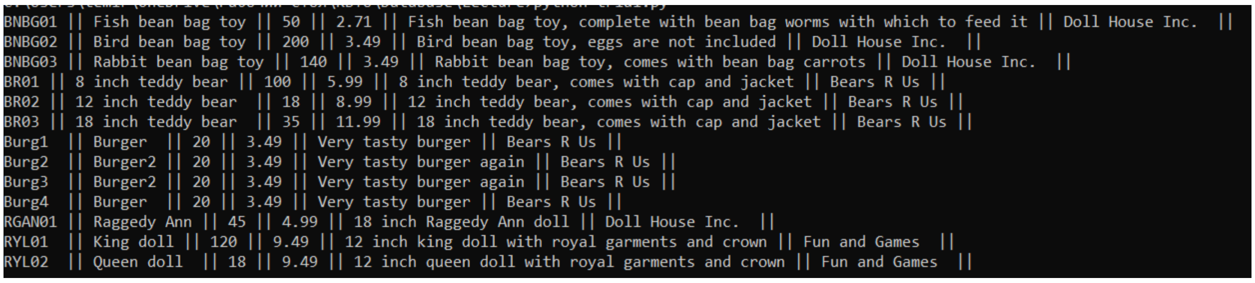


```
cursor.execute("insert into vWVendorsProductsDetails values('Burg4','Burger',20,'3.49','Very tasty burger','Bears R Us');")
```



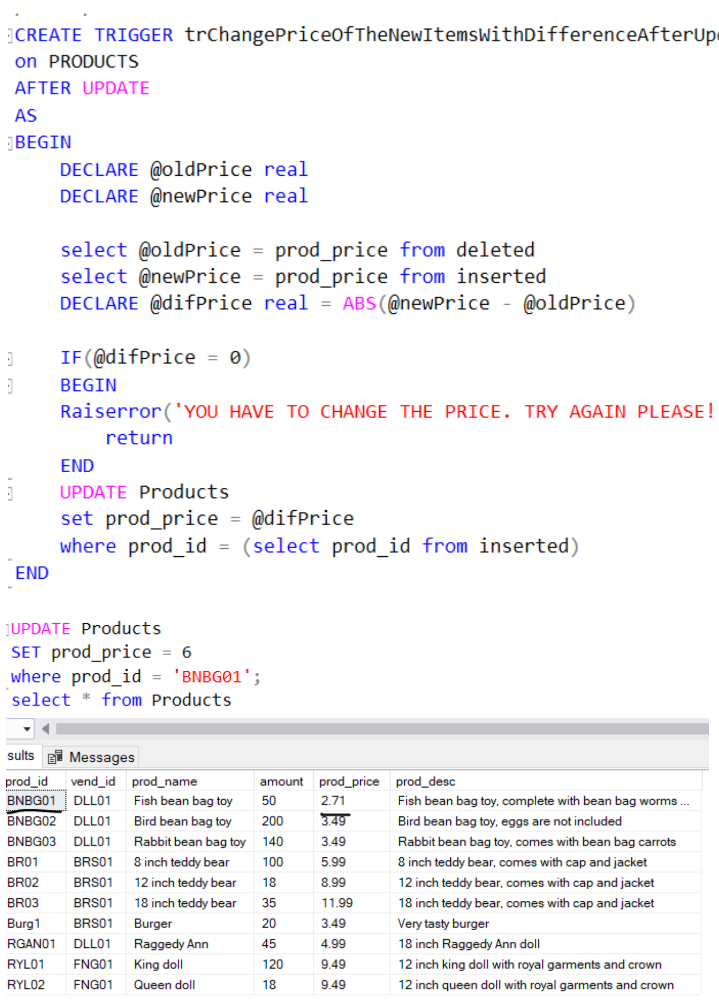
```
cursor.execute("select * from Market.dbo.tbCustomersAudit")
```

**The result in Console:**



```
BNBG01 || Fish bean bag toy || 50 || 2.71 || Fish bean bag toy, complete with bean bag worms with which to feed it || Doll House Inc.  ||
BNBG02 || Bird bean bag toy || 200 || 3.49 || Bird bean bag toy, eggs are not included || Doll House Inc.  ||
BNBG03 || Rabbit bean bag toy || 140 || 3.49 || Rabbit bean bag toy, comes with bean bag carrots || Doll House Inc.  ||
BR01 || 8 inch teddy bear || 100 || 5.99 || 8 inch teddy bear, comes with cap and jacket || Bears R Us ||
BR02 || 12 inch teddy bear  || 18 || 8.99 || 12 inch teddy bear, comes with cap and jacket || Bears R Us ||
BR03 || 18 inch teddy bear  || 35 || 11.99 || 18 inch teddy bear, comes with cap and jacket || Bears R Us ||
Burg1  || Burger  || 20 || 3.49 || Very tasty burger || Bears R Us ||
Burg2  || Burger2 || 20 || 3.49 || Very tasty burger again || Bears R Us ||
Burg3  || Burger2 || 20 || 3.49 || Very tasty burger again || Bears R Us ||
Burg4  || Burger  || 20 || 3.49 || Very tasty burger || Bears R Us ||
RGAN01 || Raggedy Ann || 45 || 4.99 || 18 inch Raggedy Ann doll || Doll House Inc.  ||
RYL01  || King doll || 120 || 9.49 || 12 inch king doll with royal garments and crown || Fun and Games  ||
RYL02  || Queen doll  || 18 || 9.49 || 12 inch queen doll with royal garments and crown || Fun and Games  ||
```

**10.** Create a Trigger that works if we update the PRICE of the PRODUCTS otherwise mistake appears. We need to assign the difference between new and old prices as new price for those products that were influenced by changes.
**The SQL code with output:**

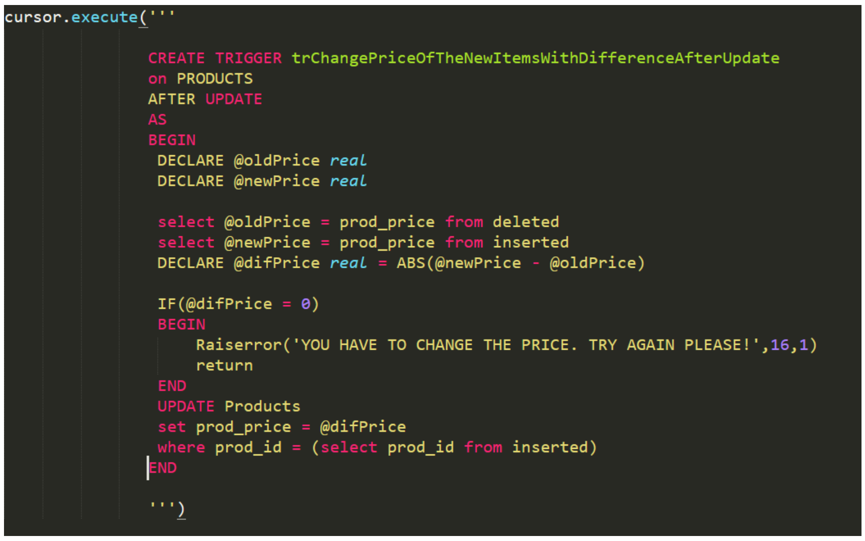


```
CREATE TRIGGER trChangePriceOfTheNewItemsWithDifferenceAfterUpdate
on PRODUCTS
AFTER UPDATE
AS
BEGIN
    DECLARE @oldPrice real
    DECLARE @newPrice real

    select @oldPrice = prod_price from deleted
    select @newPrice = prod_price from inserted
    DECLARE @difPrice real = ABS(@newPrice - @oldPrice)

    IF(@difPrice = 0)
    BEGIN
    Raiserror('YOU HAVE TO CHANGE THE PRICE. TRY AGAIN PLEASE!',16,1)
        return
    END
    UPDATE Products
    set prod_price = @difPrice
    where prod_id = (select prod_id from inserted)
END

UPDATE Products
SET prod_price = 6
where prod_id = 'BNBG01';
select * from Products
```

sults | Messages

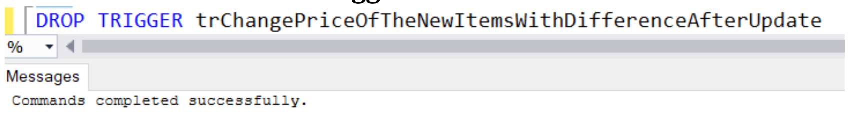
| prod_id | vend_id | prod_name | amount | prod_price | prod_desc |
|---|---|---|---|---|---|
| BNBG01 | DLL01 | Fish bean bag toy | 50 | 2.71 | Fish bean bag toy, complete with bean bag worms ... |
| BNBG02 | DLL01 | Bird bean bag toy | 200 | 3.49 | Bird bean bag toy, eggs are not included |
| BNBG03 | DLL01 | Rabbit bean bag toy | 140 | 3.49 | Rabbit bean bag toy, comes with bean bag carrots |
| BR01 | BRS01 | 8 inch teddy bear | 100 | 5.99 | 8 inch teddy bear, comes with cap and jacket |
| BR02 | BRS01 | 12 inch teddy bear | 18 | 8.99 | 12 inch teddy bear, comes with cap and jacket |
| BR03 | BRS01 | 18 inch teddy bear | 35 | 11.99 | 18 inch teddy bear, comes with cap and jacket |
| Burg1 | BRS01 | Burger | 20 | 3.49 | Very tasty burger |
| RGAN01 | DLL01 | Raggedy Ann | 45 | 4.99 | 18 inch Raggedy Ann doll |
| RYL01 | FNG01 | King doll | 120 | 9.49 | 12 inch king doll with royal garments and crown |
| RYL02 | FNG01 | Queen doll | 18 | 9.49 | 12 inch queen doll with royal garments and crown |

**The Python code to create Trigger:**



```
cursor.execute('''

                CREATE TRIGGER trChangePriceOfTheNewItemsWithDifferenceAfterUpdate
                on PRODUCTS
                AFTER UPDATE
                AS
                BEGIN
                 DECLARE @oldPrice real
                 DECLARE @newPrice real

                 select @oldPrice = prod_price from deleted
                 select @newPrice = prod_price from inserted
                 DECLARE @difPrice real = ABS(@newPrice - @oldPrice)

                 IF(@difPrice = 0)
                 BEGIN
                     Raiserror('YOU HAVE TO CHANGE THE PRICE. TRY AGAIN PLEASE!',16,1)
                     return
                 END
                 UPDATE Products
                 set prod_price = @difPrice
                 where prod_id = (select prod_id from inserted)
                END

                ''')
```

**Be confident that deleted the trigger before:**

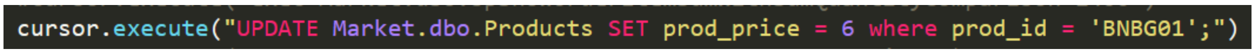


```
DROP TRIGGER trChangePriceOfTheNewItemsWithDifferenceAfterUpdate
```

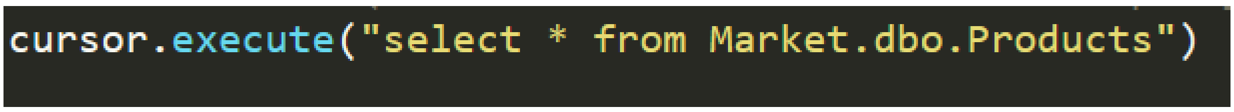
Messages

```
Commands completed successfully.
```

**Execute the working code:**

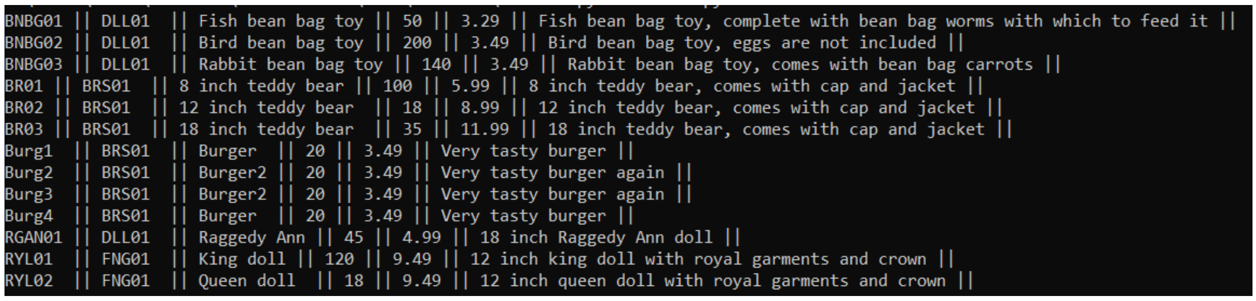


```
cursor.execute("UPDATE Market.dbo.Products SET prod_price = 6 where prod_id = 'BNBG01';")
```



```
cursor.execute("select * from Market.dbo.Products")
```

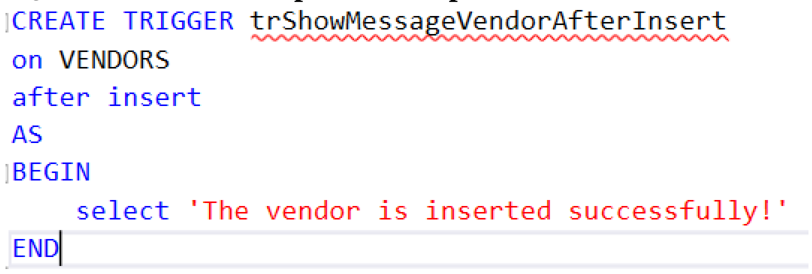
**The output in console:**



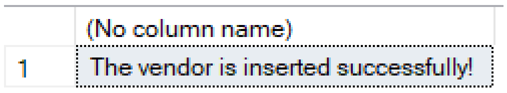
```
BNBG01 || DLL01  || Fish bean bag toy || 50 || 3.29 || Fish bean bag toy, complete with bean bag worms with which to feed it ||
BNBG02 || DLL01  || Bird bean bag toy || 200 || 3.49 || Bird bean bag toy, eggs are not included ||
BNBG03 || DLL01  || Rabbit bean bag toy || 140 || 3.49 || Rabbit bean bag toy, comes with bean bag carrots ||
BR01 || BRS01  || 8 inch teddy bear || 100 || 5.99 || 8 inch teddy bear, comes with cap and jacket ||
BR02 || BRS01  || 12 inch teddy bear  || 18 || 8.99 || 12 inch teddy bear, comes with cap and jacket ||
BR03 || BRS01  || 18 inch teddy bear  || 35 || 11.99 || 18 inch teddy bear, comes with cap and jacket ||
Burg1  || BRS01  || Burger  || 20 || 3.49 || Very tasty burger ||
Burg2  || BRS01  || Burger2 || 20 || 3.49 || Very tasty burger again ||
Burg3  || BRS01  || Burger2 || 20 || 3.49 || Very tasty burger again ||
Burg4  || BRS01  || Burger  || 20 || 3.49 || Very tasty burger ||
RGAN01 || DLL01  || Raggedy Ann || 45 || 4.99 || 18 inch Raggedy Ann doll ||
RYL01  || FNG01  || King doll || 120 || 9.49 || 12 inch king doll with royal garments and crown ||
RYL02  || FNG01  || Queen doll  || 18 || 9.49 || 12 inch queen doll with royal garments and crown ||
```

**11.** Oh, since there are no efforts and imagination to produce a cool query let's create something basic. Write a Trigger that would show 'The vendor is inserted successfully!' if there was inserted a new Seller into the table.

**The SQL code with corresponded output:**

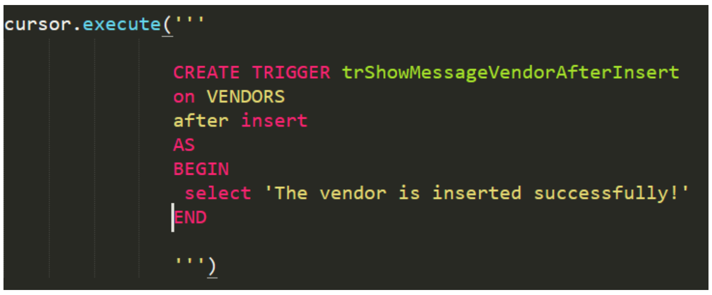


```
CREATE TRIGGER trShowMessageVendorAfterInsert
on VENDORS
after insert
AS
BEGIN
	select 'The vendor is inserted successfully!'
END
```



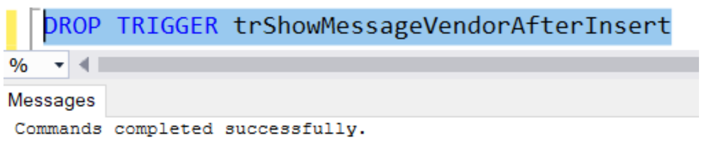
|   | (No column name) |
|---|---|
| 1 | The vendor is inserted successfully! |

**The Python to create Trigger:**



```
cursor.execute('''

            CREATE TRIGGER trShowMessageVendorAfterInsert
            on VENDORS
            after insert
            AS
            BEGIN
             select 'The vendor is inserted successfully!'
            END

            ''')
```

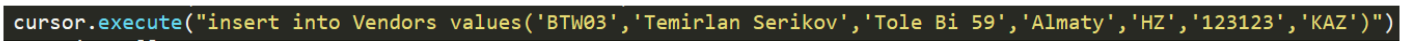
**Be sure that we deleted Trigger before:**



```
DROP TRIGGER trShowMessageVendorAfterInsert
```

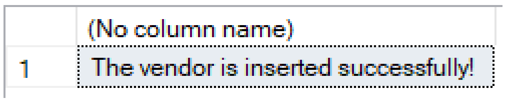
```
Messages
Commands completed successfully.
```

**The python code to execute the Trigger:**



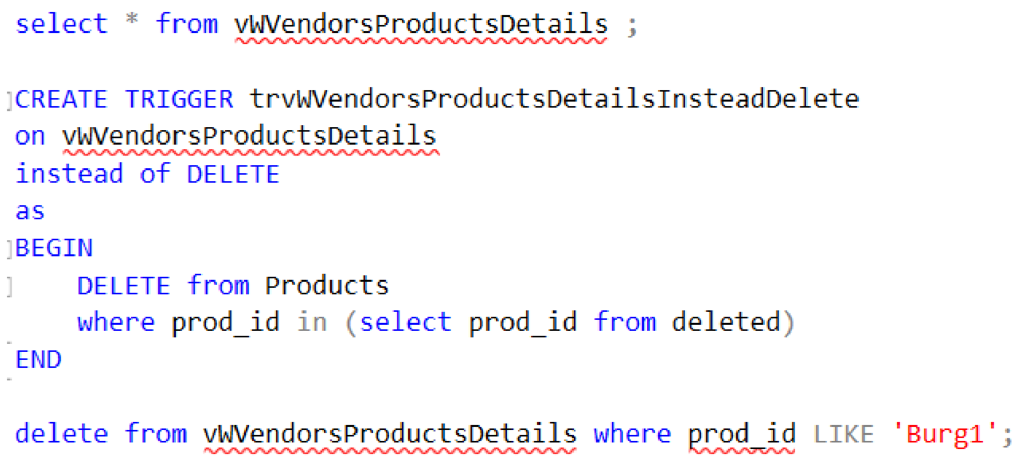
```
cursor.execute("insert into Vendors values('BTW03','Temirlan Serikov','Tole Bi 59','Almaty','HZ','123123','KAZ')")
```

**The Output:**



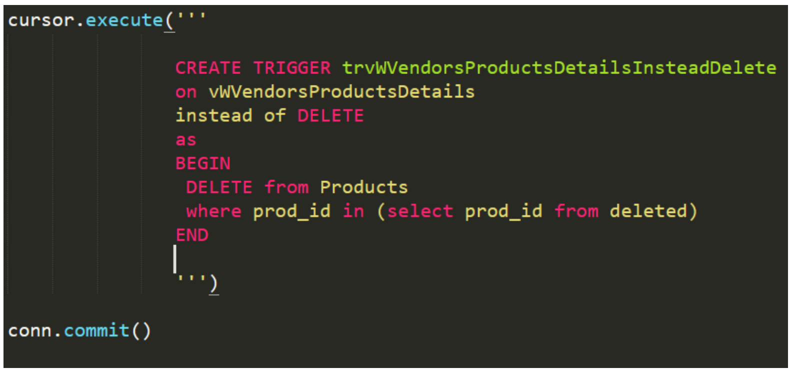
|   | (No column name) |
|---|---|
| 1 | The vendor is inserted successfully! |

**12.** Well, you need to use the created previously VIEW and this time investigate a TRIGGER that would imitate the working principle of DELETE for the VIEW since mistakes appears if we try to do it. We will delete recently inserted burger product.



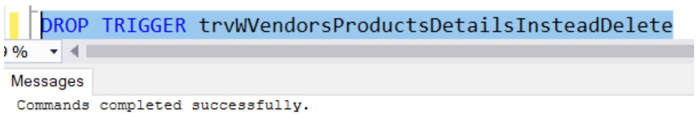
```sql
select * from vWVendorsProductsDetails ;

CREATE TRIGGER trvWVendorsProductsDetailsInsteadDelete
on vWVendorsProductsDetails
instead of DELETE
as
BEGIN
    DELETE from Products
    where prod_id in (select prod_id from deleted)
END

delete from vWVendorsProductsDetails where prod_id LIKE 'Burg1';
```

**The creation in Python:**



```python
cursor.execute('''

                CREATE TRIGGER trvWVendorsProductsDetailsInsteadDelete
                on vWVendorsProductsDetails
                instead of DELETE
                as
                BEGIN
                 DELETE from Products
                 where prod_id in (select prod_id from deleted)
                END

                ''')

conn.commit()
```

**Be confident that we deleted the Trigger in SQL before:**

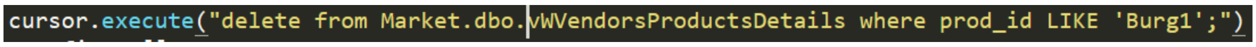


```sql
DROP TRIGGER trvWVendorsProductsDetailsInsteadDelete
```

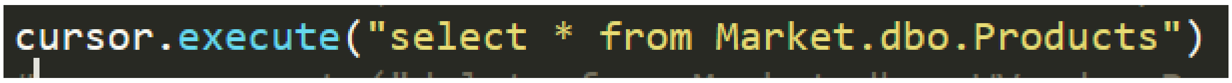
Messages

```
Commands completed successfully.
```

**The Python code execution:**

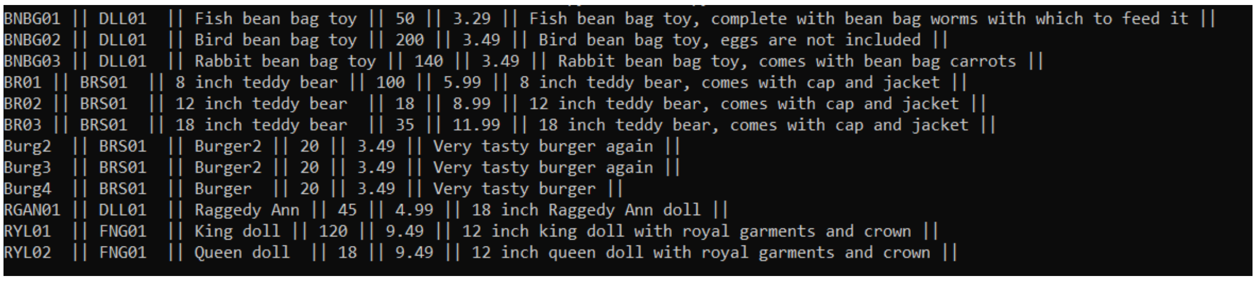


```python
cursor.execute("delete from Market.dbo.vWVendorsProductsDetails where prod_id LIKE 'Burg1';")
```



```python
cursor.execute("select * from Market.dbo.Products")
```

**The output with no 'Burg1':**

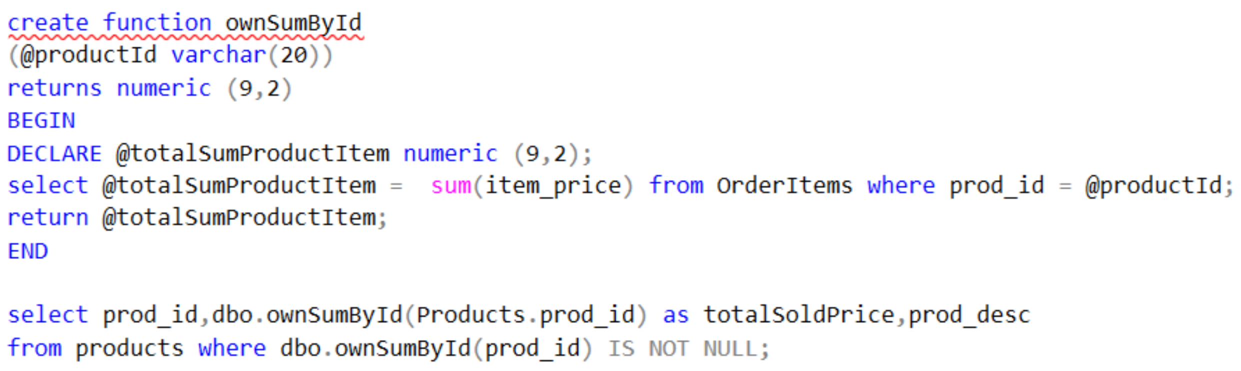


```
BNBG01 || DLL01  || Fish bean bag toy || 50 || 3.29 || Fish bean bag toy, complete with bean bag worms with which to feed it ||
BNBG02 || DLL01  || Bird bean bag toy || 200 || 3.49 || Bird bean bag toy, eggs are not included ||
BNBG03 || DLL01  || Rabbit bean bag toy || 140 || 3.49 || Rabbit bean bag toy, comes with bean bag carrots ||
BR01 || BRS01  || 8 inch teddy bear || 100 || 5.99 || 8 inch teddy bear, comes with cap and jacket ||
BR02 || BRS01  || 12 inch teddy bear  || 18 || 8.99 || 12 inch teddy bear, comes with cap and jacket ||
BR03 || BRS01  || 18 inch teddy bear  || 35 || 11.99 || 18 inch teddy bear, comes with cap and jacket ||
Burg2  || BRS01  || Burger2 || 20 || 3.49 || Very tasty burger again ||
Burg3  || BRS01  || Burger2 || 20 || 3.49 || Very tasty burger again ||
Burg4  || BRS01  || Burger  || 20 || 3.49 || Very tasty burger ||
RGAN01 || DLL01  || Raggedy Ann || 45 || 4.99 || 18 inch Raggedy Ann doll ||
RYL01  || FNG01  || King doll || 120 || 9.49 || 12 inch king doll with royal garments and crown ||
RYL02  || FNG01  || Queen doll  || 18 || 9.49 || 12 inch queen doll with royal garments and crown ||
```

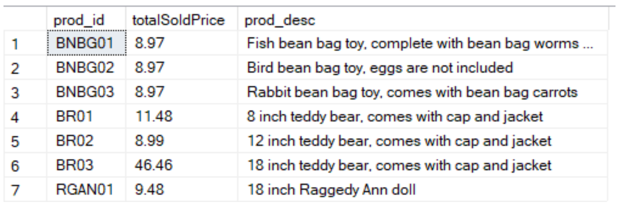
## 8 QUERIES FOR FUNCTIONS
## (Also very interesting)

**13.** Create a function that would replace the real sum for the prices of the products and return this value.

**The SQL code with appropriate output:**

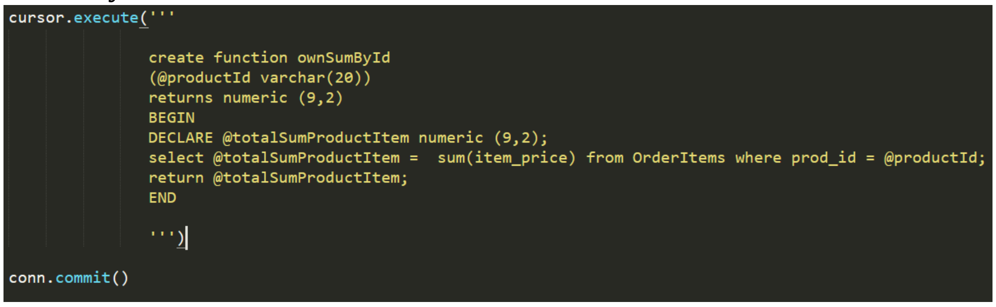


```sql
create function ownSumById
(@productId varchar(20))
returns numeric (9,2)
BEGIN
DECLARE @totalSumProductItem numeric (9,2);
select @totalSumProductItem =  sum(item_price) from OrderItems where prod_id = @productId;
return @totalSumProductItem;
END

select prod_id,dbo.ownSumById(Products.prod_id) as totalSoldPrice,prod_desc
from products where dbo.ownSumById(prod_id) IS NOT NULL;
```



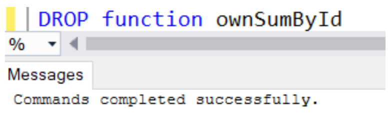
|  | prod_id | totalSoldPrice | prod_desc |
|---|---|---|---|
| 1 | BNBG01 | 8.97 | Fish bean bag toy, complete with bean bag worms ... |
| 2 | BNBG02 | 8.97 | Bird bean bag toy, eggs are not included |
| 3 | BNBG03 | 8.97 | Rabbit bean bag toy, comes with bean bag carrots |
| 4 | BR01 | 11.48 | 8 inch teddy bear, comes with cap and jacket |
| 5 | BR02 | 8.99 | 12 inch teddy bear, comes with cap and jacket |
| 6 | BR03 | 46.46 | 18 inch teddy bear, comes with cap and jacket |
| 7 | RGAN01 | 9.48 | 18 inch Raggedy Ann doll |

**The Python Code to create the Function:**



```python
cursor.execute('''

                create function ownSumById
                (@productId varchar(20))
                returns numeric (9,2)
                BEGIN
                DECLARE @totalSumProductItem numeric (9,2);
                select @totalSumProductItem =  sum(item_price) from OrderItems where prod_id = @productId;
                return @totalSumProductItem;
                END

                ''')

conn.commit()
```

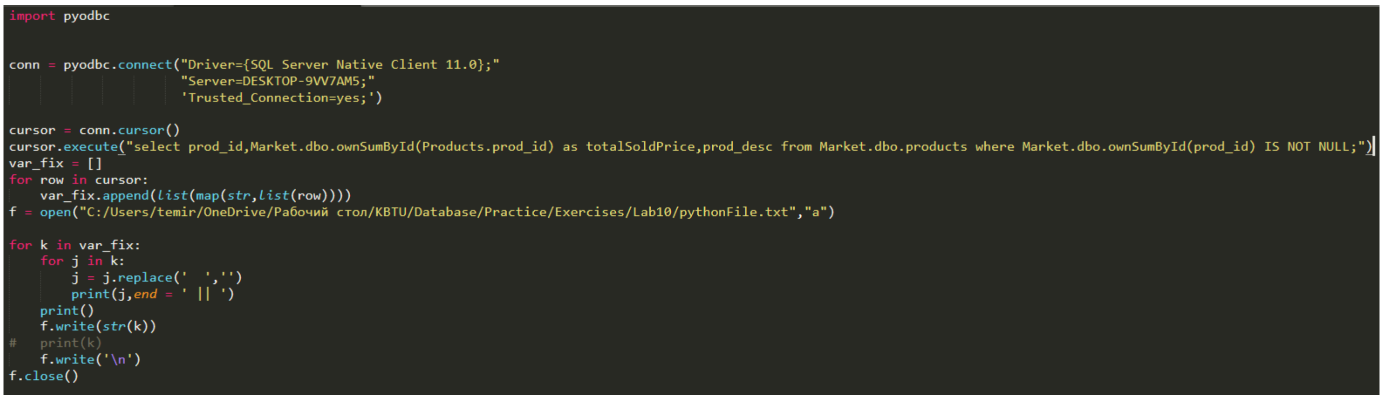
**Be sure that we deleted the function previously:**



```
DROP function ownSumById
```

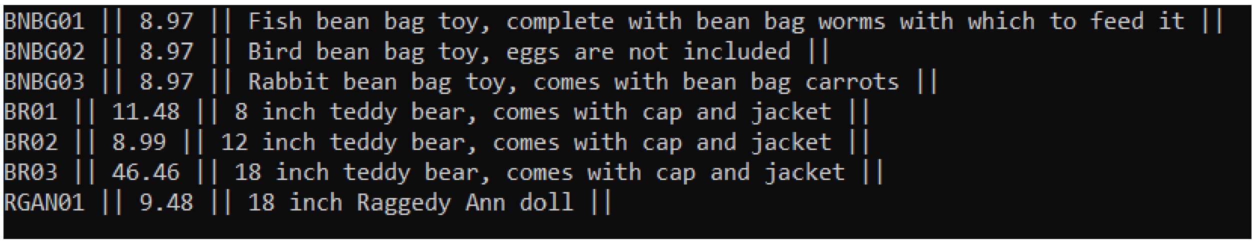
```
Commands completed successfully.
```

**The Python code to execute the Function and get the result:**



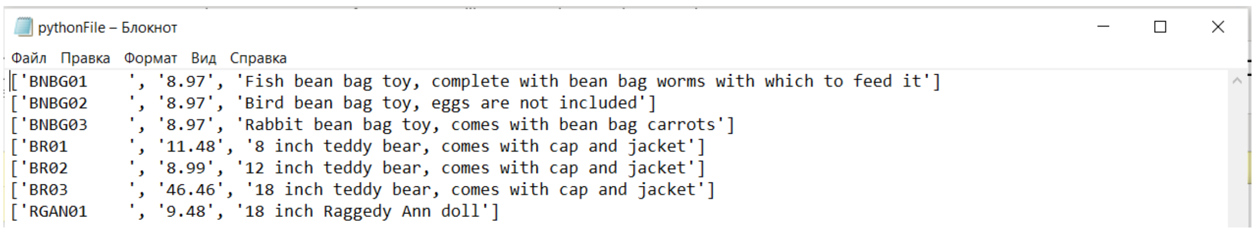
```python
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

cursor = conn.cursor()
cursor.execute("select prod_id,Market.dbo.ownSumById(Products.prod_id) as totalSoldPrice,prod_desc from Market.dbo.products where Market.dbo.ownSumById(prod_id) IS NOT NULL;")
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The output in console:**



```
BNBG01 || 8.97 || Fish bean bag toy, complete with bean bag worms with which to feed it ||
BNBG02 || 8.97 || Bird bean bag toy, eggs are not included ||
BNBG03 || 8.97 || Rabbit bean bag toy, comes with bean bag carrots ||
BR01 || 11.48 || 8 inch teddy bear, comes with cap and jacket ||
BR02 || 8.99 || 12 inch teddy bear, comes with cap and jacket ||
BR03 || 46.46 || 18 inch teddy bear, comes with cap and jacket ||
RGAN01 || 9.48 || 18 inch Raggedy Ann doll ||
```

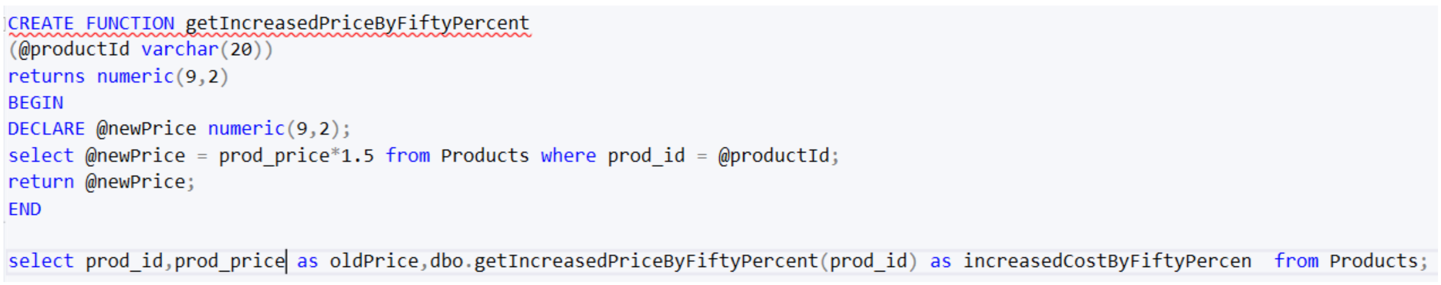
**The output in txt file:**



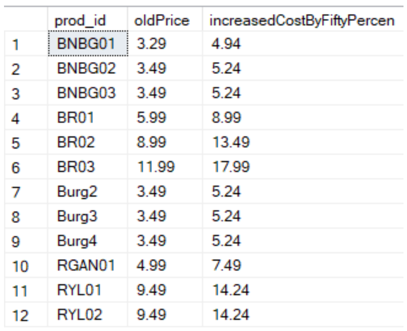
```
['BNBG01    ', '8.97', 'Fish bean bag toy, complete with bean bag worms with which to feed it']
['BNBG02    ', '8.97', 'Bird bean bag toy, eggs are not included']
['BNBG03    ', '8.97', 'Rabbit bean bag toy, comes with bean bag carrots']
['BR01      ', '11.48', '8 inch teddy bear, comes with cap and jacket']
['BR02      ', '8.99', '12 inch teddy bear, comes with cap and jacket']
['BR03      ', '46.46', '18 inch teddy bear, comes with cap and jacket']
['RGAN01    ', '9.48', '18 inch Raggedy Ann doll']
```

**14.** Write the function that would increase a price of the products by 50 percent and returns this new price.

**The SQL Part with code and output:**

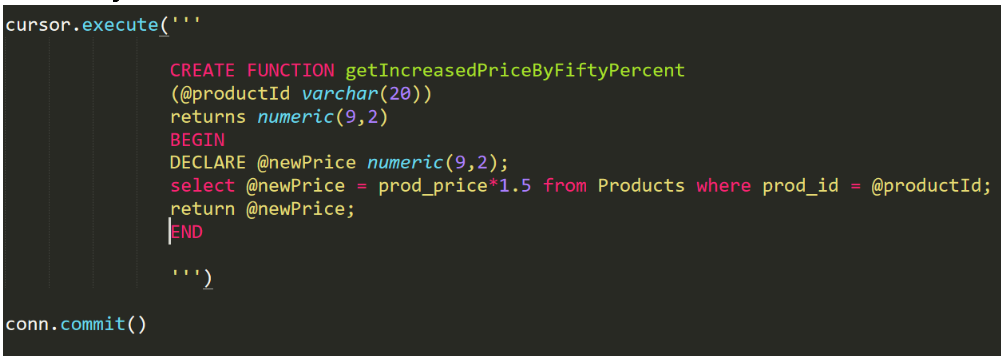


```sql
CREATE FUNCTION getIncreasedPriceByFiftyPercent
(@productId varchar(20))
returns numeric(9,2)
BEGIN
DECLARE @newPrice numeric(9,2);
select @newPrice = prod_price*1.5 from Products where prod_id = @productId;
return @newPrice;
END

select prod_id,prod_price as oldPrice,dbo.getIncreasedPriceByFiftyPercent(prod_id) as increasedCostByFiftyPercen  from Products;
```



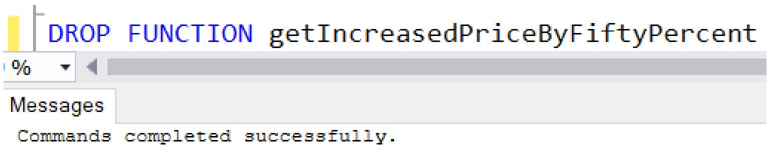
| | prod_id | oldPrice | increasedCostByFiftyPercen |
|---|---|---|---|
| 1 | BNBG01 | 3.29 | 4.94 |
| 2 | BNBG02 | 3.49 | 5.24 |
| 3 | BNBG03 | 3.49 | 5.24 |
| 4 | BR01 | 5.99 | 8.99 |
| 5 | BR02 | 8.99 | 13.49 |
| 6 | BR03 | 11.99 | 17.99 |
| 7 | Burg2 | 3.49 | 5.24 |
| 8 | Burg3 | 3.49 | 5.24 |
| 9 | Burg4 | 3.49 | 5.24 |
| 10 | RGAN01 | 4.99 | 7.49 |
| 11 | RYL01 | 9.49 | 14.24 |
| 12 | RYL02 | 9.49 | 14.24 |

**The Python code to create the Function:**



```python
cursor.execute('''

            CREATE FUNCTION getIncreasedPriceByFiftyPercent
            (@productId varchar(20))
            returns numeric(9,2)
            BEGIN
            DECLARE @newPrice numeric(9,2);
            select @newPrice = prod_price*1.5 from Products where prod_id = @productId;
            return @newPrice;
            END

            ''')

conn.commit()
```

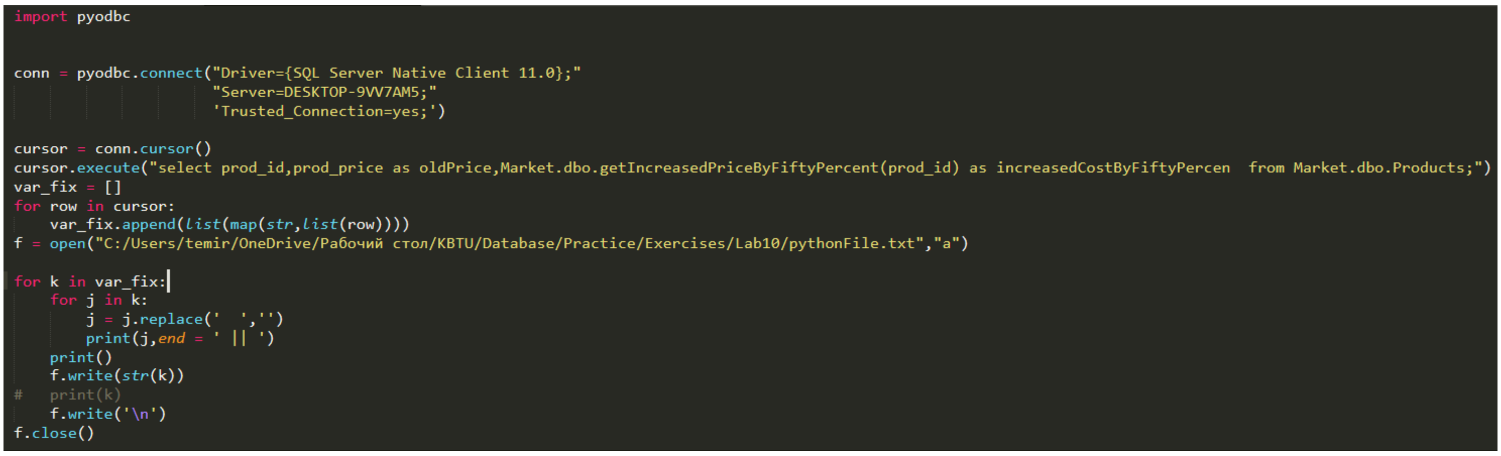
**Be aware that we deleted the function in advance:**



```
DROP FUNCTION getIncreasedPriceByFiftyPercent
```

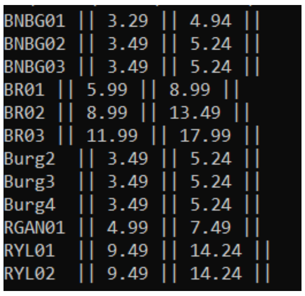
```
Commands completed successfully.
```

**Python file with Function Execution:**



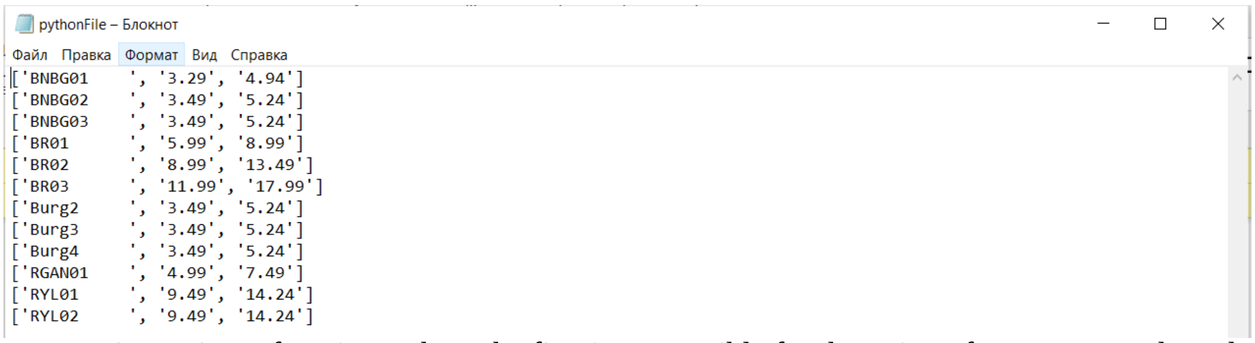
```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

cursor = conn.cursor()
cursor.execute("select prod_id,prod_price as oldPrice,Market.dbo.getIncreasedPriceByFiftyPercent(prod_id) as increasedCostByFiftyPercen  from Market.dbo.Products;")
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The Python output in console:**



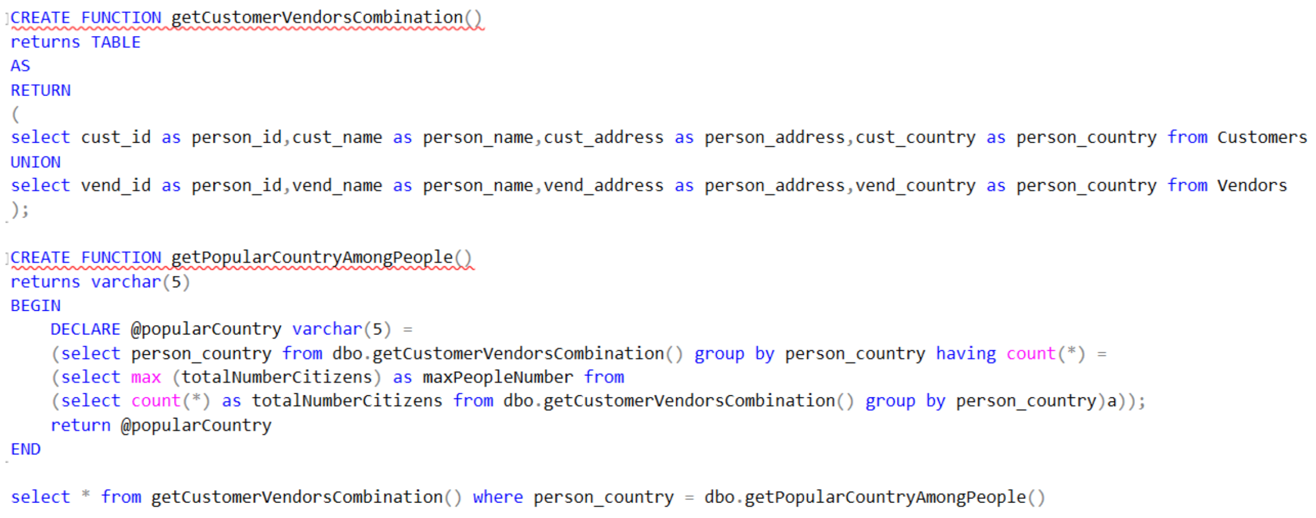
```
BNBG01 || 3.29 || 4.94 ||
BNBG02 || 3.49 || 5.24 ||
BNBG03 || 3.49 || 5.24 ||
BR01 || 5.99 || 8.99 ||
BR02 || 8.99 || 13.49 ||
BR03 || 11.99 || 17.99 ||
Burg2  || 3.49 || 5.24 ||
Burg3  || 3.49 || 5.24 ||
Burg4  || 3.49 || 5.24 ||
RGAN01 || 4.99 || 7.49 ||
RYL01  || 9.49 || 14.24 ||
RYL02  || 9.49 || 14.24 ||
```

**The output in txt File:**

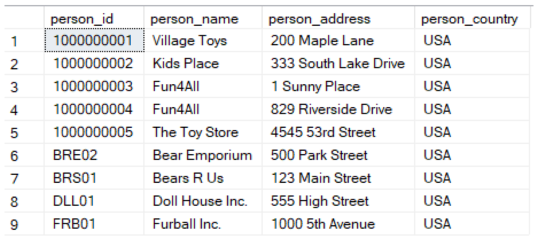


```
['BNBG01     ', '3.29', '4.94']
['BNBG02     ', '3.49', '5.24']
['BNBG03     ', '3.49', '5.24']
['BR01       ', '5.99', '8.99']
['BR02       ', '8.99', '13.49']
['BR03       ', '11.99', '17.99']
['Burg2      ', '3.49', '5.24']
['Burg3      ', '3.49', '5.24']
['Burg4      ', '3.49', '5.24']
['RGAN01     ', '4.99', '7.49']
['RYL01      ', '9.49', '14.24']
['RYL02      ', '9.49', '14.24']
```

15. Write to functions where the first is responsible for the union of customers and vendors and it is returned as a table while the second function needs to take this new table from the first function. The second function has to return the most popular country among people. Show the people who live in the most popular Country.

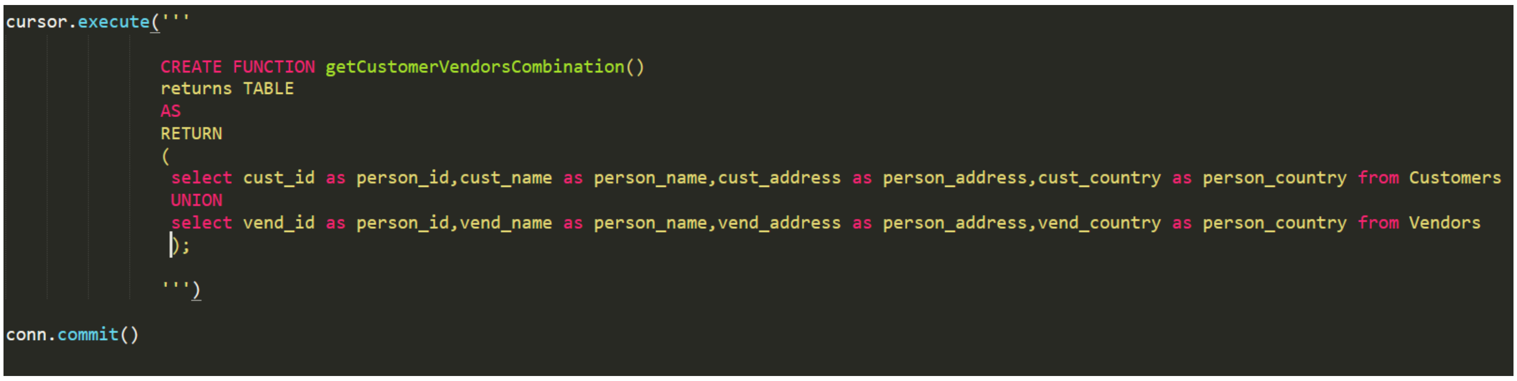


```
CREATE FUNCTION getCustomerVendorsCombination()
returns TABLE
AS
RETURN
(
select cust_id as person_id,cust_name as person_name,cust_address as person_address,cust_country as person_country from Customers
UNION
select vend_id as person_id,vend_name as person_name,vend_address as person_address,vend_country as person_country from Vendors
);

CREATE FUNCTION getPopularCountryAmongPeople()
returns varchar(5)
BEGIN
    DECLARE @popularCountry varchar(5) =
    (select person_country from dbo.getCustomerVendorsCombination() group by person_country having count(*) =
    (select max (totalNumberCitizens) as maxPeopleNumber from
    (select count(*) as totalNumberCitizens from dbo.getCustomerVendorsCombination() group by person_country)a));
    return @popularCountry
END

select * from getCustomerVendorsCombination() where person_country = dbo.getPopularCountryAmongPeople()
```

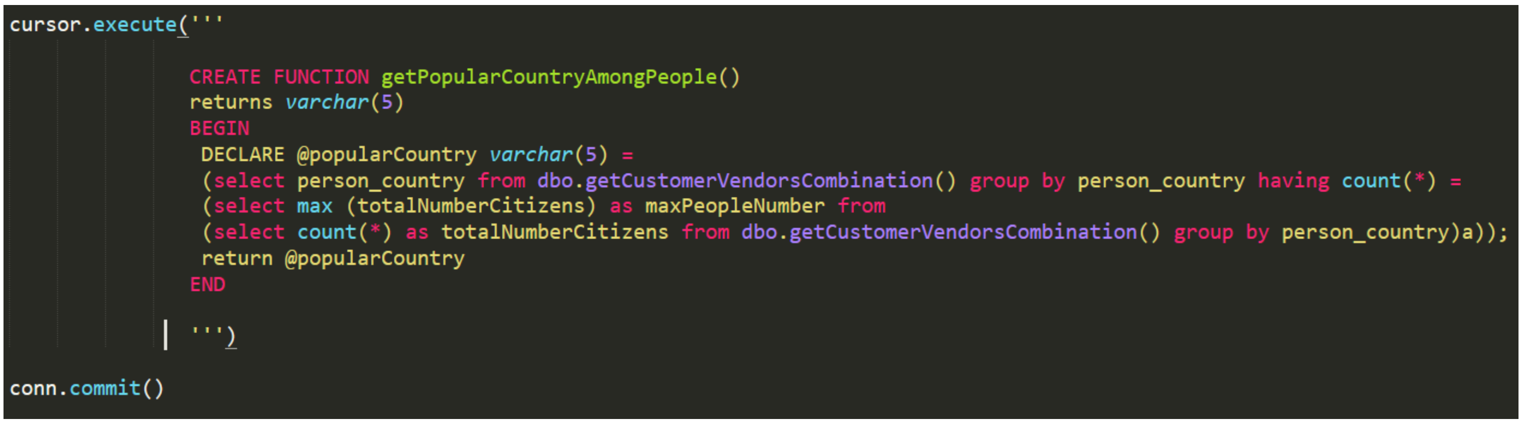


| | person_id | person_name | person_address | person_country |
|---|---|---|---|---|
| 1 | 1000000001 | Village Toys | 200 Maple Lane | USA |
| 2 | 1000000002 | Kids Place | 333 South Lake Drive | USA |
| 3 | 1000000003 | Fun4All | 1 Sunny Place | USA |
| 4 | 1000000004 | Fun4All | 829 Riverside Drive | USA |
| 5 | 1000000005 | The Toy Store | 4545 53rd Street | USA |
| 6 | BRE02 | Bear Emporium | 500 Park Street | USA |
| 7 | BRS01 | Bears R Us | 123 Main Street | USA |
| 8 | DLL01 | Doll House Inc. | 555 High Street | USA |
| 9 | FRB01 | Furball Inc. | 1000 5th Avenue | USA |

## The Python Functions Creation:

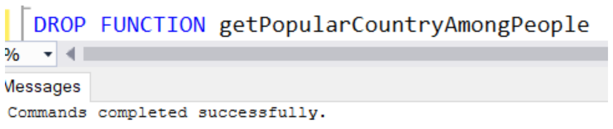


```
cursor.execute('''

            CREATE FUNCTION getCustomerVendorsCombination()
            returns TABLE
            AS
            RETURN
            (
             select cust_id as person_id,cust_name as person_name,cust_address as person_address,cust_country as person_country from Customers
             UNION
             select vend_id as person_id,vend_name as person_name,vend_address as person_address,vend_country as person_country from Vendors
             );

            ''')

conn.commit()
```



```
cursor.execute('''

            CREATE FUNCTION getPopularCountryAmongPeople()
            returns varchar(5)
            BEGIN
             DECLARE @popularCountry varchar(5) =
             (select person_country from dbo.getCustomerVendorsCombination() group by person_country having count(*) =
             (select max (totalNumberCitizens) as maxPeopleNumber from
             (select count(*) as totalNumberCitizens from dbo.getCustomerVendorsCombination() group by person_country)a));
             return @popularCountry
            END

            ''')

conn.commit()
```

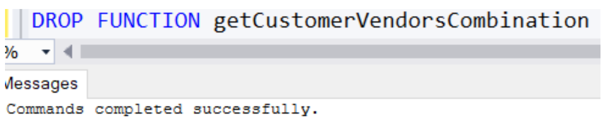
## Be aware that we deleted the functions:



```
DROP FUNCTION getPopularCountryAmongPeople
```

Messages

```
Commands completed successfully.
```

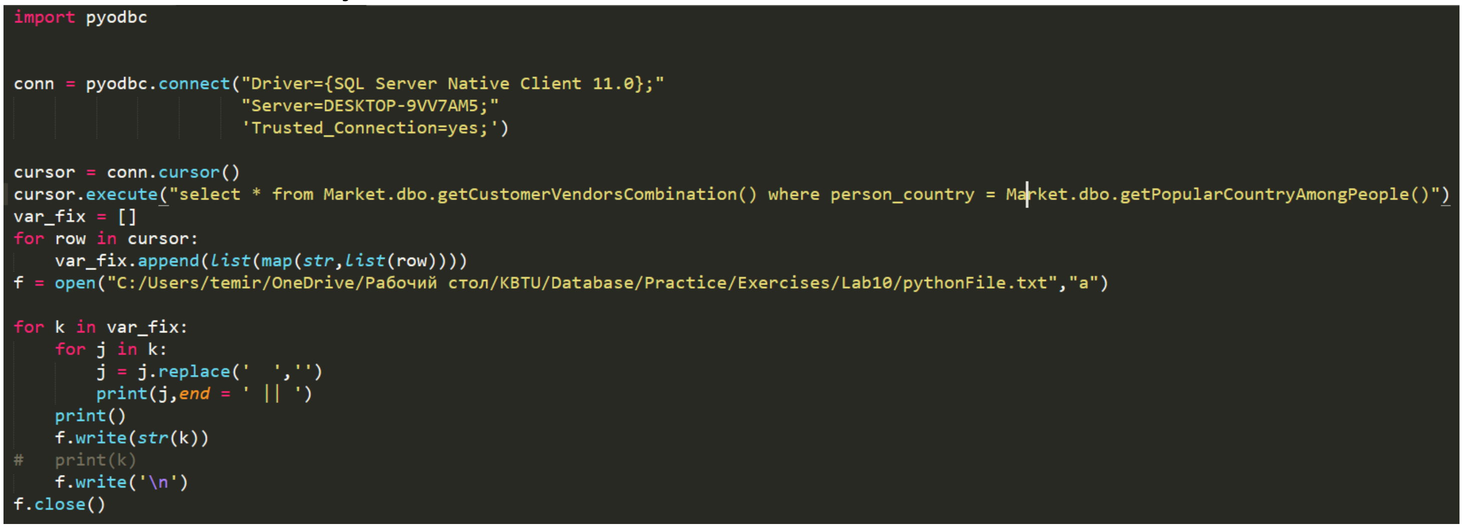


```
DROP FUNCTION getCustomerVendorsCombination
```

Messages

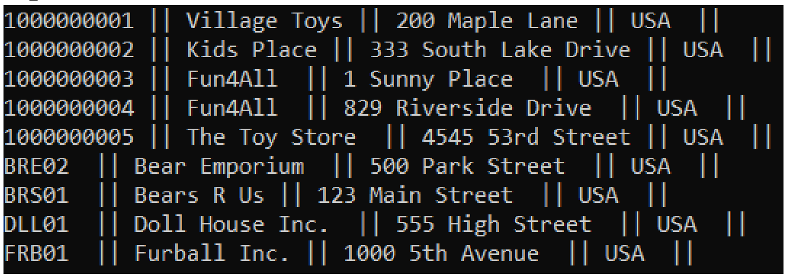
```
Commands completed successfully.
```

## The Python File to execute the functions:



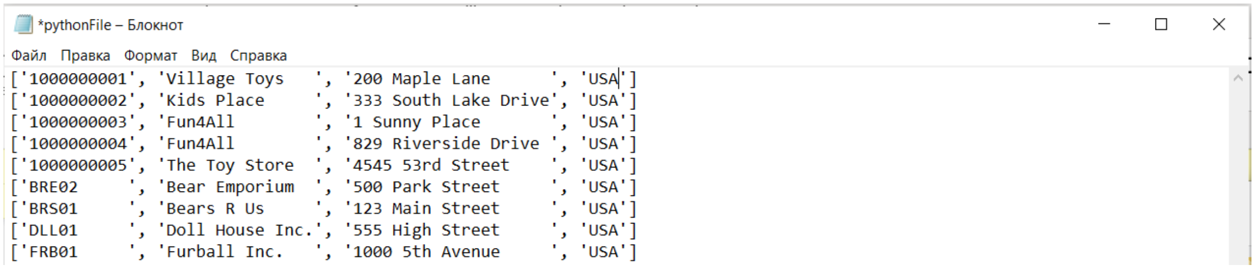
```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

cursor = conn.cursor()
cursor.execute("select * from Market.dbo.getCustomerVendorsCombination() where person_country = Market.dbo.getPopularCountryAmongPeople()")
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#    print(k)
    f.write('\n')
f.close()
```

**The output in the Console:**



```
1000000001 || Village Toys || 200 Maple Lane || USA  ||
1000000002 || Kids Place || 333 South Lake Drive || USA  ||
1000000003 || Fun4All   || 1 Sunny Place   || USA  ||
1000000004 || Fun4All   || 829 Riverside Drive  || USA  ||
1000000005 || The Toy Store  || 4545 53rd Street || USA  ||
BRE02   || Bear Emporium  || 500 Park Street  || USA  ||
BRS01   || Bears R Us || 123 Main Street   || USA  ||
DLL01   || Doll House Inc.  || 555 High Street  || USA  ||
FRB01   || Furball Inc. || 1000 5th Avenue   || USA  ||
```

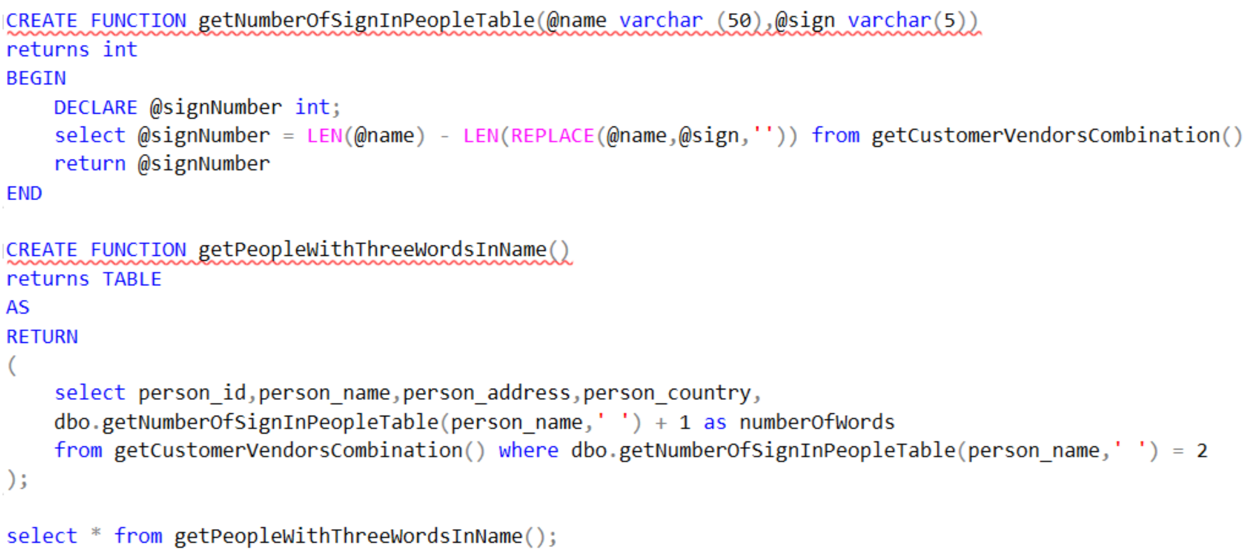
**The Output in the txt File:**



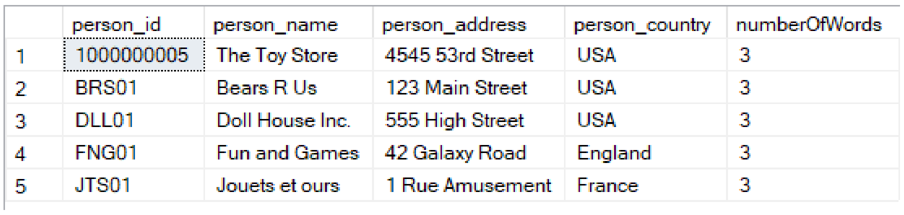
```
['1000000001', 'Village Toys   ', '200 Maple Lane      ', 'USA']
['1000000002', 'Kids Place     ', '333 South Lake Drive', 'USA']
['1000000003', 'Fun4All        ', '1 Sunny Place       ', 'USA']
['1000000004', 'Fun4All        ', '829 Riverside Drive ', 'USA']
['1000000005', 'The Toy Store  ', '4545 53rd Street    ', 'USA']
['BRE02     ', 'Bear Emporium  ', '500 Park Street     ', 'USA']
['BRS01     ', 'Bears R Us     ', '123 Main Street     ', 'USA']
['DLL01     ', 'Doll House Inc.', '555 High Street     ', 'USA']
['FRB01     ', 'Furball Inc.   ', '1000 5th Avenue     ', 'USA']
```

16. Write the functions that finally return a table with those people whose names consists of 3 words. Then show the whole information of these people.

**The SQL Code with corresponded output:**

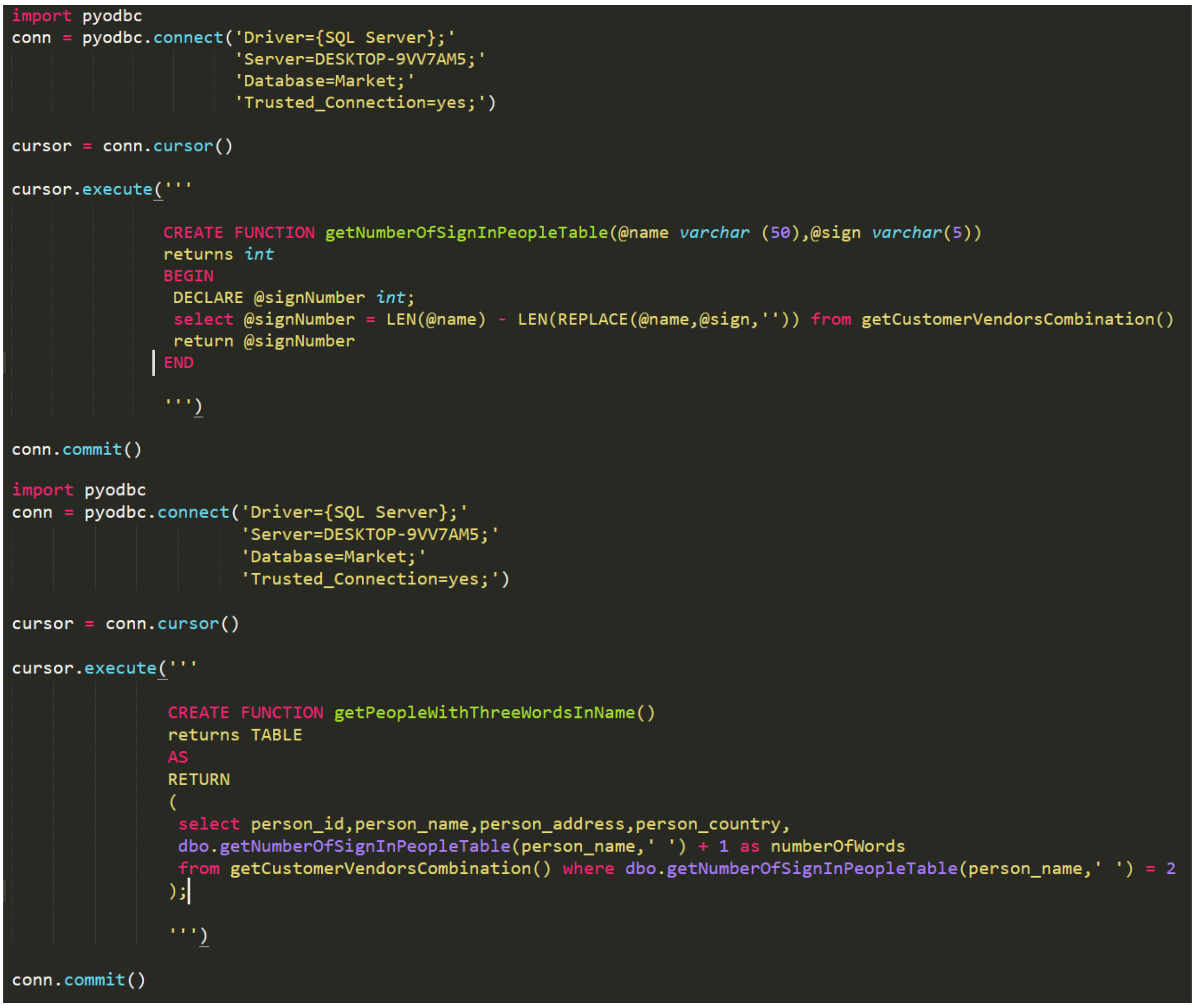


```
CREATE FUNCTION getNumberOfSignInPeopleTable(@name varchar (50),@sign varchar(5))
returns int
BEGIN
    DECLARE @signNumber int;
    select @signNumber = LEN(@name) - LEN(REPLACE(@name,@sign,'')) from getCustomerVendorsCombination()
    return @signNumber
END

CREATE FUNCTION getPeopleWithThreeWordsInName()
returns TABLE
AS
RETURN
(
    select person_id,person_name,person_address,person_country,
    dbo.getNumberOfSignInPeopleTable(person_name,' ') + 1 as numberOfWords
    from getCustomerVendorsCombination() where dbo.getNumberOfSignInPeopleTable(person_name,' ') = 2
);

select * from getPeopleWithThreeWordsInName();
```



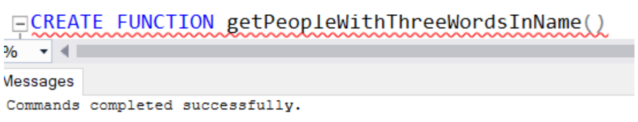
| | person_id | person_name | person_address | person_country | numberOfWords |
|---|---|---|---|---|---|
| 1 | 1000000005 | The Toy Store | 4545 53rd Street | USA | 3 |
| 2 | BRS01 | Bears R Us | 123 Main Street | USA | 3 |
| 3 | DLL01 | Doll House Inc. | 555 High Street | USA | 3 |
| 4 | FNG01 | Fun and Games | 42 Galaxy Road | England | 3 |
| 5 | JTS01 | Jouets et ours | 1 Rue Amusement | France | 3 |

**The Python Creation of Functions:**



```
import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE FUNCTION getNumberOfSignInPeopleTable(@name varchar (50),@sign varchar(5))
               returns int
               BEGIN
                DECLARE @signNumber int;
                select @signNumber = LEN(@name) - LEN(REPLACE(@name,@sign,'')) from getCustomerVendorsCombination()
                return @signNumber
               END

               ''')

conn.commit()

import pyodbc
conn = pyodbc.connect('Driver={SQL Server};'
                      'Server=DESKTOP-9VV7AM5;'
                      'Database=Market;'
                      'Trusted_Connection=yes;')

cursor = conn.cursor()

cursor.execute('''

               CREATE FUNCTION getPeopleWithThreeWordsInName()
               returns TABLE
               AS
               RETURN
               (
                select person_id,person_name,person_address,person_country,
                dbo.getNumberOfSignInPeopleTable(person_name,' ') + 1 as numberOfWords
                from getCustomerVendorsCombination() where dbo.getNumberOfSignInPeopleTable(person_name,' ') = 2
               );

               ''')

conn.commit()
```

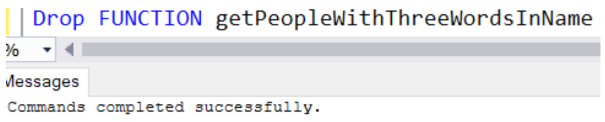
**Be sure that we deleted the Function in advance:**



```
CREATE FUNCTION getPeopleWithThreeWordsInName()
```

Messages

```
Commands completed successfully.
```

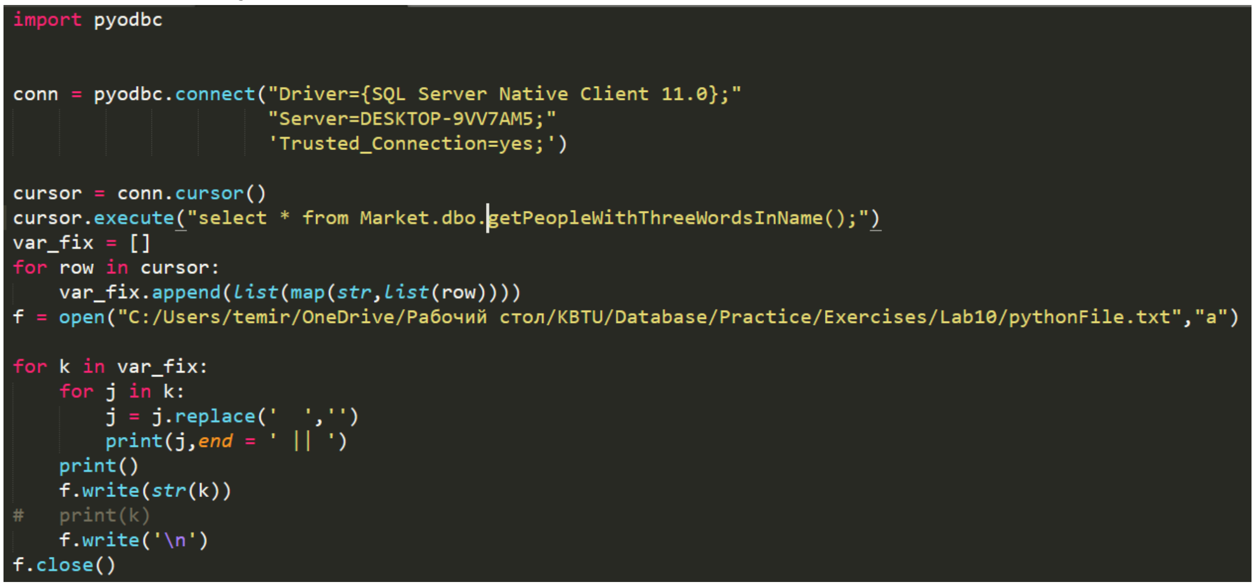


```
Drop FUNCTION getPeopleWithThreeWordsInName
```

Messages

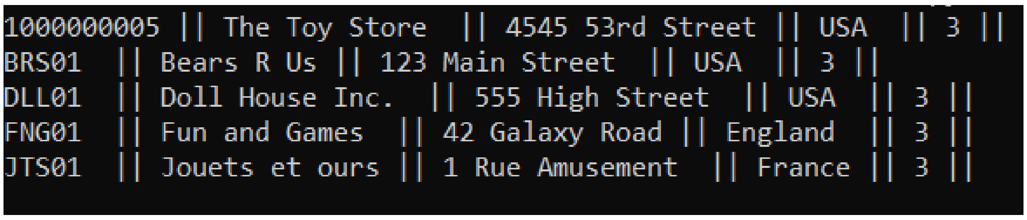
```
Commands completed successfully.
```

**The Python code with Functions Execution:**



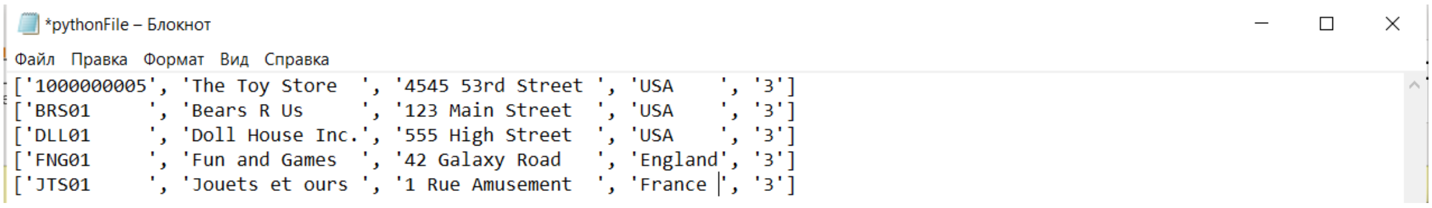
```
import pyodbc


conn = pyodbc.connect("Driver={SQL Server Native Client 11.0};"
                      "Server=DESKTOP-9VV7AM5;"
                      'Trusted_Connection=yes;')

cursor = conn.cursor()
cursor.execute("select * from Market.dbo.getPeopleWithThreeWordsInName();")
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The output of the code in Console:**



```
1000000005 || The Toy Store  || 4545 53rd Street || USA  || 3 ||
BRS01   || Bears R Us || 123 Main Street  || USA  || 3 ||
DLL01   || Doll House Inc.  || 555 High Street  || USA  || 3 ||
FNG01   || Fun and Games  || 42 Galaxy Road || England  || 3 ||
JTS01   || Jouets et ours || 1 Rue Amusement  || France || 3 ||
```

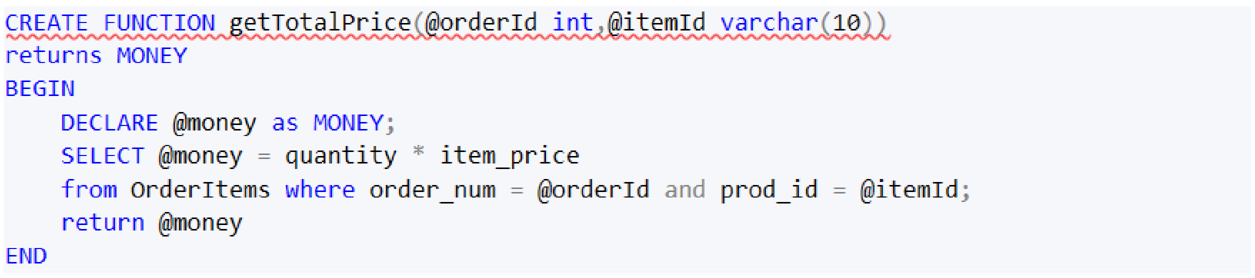
**The output in txt File:**



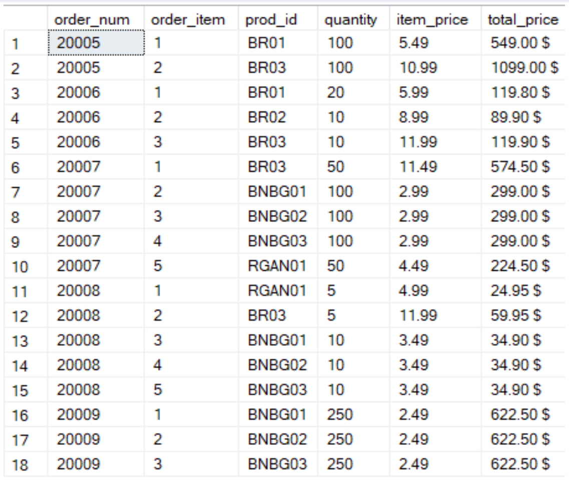
```
['1000000005', 'The Toy Store  ', '4545 53rd Street ', 'USA    ', '3']
['BRS01     ', 'Bears R Us     ', '123 Main Street  ', 'USA    ', '3']
['DLL01     ', 'Doll House Inc.', '555 High Street  ', 'USA    ', '3']
['FNG01     ', 'Fun and Games  ', '42 Galaxy Road   ', 'England', '3']
['JTS01     ', 'Jouets et ours ', '1 Rue Amusement  ', 'France ', '3']
```

**17.** Write a function that would return the total price that person needs to pay. Just multiply the quantity of items by cost of one. Use the type MONEY with dollars sign to make it more realistic.

**The SQL code with needed output:**

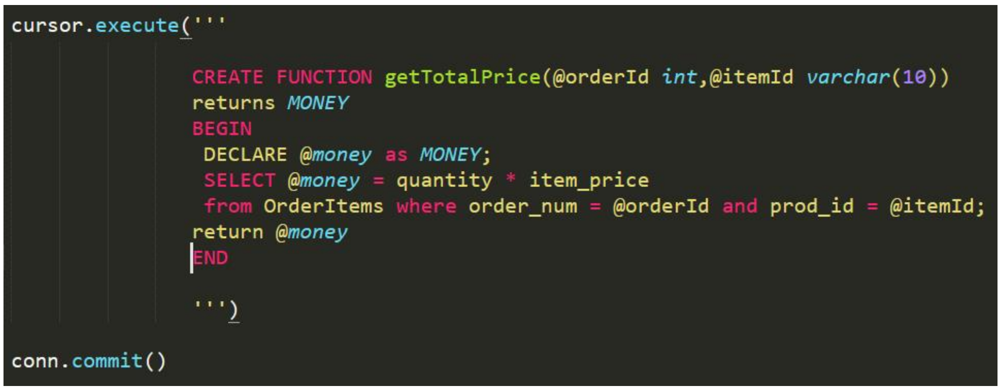


```sql
CREATE FUNCTION getTotalPrice(@orderId int,@itemId varchar(10))
returns MONEY
BEGIN
    DECLARE @money as MONEY;
    SELECT @money = quantity * item_price
    from OrderItems where order_num = @orderId and prod_id = @itemId;
    return @money
END

select *,CONCAT(dbo.getTotalPrice(order_num,prod_id),' $')as total_price from OrderItems
```



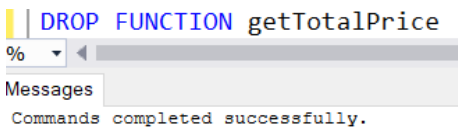
| | order_num | order_item | prod_id | quantity | item_price | total_price |
|---|---|---|---|---|---|---|
| 1 | 20005 | 1 | BR01 | 100 | 5.49 | 549.00 $ |
| 2 | 20005 | 2 | BR03 | 100 | 10.99 | 1099.00 $ |
| 3 | 20006 | 1 | BR01 | 20 | 5.99 | 119.80 $ |
| 4 | 20006 | 2 | BR02 | 10 | 8.99 | 89.90 $ |
| 5 | 20006 | 3 | BR03 | 10 | 11.99 | 119.90 $ |
| 6 | 20007 | 1 | BR03 | 50 | 11.49 | 574.50 $ |
| 7 | 20007 | 2 | BNBG01 | 100 | 2.99 | 299.00 $ |
| 8 | 20007 | 3 | BNBG02 | 100 | 2.99 | 299.00 $ |
| 9 | 20007 | 4 | BNBG03 | 100 | 2.99 | 299.00 $ |
| 10 | 20007 | 5 | RGAN01 | 50 | 4.49 | 224.50 $ |
| 11 | 20008 | 1 | RGAN01 | 5 | 4.99 | 24.95 $ |
| 12 | 20008 | 2 | BR03 | 5 | 11.99 | 59.95 $ |
| 13 | 20008 | 3 | BNBG01 | 10 | 3.49 | 34.90 $ |
| 14 | 20008 | 4 | BNBG02 | 10 | 3.49 | 34.90 $ |
| 15 | 20008 | 5 | BNBG03 | 10 | 3.49 | 34.90 $ |
| 16 | 20009 | 1 | BNBG01 | 250 | 2.49 | 622.50 $ |
| 17 | 20009 | 2 | BNBG02 | 250 | 2.49 | 622.50 $ |
| 18 | 20009 | 3 | BNBG03 | 250 | 2.49 | 622.50 $ |

**The Python Creation of the Function:**



```python
cursor.execute('''

                CREATE FUNCTION getTotalPrice(@orderId int,@itemId varchar(10))
                returns MONEY
                BEGIN
                 DECLARE @money as MONEY;
                 SELECT @money = quantity * item_price
                 from OrderItems where order_num = @orderId and prod_id = @itemId;
                return @money
                END

                ''')

conn.commit()
```

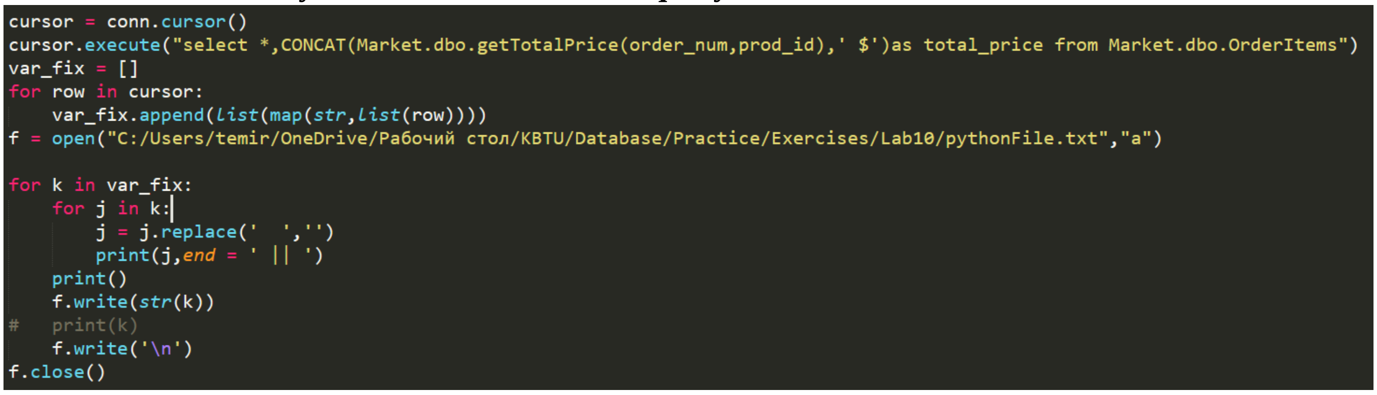
**Be certain that we deleted the Function:**



```
DROP FUNCTION getTotalPrice
```

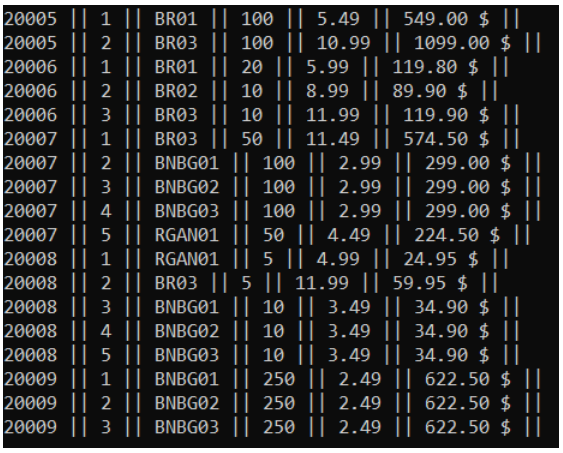
```
Commands completed successfully.
```

**The Python code to execute the query:**



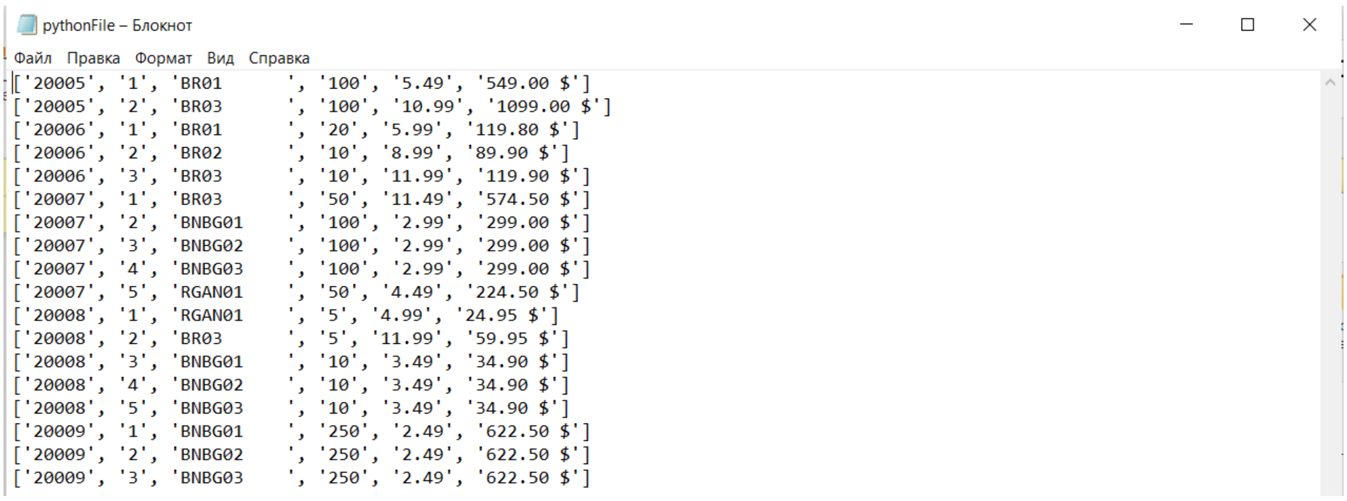
```python
cursor = conn.cursor()
cursor.execute("select *,CONCAT(Market.dbo.getTotalPrice(order_num,prod_id),' $')as total_price from Market.dbo.OrderItems")
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The output of the query in console:**



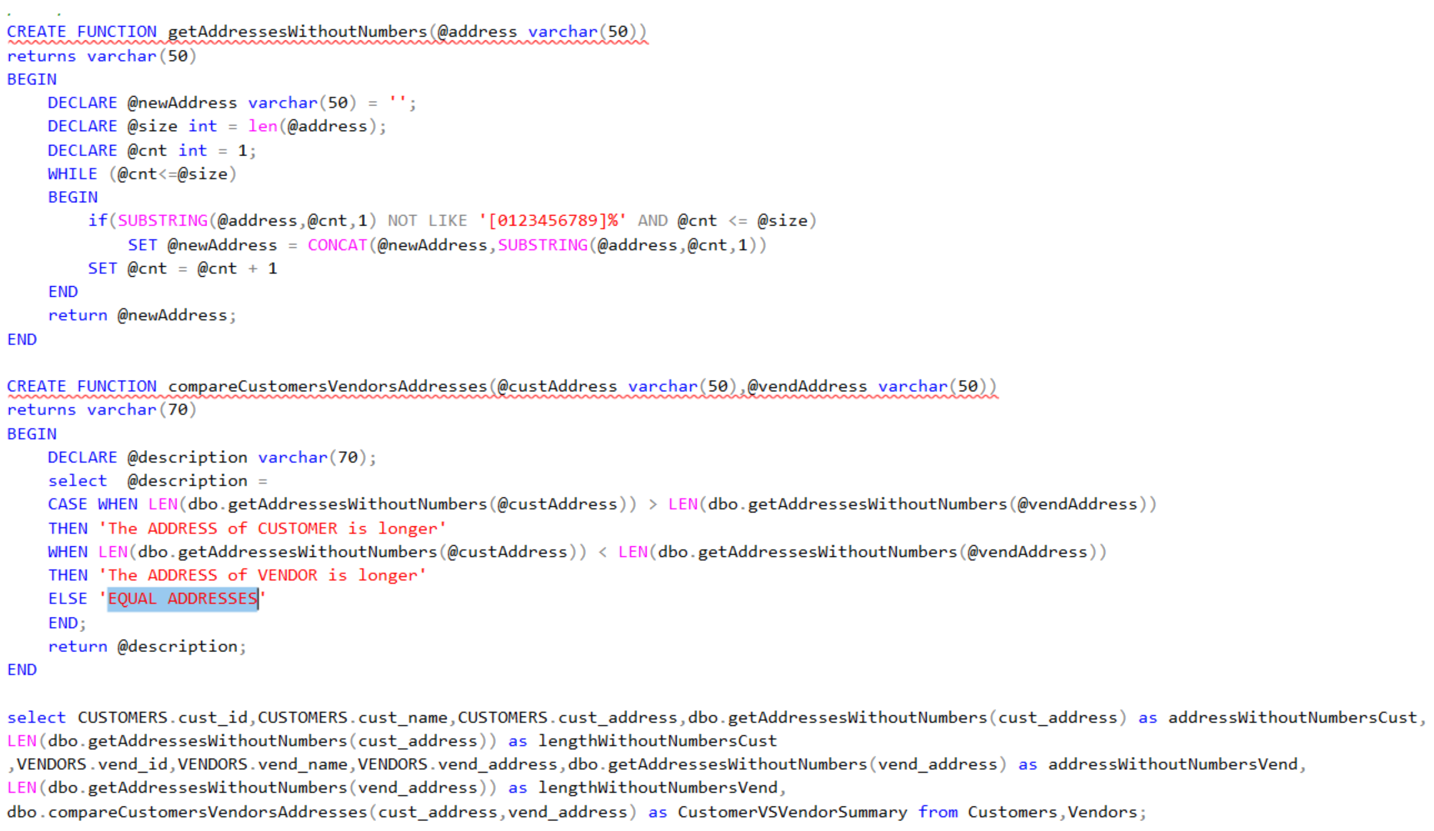
```
20005 || 1 || BR01 || 100 || 5.49 || 549.00 $ ||
20005 || 2 || BR03 || 100 || 10.99 || 1099.00 $ ||
20006 || 1 || BR01 || 20 || 5.99 || 119.80 $ ||
20006 || 2 || BR02 || 10 || 8.99 || 89.90 $ ||
20006 || 3 || BR03 || 10 || 11.99 || 119.90 $ ||
20007 || 1 || BR03 || 50 || 11.49 || 574.50 $ ||
20007 || 2 || BNBG01 || 100 || 2.99 || 299.00 $ ||
20007 || 3 || BNBG02 || 100 || 2.99 || 299.00 $ ||
20007 || 4 || BNBG03 || 100 || 2.99 || 299.00 $ ||
20007 || 5 || RGAN01 || 50 || 4.49 || 224.50 $ ||
20008 || 1 || RGAN01 || 5 || 4.99 || 24.95 $ ||
20008 || 2 || BR03 || 5 || 11.99 || 59.95 $ ||
20008 || 3 || BNBG01 || 10 || 3.49 || 34.90 $ ||
20008 || 4 || BNBG02 || 10 || 3.49 || 34.90 $ ||
20008 || 5 || BNBG03 || 10 || 3.49 || 34.90 $ ||
20009 || 1 || BNBG01 || 250 || 2.49 || 622.50 $ ||
20009 || 2 || BNBG02 || 250 || 2.49 || 622.50 $ ||
20009 || 3 || BNBG03 || 250 || 2.49 || 622.50 $ ||
```

**The output in txt file:**

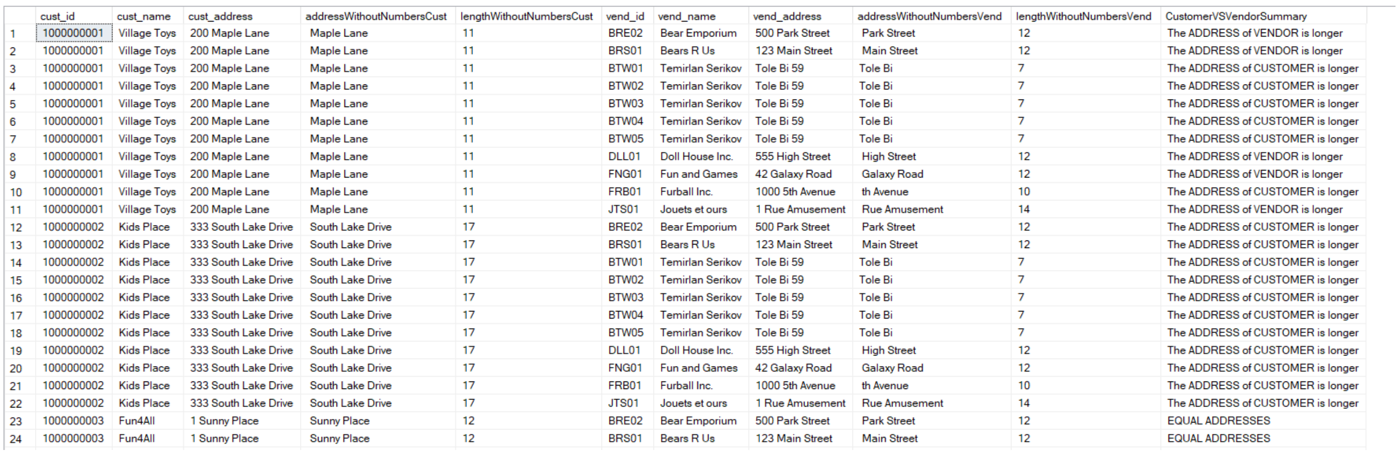


```
['20005', '1', 'BR01      ', '100', '5.49', '549.00 $']
['20005', '2', 'BR03      ', '100', '10.99', '1099.00 $']
['20006', '1', 'BR01      ', '20', '5.99', '119.80 $']
['20006', '2', 'BR02      ', '10', '8.99', '89.90 $']
['20006', '3', 'BR03      ', '10', '11.99', '119.90 $']
['20007', '1', 'BR03      ', '50', '11.49', '574.50 $']
['20007', '2', 'BNBG01    ', '100', '2.99', '299.00 $']
['20007', '3', 'BNBG02    ', '100', '2.99', '299.00 $']
['20007', '4', 'BNBG03    ', '100', '2.99', '299.00 $']
['20007', '5', 'RGAN01    ', '50', '4.49', '224.50 $']
['20008', '1', 'RGAN01    ', '5', '4.99', '24.95 $']
['20008', '2', 'BR03      ', '5', '11.99', '59.95 $']
['20008', '3', 'BNBG01    ', '10', '3.49', '34.90 $']
['20008', '4', 'BNBG02    ', '10', '3.49', '34.90 $']
['20008', '5', 'BNBG03    ', '10', '3.49', '34.90 $']
['20009', '1', 'BNBG01    ', '250', '2.49', '622.50 $']
['20009', '2', 'BNBG02    ', '250', '2.49', '622.50 $']
['20009', '3', 'BNBG03    ', '250', '2.49', '622.50 $']
```

**18.** Write two functions where one will return the address for the supplied person without any figures while the second function would use it and compare the lengths of the addresses between customers and vendors and SHOWS `The ADDRESS of CUSTOMER is longer` if the length of the customer's address without numbers is longer than vendor's , `The ADDRESS of VENDOR is longer` if vendor's if bigger or `EQUAL ADDRESSES` if they are the same. Compare all the customers to the vendors using CARTESIAN PRODUCT.

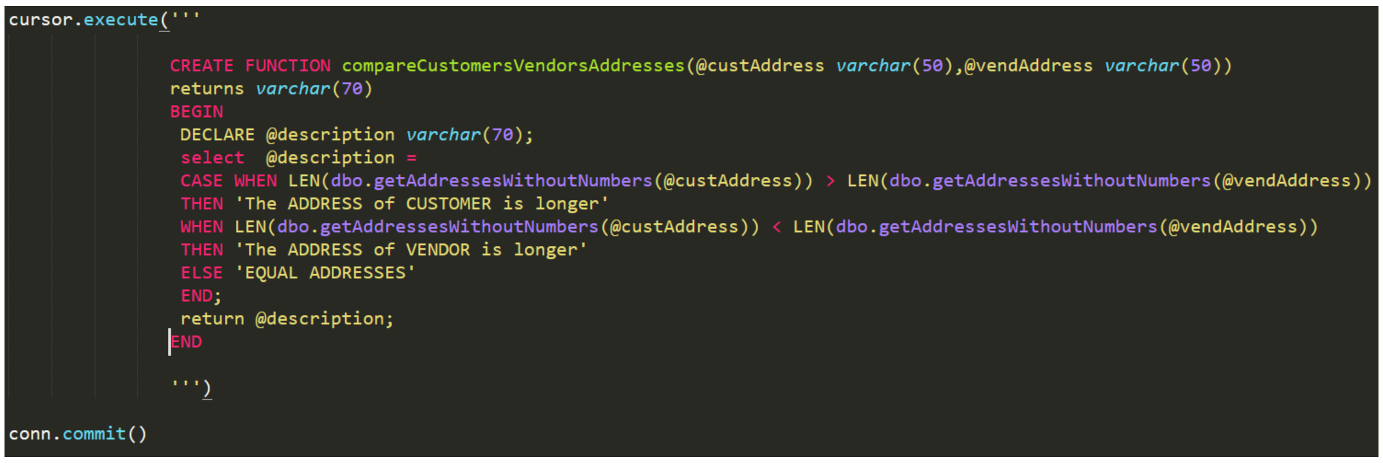


```sql
CREATE FUNCTION getAddressesWithoutNumbers(@address varchar(50))
returns varchar(50)
BEGIN
    DECLARE @newAddress varchar(50) = '';
    DECLARE @size int = len(@address);
    DECLARE @cnt int = 1;
    WHILE (@cnt<=@size)
    BEGIN
        if(SUBSTRING(@address,@cnt,1) NOT LIKE '[0123456789]%' AND @cnt <= @size)
            SET @newAddress = CONCAT(@newAddress,SUBSTRING(@address,@cnt,1))
        SET @cnt = @cnt + 1
    END
    return @newAddress;
END

CREATE FUNCTION compareCustomersVendorsAddresses(@custAddress varchar(50),@vendAddress varchar(50))
returns varchar(70)
BEGIN
    DECLARE @description varchar(70);
    select  @description =
    CASE WHEN LEN(dbo.getAddressesWithoutNumbers(@custAddress)) > LEN(dbo.getAddressesWithoutNumbers(@vendAddress))
    THEN 'The ADDRESS of CUSTOMER is longer'
    WHEN LEN(dbo.getAddressesWithoutNumbers(@custAddress)) < LEN(dbo.getAddressesWithoutNumbers(@vendAddress))
    THEN 'The ADDRESS of VENDOR is longer'
    ELSE 'EQUAL ADDRESSES'
    END;
    return @description;
END

select CUSTOMERS.cust_id,CUSTOMERS.cust_name,CUSTOMERS.cust_address,dbo.getAddressesWithoutNumbers(cust_address) as addressWithoutNumbersCust,
LEN(dbo.getAddressesWithoutNumbers(cust_address)) as lengthWithoutNumbersCust
,VENDORS.vend_id,VENDORS.vend_name,VENDORS.vend_address,dbo.getAddressesWithoutNumbers(vend_address) as addressWithoutNumbersVend,
LEN(dbo.getAddressesWithoutNumbers(vend_address)) as lengthWithoutNumbersVend,
dbo.compareCustomersVendorsAddresses(cust_address,vend_address) as CustomerVSVendorSummary from Customers,Vendors;
```

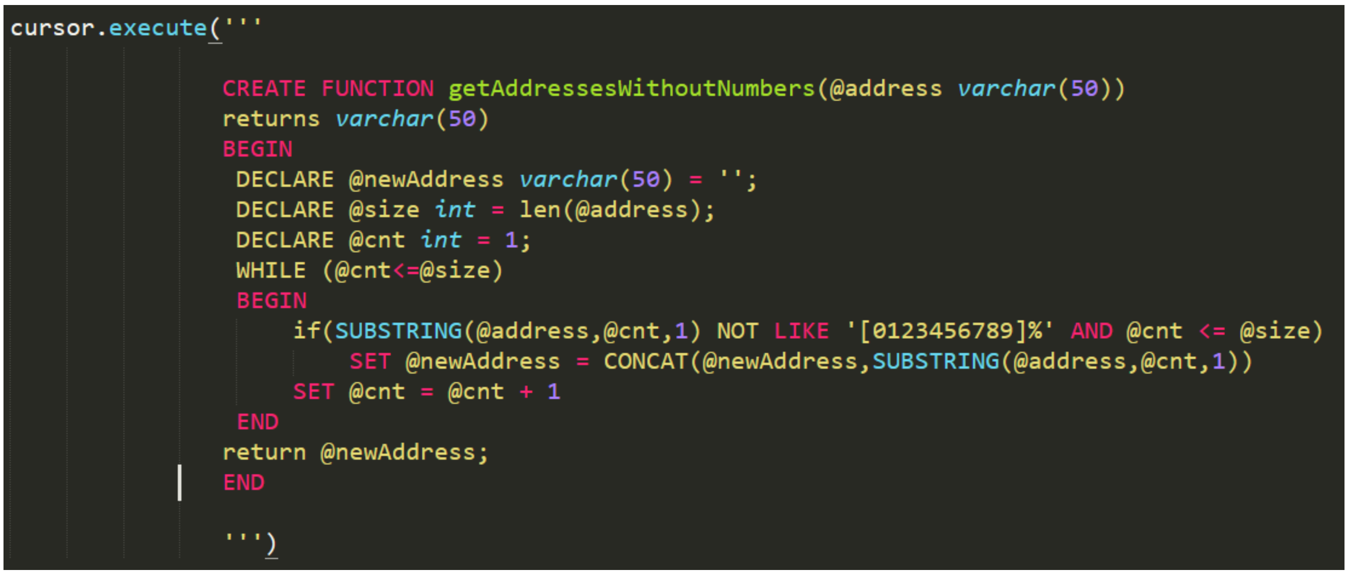


| | cust_id | cust_name | cust_address | addressWithoutNumbersCust | lengthWithoutNumbersCust | vend_id | vend_name | vend_address | addressWithoutNumbersVend | lengthWithoutNumbersVend | CustomerVSVendorSummary |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BRE02 | Bear Emporium | 500 Park Street | Park Street | 12 | The ADDRESS of VENDOR is longer |
| 2 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BRS01 | Bears R Us | 123 Main Street | Main Street | 12 | The ADDRESS of VENDOR is longer |
| 3 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BTW01 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 4 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BTW02 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 5 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BTW03 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 6 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BTW04 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 7 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | BTW05 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 8 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | DLL01 | Doll House Inc. | 555 High Street | High Street | 12 | The ADDRESS of VENDOR is longer |
| 9 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | FNG01 | Fun and Games | 42 Galaxy Road | Galaxy Road | 12 | The ADDRESS of VENDOR is longer |
| 10 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | FRB01 | Furball Inc. | 1000 5th Avenue | th Avenue | 10 | The ADDRESS of CUSTOMER is longer |
| 11 | 1000000001 | Village Toys | 200 Maple Lane | Maple Lane | 11 | JTS01 | Jouets et ours | 1 Rue Amusement | Rue Amusement | 14 | The ADDRESS of VENDOR is longer |
| 12 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BRE02 | Bear Emporium | 500 Park Street | Park Street | 12 | The ADDRESS of CUSTOMER is longer |
| 13 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BRS01 | Bears R Us | 123 Main Street | Main Street | 12 | The ADDRESS of CUSTOMER is longer |
| 14 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BTW01 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 15 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BTW02 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 16 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BTW03 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 17 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BTW04 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 18 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | BTW05 | Temirlan Serikov | Tole Bi 59 | Tole Bi | 7 | The ADDRESS of CUSTOMER is longer |
| 19 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | DLL01 | Doll House Inc. | 555 High Street | High Street | 12 | The ADDRESS of CUSTOMER is longer |
| 20 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | FNG01 | Fun and Games | 42 Galaxy Road | Galaxy Road | 12 | The ADDRESS of CUSTOMER is longer |
| 21 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | FRB01 | Furball Inc. | 1000 5th Avenue | th Avenue | 10 | The ADDRESS of CUSTOMER is longer |
| 22 | 1000000002 | Kids Place | 333 South Lake Drive | South Lake Drive | 17 | JTS01 | Jouets et ours | 1 Rue Amusement | Rue Amusement | 14 | The ADDRESS of CUSTOMER is longer |
| 23 | 1000000003 | Fun4All | 1 Sunny Place | Sunny Place | 12 | BRE02 | Bear Emporium | 500 Park Street | Park Street | 12 | EQUAL ADDRESSES |
| 24 | 1000000003 | Fun4All | 1 Sunny Place | Sunny Place | 12 | BRS01 | Bears R Us | 123 Main Street | Main Street | 12 | EQUAL ADDRESSES |

## The Python Functions creation:

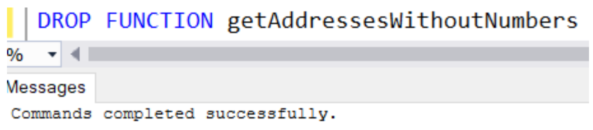


```python
cursor.execute('''

            CREATE FUNCTION compareCustomersVendorsAddresses(@custAddress varchar(50),@vendAddress varchar(50))
            returns varchar(70)
            BEGIN
             DECLARE @description varchar(70);
             select  @description =
             CASE WHEN LEN(dbo.getAddressesWithoutNumbers(@custAddress)) > LEN(dbo.getAddressesWithoutNumbers(@vendAddress))
             THEN 'The ADDRESS of CUSTOMER is longer'
             WHEN LEN(dbo.getAddressesWithoutNumbers(@custAddress)) < LEN(dbo.getAddressesWithoutNumbers(@vendAddress))
             THEN 'The ADDRESS of VENDOR is longer'
             ELSE 'EQUAL ADDRESSES'
             END;
             return @description;
            END

            ''')

conn.commit()
```



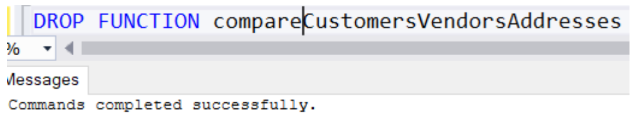
```
cursor.execute('''

                CREATE FUNCTION getAddressesWithoutNumbers(@address varchar(50))
                returns varchar(50)
                BEGIN
                 DECLARE @newAddress varchar(50) = '';
                 DECLARE @size int = len(@address);
                 DECLARE @cnt int = 1;
                 WHILE (@cnt<=@size)
                 BEGIN
                     if(SUBSTRING(@address,@cnt,1) NOT LIKE '[0123456789]%' AND @cnt <= @size)
                         SET @newAddress = CONCAT(@newAddress,SUBSTRING(@address,@cnt,1))
                     SET @cnt = @cnt + 1
                 END
                return @newAddress;
                END

                ''')
```

**Be sure that we deleted the function in advance:**



```
DROP FUNCTION getAddressesWithoutNumbers
```

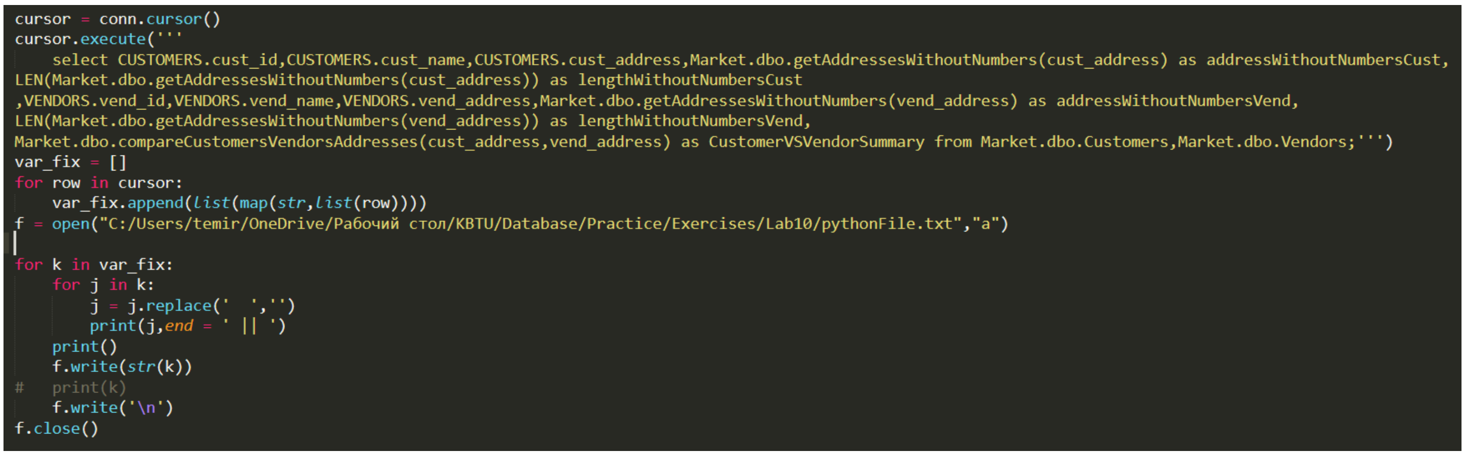
```
Commands completed successfully.
```



```
DROP FUNCTION compareCustomersVendorsAddresses
```

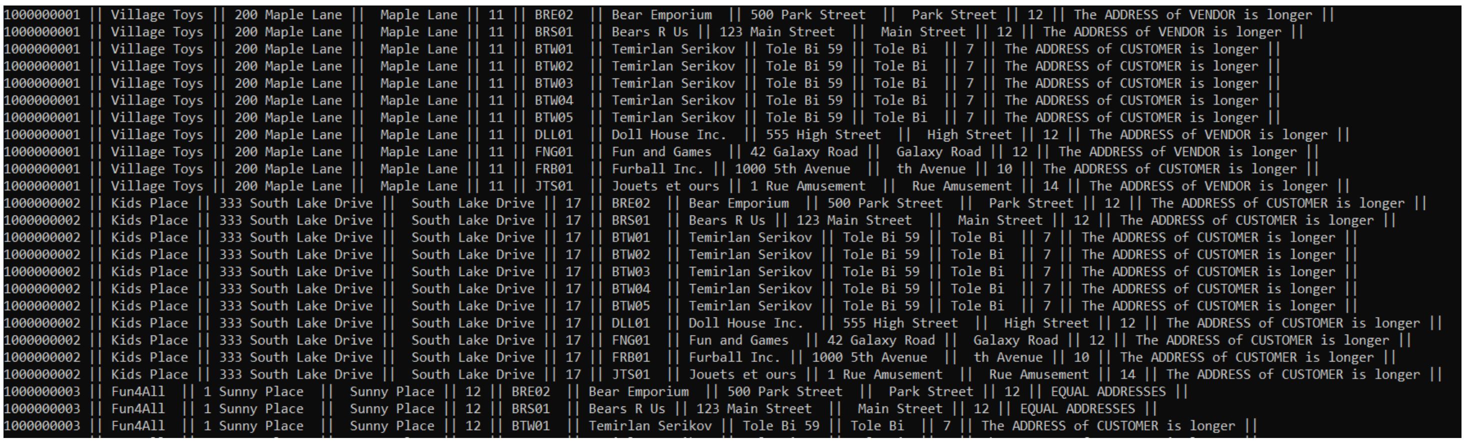
```
Commands completed successfully.
```

**The Python code to execute the queries with functions:**



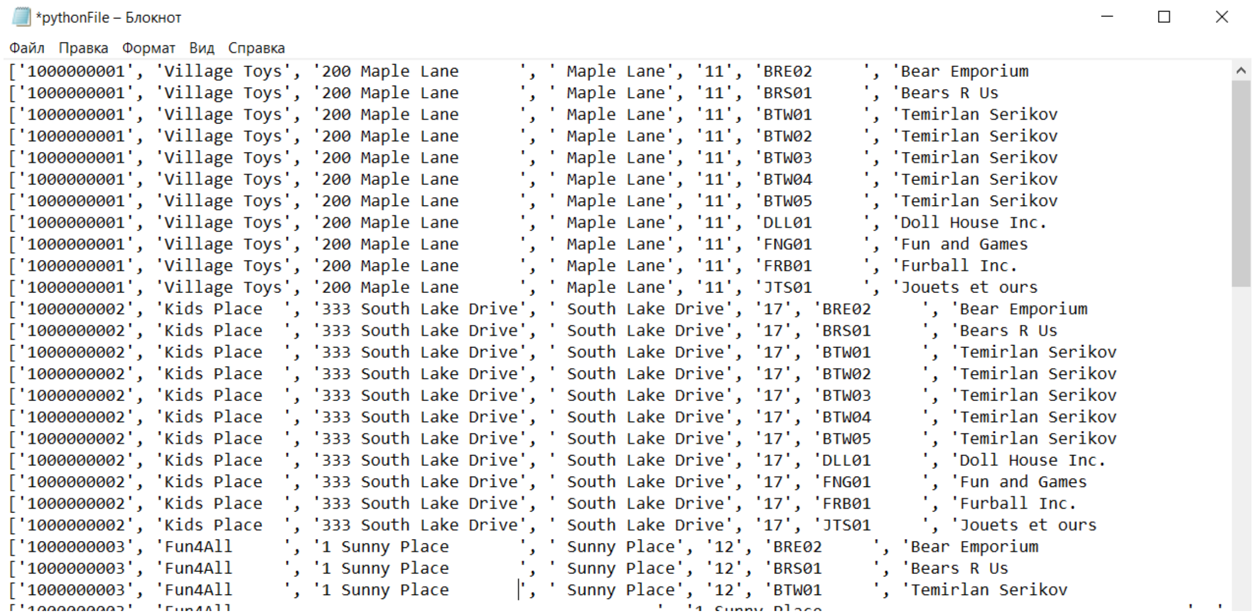
```
cursor = conn.cursor()
cursor.execute('''
    select CUSTOMERS.cust_id,CUSTOMERS.cust_name,CUSTOMERS.cust_address,Market.dbo.getAddressesWithoutNumbers(cust_address) as addressWithoutNumbersCust,
LEN(Market.dbo.getAddressesWithoutNumbers(cust_address)) as lengthWithoutNumbersCust
,VENDORS.vend_id,VENDORS.vend_name,VENDORS.vend_address,Market.dbo.getAddressesWithoutNumbers(vend_address) as addressWithoutNumbersVend,
LEN(Market.dbo.getAddressesWithoutNumbers(vend_address)) as lengthWithoutNumbersVend,
Market.dbo.compareCustomersVendorsAddresses(cust_address,vend_address) as CustomerVSVendorSummary from Market.dbo.Customers,Market.dbo.Vendors;''')
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The output in console:**



```
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BRE02  || Bear Emporium  || 500 Park Street  ||  Park Street || 12 || The ADDRESS of VENDOR is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BRS01  || Bears R Us || 123 Main Street  ||  Main Street || 12 || The ADDRESS of VENDOR is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BTW01  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BTW02  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BTW03  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BTW04  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || BTW05  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || DLL01  || Doll House Inc.  || 555 High Street  ||  High Street || 12 || The ADDRESS of VENDOR is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || FNG01  || Fun and Games  || 42 Galaxy Road ||  Galaxy Road || 12 || The ADDRESS of VENDOR is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || FRB01  || Furball Inc. || 1000 5th Avenue  ||  th Avenue || 10 || The ADDRESS of CUSTOMER is longer ||
1000000001 || Village Toys || 200 Maple Lane ||  Maple Lane || 11 || JTS01  || Jouets et ours || 1 Rue Amusement  ||  Rue Amusement || 14 || The ADDRESS of VENDOR is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BRE02  || Bear Emporium  || 500 Park Street  ||  Park Street || 12 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BRS01  || Bears R Us || 123 Main Street  ||  Main Street || 12 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BTW01  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BTW02  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BTW03  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BTW04  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || BTW05  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || DLL01  || Doll House Inc.  || 555 High Street  ||  High Street || 12 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || FNG01  || Fun and Games  || 42 Galaxy Road ||  Galaxy Road || 12 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || FRB01  || Furball Inc. || 1000 5th Avenue  ||  th Avenue || 10 || The ADDRESS of CUSTOMER is longer ||
1000000002 || Kids Place || 333 South Lake Drive ||  South Lake Drive || 17 || JTS01  || Jouets et ours || 1 Rue Amusement  ||  Rue Amusement || 14 || The ADDRESS of CUSTOMER is longer ||
1000000003 || Fun4All  || 1 Sunny Place  ||  Sunny Place || 12 || BRE02  || Bear Emporium  || 500 Park Street  ||  Park Street || 12 || EQUAL ADDRESSES ||
1000000003 || Fun4All  || 1 Sunny Place  ||  Sunny Place || 12 || BRS01  || Bears R Us || 123 Main Street  ||  Main Street || 12 || EQUAL ADDRESSES ||
1000000003 || Fun4All  || 1 Sunny Place  ||  Sunny Place || 12 || BTW01  || Temirlan Serikov || Tole Bi 59 || Tole Bi  || 7 || The ADDRESS of CUSTOMER is longer ||
```

**The output in txt File:**

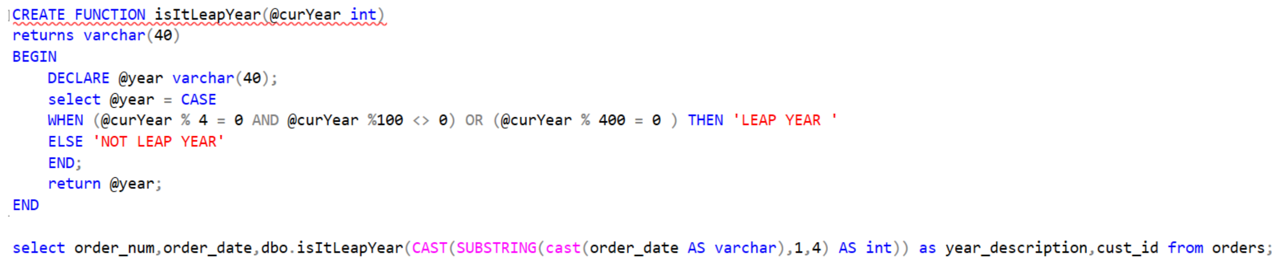


*pythonFile – Блокнот

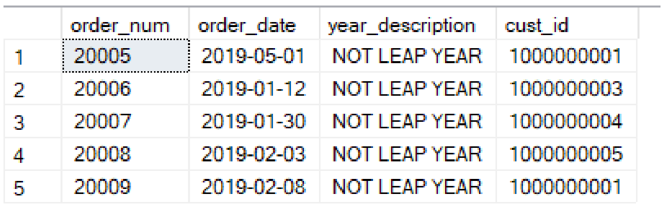
Файл Правка Формат Вид Справка

```
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BRE02     ', 'Bear Emporium
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BRS01     ', 'Bears R Us
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BTW01     ', 'Temirlan Serikov
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BTW02     ', 'Temirlan Serikov
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BTW03     ', 'Temirlan Serikov
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BTW04     ', 'Temirlan Serikov
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'BTW05     ', 'Temirlan Serikov
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'DLL01     ', 'Doll House Inc.
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'FNG01     ', 'Fun and Games
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'FRB01     ', 'Furball Inc.
['1000000001', 'Village Toys', '200 Maple Lane      ', ' Maple Lane', '11', 'JTS01     ', 'Jouets et ours
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BRE02     ', 'Bear Emporium
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BRS01     ', 'Bears R Us
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BTW01     ', 'Temirlan Serikov
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BTW02     ', 'Temirlan Serikov
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BTW03     ', 'Temirlan Serikov
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BTW04     ', 'Temirlan Serikov
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'BTW05     ', 'Temirlan Serikov
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'DLL01     ', 'Doll House Inc.
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'FNG01     ', 'Fun and Games
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'FRB01     ', 'Furball Inc.
['1000000002', 'Kids Place  ', '333 South Lake Drive', ' South Lake Drive', '17', 'JTS01     ', 'Jouets et ours
['1000000003', 'Fun4All     ', '1 Sunny Place       ', ' Sunny Place', '12', 'BRE02     ', 'Bear Emporium
['1000000003', 'Fun4All     ', '1 Sunny Place       ', ' Sunny Place', '12', 'BRS01     ', 'Bears R Us
['1000000003', 'Fun4All     ', '1 Sunny Place       ', ' Sunny Place', '12', 'BTW01     ', 'Temirlan Serikov
```

**19.** Write a function that would check the taken year and return ‘LEAP YEAR’ or ‘NOT LEAP YEAR’.

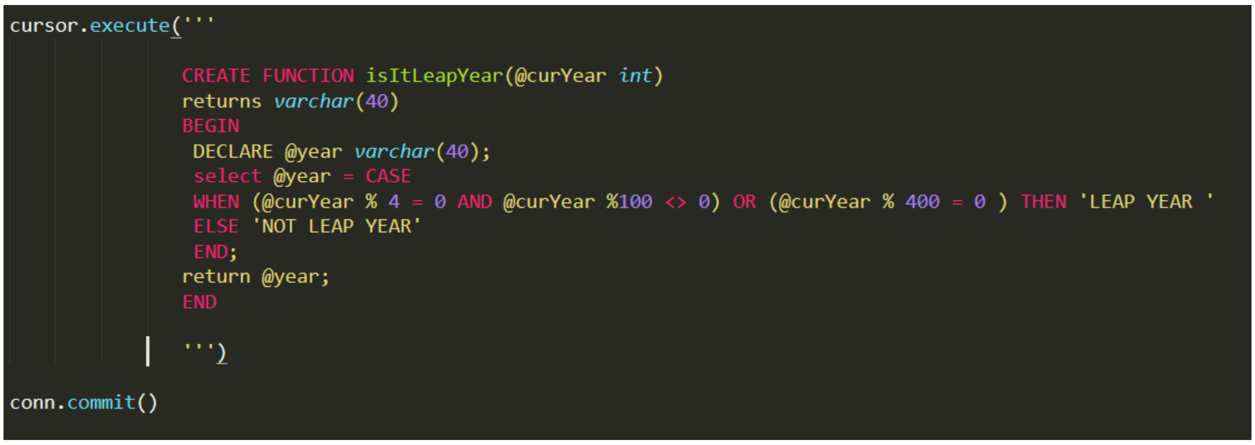


```
CREATE FUNCTION isItLeapYear(@curYear int)
returns varchar(40)
BEGIN
    DECLARE @year varchar(40);
    select @year = CASE
    WHEN (@curYear % 4 = 0 AND @curYear %100 <> 0) OR (@curYear % 400 = 0 ) THEN 'LEAP YEAR '
    ELSE 'NOT LEAP YEAR'
    END;
    return @year;
END

select order_num,order_date,dbo.isItLeapYear(CAST(SUBSTRING(cast(order_date AS varchar),1,4) AS int)) as year_description,cust_id from orders;
```



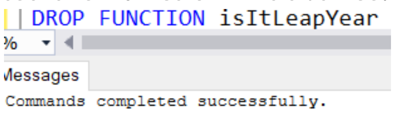
| | order_num | order_date | year_description | cust_id |
|---|---|---|---|---|
| 1 | 20005 | 2019-05-01 | NOT LEAP YEAR | 1000000001 |
| 2 | 20006 | 2019-01-12 | NOT LEAP YEAR | 1000000003 |
| 3 | 20007 | 2019-01-30 | NOT LEAP YEAR | 1000000004 |
| 4 | 20008 | 2019-02-03 | NOT LEAP YEAR | 1000000005 |
| 5 | 20009 | 2019-02-08 | NOT LEAP YEAR | 1000000001 |

**The Python Creation Function code:**



```
cursor.execute('''

                CREATE FUNCTION isItLeapYear(@curYear int)
                returns varchar(40)
                BEGIN
                 DECLARE @year varchar(40);
                 select @year = CASE
                 WHEN (@curYear % 4 = 0 AND @curYear %100 <> 0) OR (@curYear % 400 = 0 ) THEN 'LEAP YEAR '
                 ELSE 'NOT LEAP YEAR'
                 END;
                return @year;
                END

                ''')

conn.commit()
```

**Be sure that we deleted the Function in advance:**

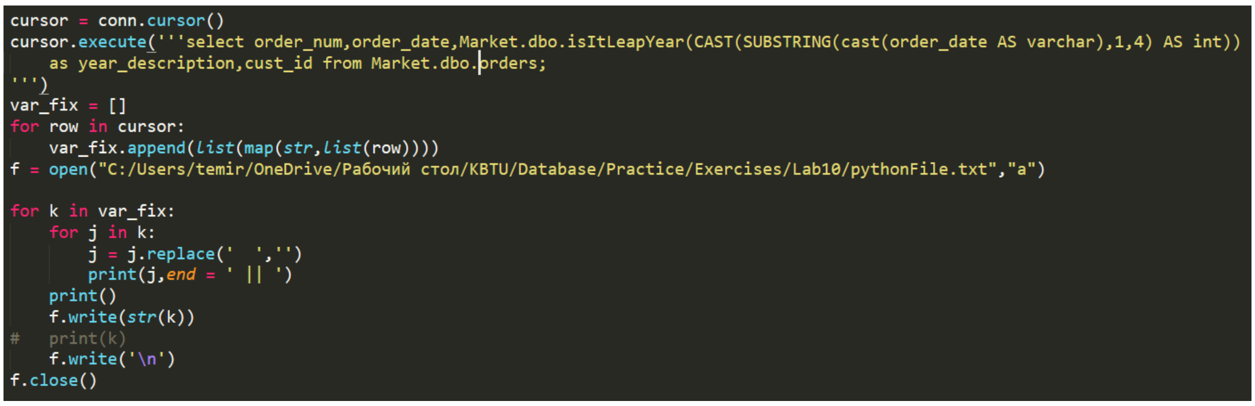


```
DROP FUNCTION isItLeapYear
```

Messages

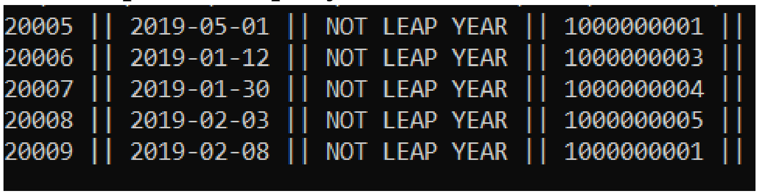
```
Commands completed successfully.
```

**Python code to execute the query with function calling:**



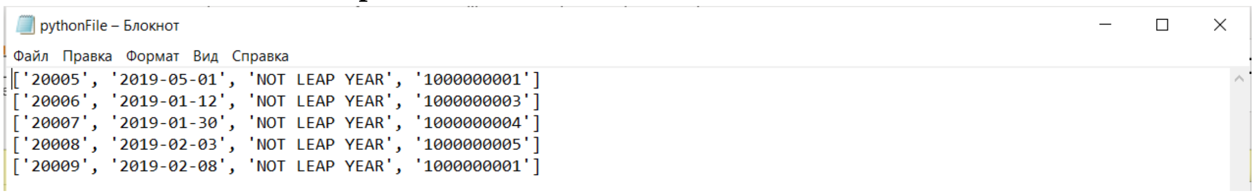
```
cursor = conn.cursor()
cursor.execute('''select order_num,order_date,Market.dbo.isItLeapYear(CAST(SUBSTRING(cast(order_date AS varchar),1,4) AS int))
    as year_description,cust_id from Market.dbo.orders;
''')
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The console output of the query:**



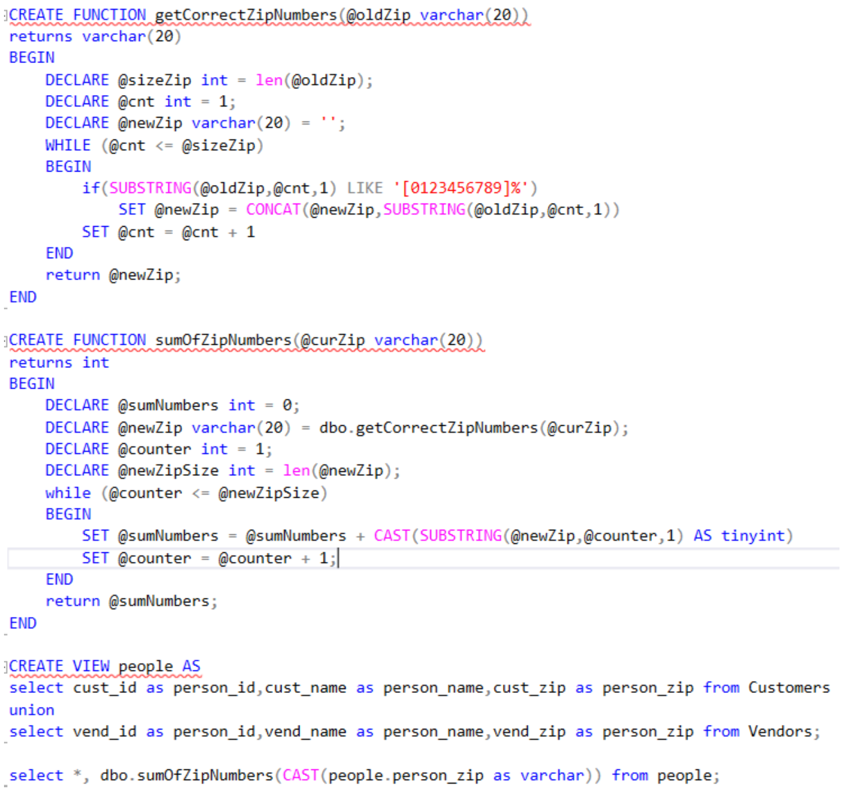
```
20005 || 2019-05-01 || NOT LEAP YEAR || 1000000001 ||
20006 || 2019-01-12 || NOT LEAP YEAR || 1000000003 ||
20007 || 2019-01-30 || NOT LEAP YEAR || 1000000004 ||
20008 || 2019-02-03 || NOT LEAP YEAR || 1000000005 ||
20009 || 2019-02-08 || NOT LEAP YEAR || 1000000001 ||
```

**The txt file output:**

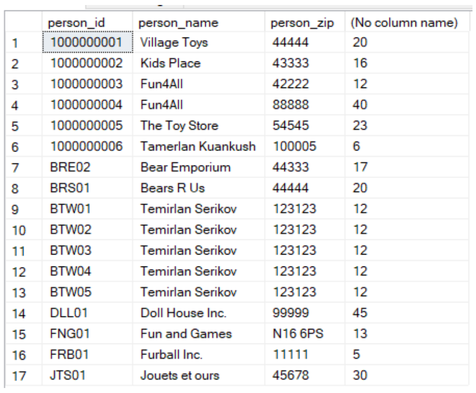


```
['20005', '2019-05-01', 'NOT LEAP YEAR', '1000000001']
['20006', '2019-01-12', 'NOT LEAP YEAR', '1000000003']
['20007', '2019-01-30', 'NOT LEAP YEAR', '1000000004']
['20008', '2019-02-03', 'NOT LEAP YEAR', '1000000005']
['20009', '2019-02-08', 'NOT LEAP YEAR', '1000000001']
```

**20.** Write functions that together would produce the sum of the figures that are inside of the ZIP column but there problem can appear since there are some rows which have not only numbers but letters too. For example, the zip = N16 6PS would produce 13 (1 + 6 + 6). Produce the solution for all the Zip numbers among the whole people. You can create a view where you would store al the people (Customers + Vendors).

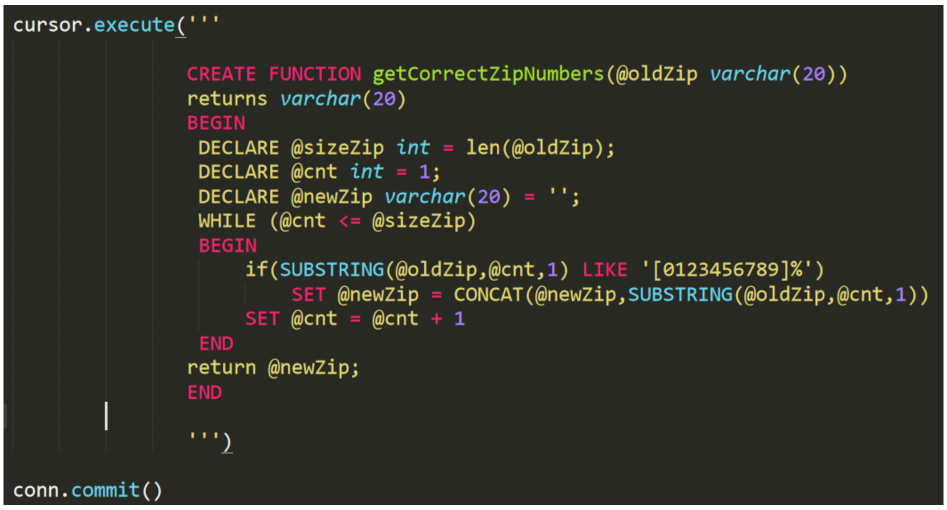


```
CREATE FUNCTION getCorrectZipNumbers(@oldZip varchar(20))
returns varchar(20)
BEGIN
    DECLARE @sizeZip int = len(@oldZip);
    DECLARE @cnt int = 1;
    DECLARE @newZip varchar(20) = '';
    WHILE (@cnt <= @sizeZip)
    BEGIN
        if(SUBSTRING(@oldZip,@cnt,1) LIKE '[0123456789]%')
            SET @newZip = CONCAT(@newZip,SUBSTRING(@oldZip,@cnt,1))
        SET @cnt = @cnt + 1
    END
    return @newZip;
END

CREATE FUNCTION sumOfZipNumbers(@curZip varchar(20))
returns int
BEGIN
    DECLARE @sumNumbers int = 0;
    DECLARE @newZip varchar(20) = dbo.getCorrectZipNumbers(@curZip);
    DECLARE @counter int = 1;
    DECLARE @newZipSize int = len(@newZip);
    while (@counter <= @newZipSize)
    BEGIN
        SET @sumNumbers = @sumNumbers + CAST(SUBSTRING(@newZip,@counter,1) AS tinyint)
        SET @counter = @counter + 1;
    END
    return @sumNumbers;
END

CREATE VIEW people AS
select cust_id as person_id,cust_name as person_name,cust_zip as person_zip from Customers
union
select vend_id as person_id,vend_name as person_name,vend_zip as person_zip from Vendors;

select *, dbo.sumOfZipNumbers(CAST(people.person_zip as varchar)) from people;
```

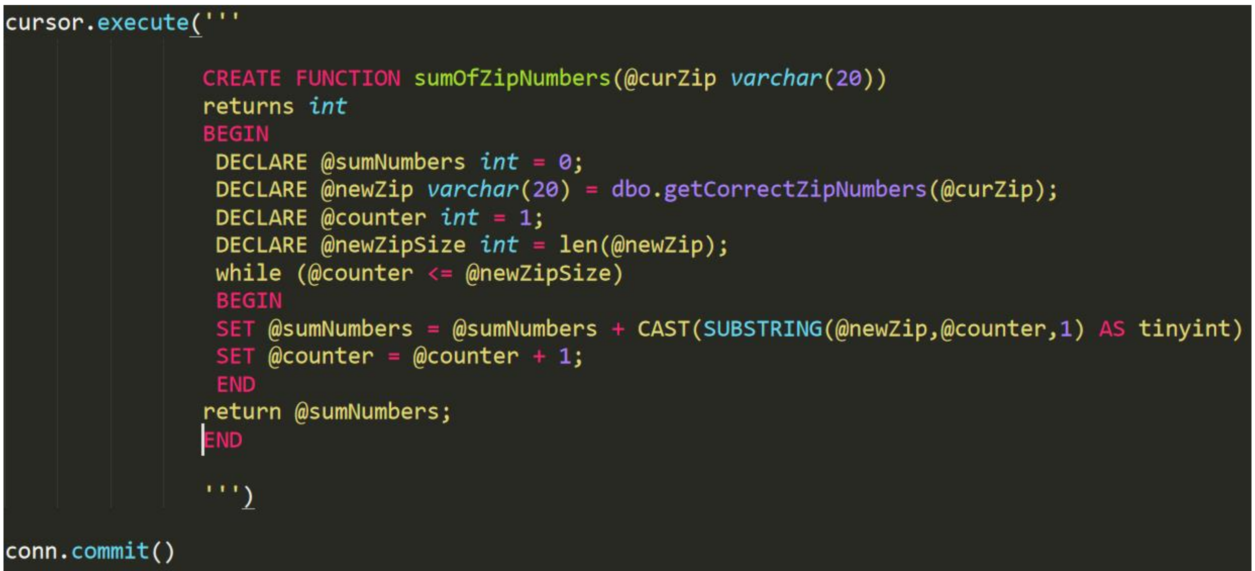


| | person_id | person_name | person_zip | (No column name) |
|---|---|---|---|---|
| 1 | 1000000001 | Village Toys | 44444 | 20 |
| 2 | 1000000002 | Kids Place | 43333 | 16 |
| 3 | 1000000003 | Fun4All | 42222 | 12 |
| 4 | 1000000004 | Fun4All | 88888 | 40 |
| 5 | 1000000005 | The Toy Store | 54545 | 23 |
| 6 | 1000000006 | Tamerlan Kuankush | 100005 | 6 |
| 7 | BRE02 | Bear Emporium | 44333 | 17 |
| 8 | BRS01 | Bears R Us | 44444 | 20 |
| 9 | BTW01 | Temirlan Serikov | 123123 | 12 |
| 10 | BTW02 | Temirlan Serikov | 123123 | 12 |
| 11 | BTW03 | Temirlan Serikov | 123123 | 12 |
| 12 | BTW04 | Temirlan Serikov | 123123 | 12 |
| 13 | BTW05 | Temirlan Serikov | 123123 | 12 |
| 14 | DLL01 | Doll House Inc. | 99999 | 45 |
| 15 | FNG01 | Fun and Games | N16 6PS | 13 |
| 16 | FRB01 | Furball Inc. | 11111 | 5 |
| 17 | JTS01 | Jouets et ours | 45678 | 30 |

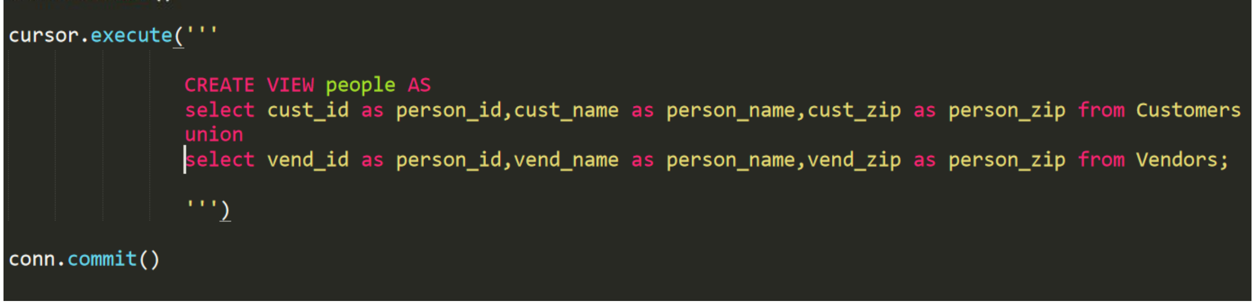
## The Python code to create Functions:



```
cursor.execute('''

            CREATE FUNCTION getCorrectZipNumbers(@oldZip varchar(20))
            returns varchar(20)
            BEGIN
             DECLARE @sizeZip int = len(@oldZip);
             DECLARE @cnt int = 1;
             DECLARE @newZip varchar(20) = '';
             WHILE (@cnt <= @sizeZip)
             BEGIN
                 if(SUBSTRING(@oldZip,@cnt,1) LIKE '[0123456789]%')
                     SET @newZip = CONCAT(@newZip,SUBSTRING(@oldZip,@cnt,1))
                 SET @cnt = @cnt + 1
             END
            return @newZip;
            END

            ''')

conn.commit()
```

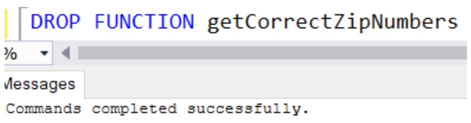


```
cursor.execute('''

            CREATE FUNCTION sumOfZipNumbers(@curZip varchar(20))
            returns int
            BEGIN
             DECLARE @sumNumbers int = 0;
             DECLARE @newZip varchar(20) = dbo.getCorrectZipNumbers(@curZip);
             DECLARE @counter int = 1;
             DECLARE @newZipSize int = len(@newZip);
             while (@counter <= @newZipSize)
             BEGIN
             SET @sumNumbers = @sumNumbers + CAST(SUBSTRING(@newZip,@counter,1) AS tinyint)
             SET @counter = @counter + 1;
             END
            return @sumNumbers;
            END

            ''')

conn.commit()
```



```
cursor.execute('''

            CREATE VIEW people AS
            select cust_id as person_id,cust_name as person_name,cust_zip as person_zip from Customers
            union
            select vend_id as person_id,vend_name as person_name,vend_zip as person_zip from Vendors;

            ''')

conn.commit()
```

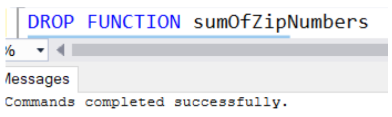
## Be sure that we deleted all the functions and view in advance:



```
DROP FUNCTION getCorrectZipNumbers
```

Messages

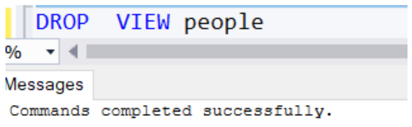
```
Commands completed successfully.
```



```
DROP FUNCTION sumOfZipNumbers
```

Messages

```
Commands completed successfully.
```

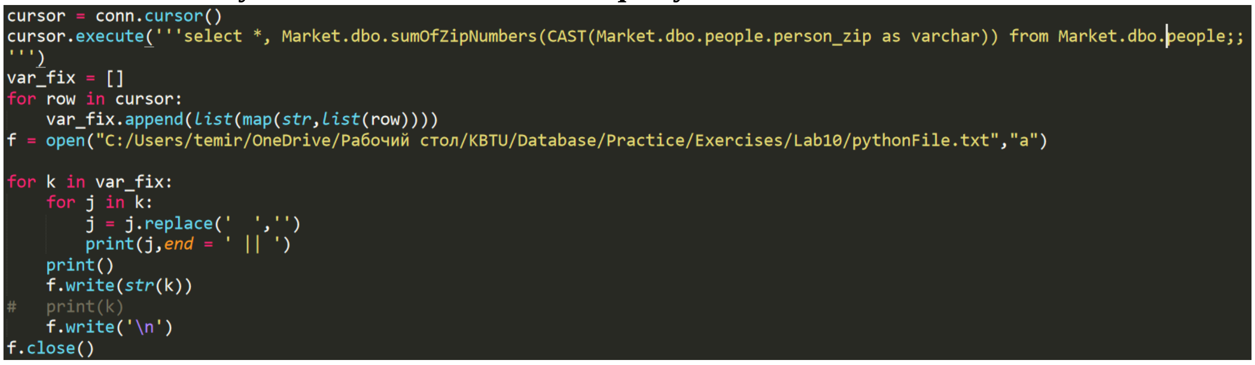


```
DROP  VIEW people
```

Messages

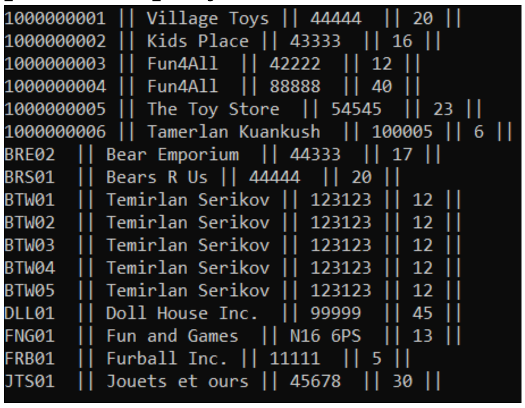
```
Commands completed successfully.
```

**The Python code to execute final query:**



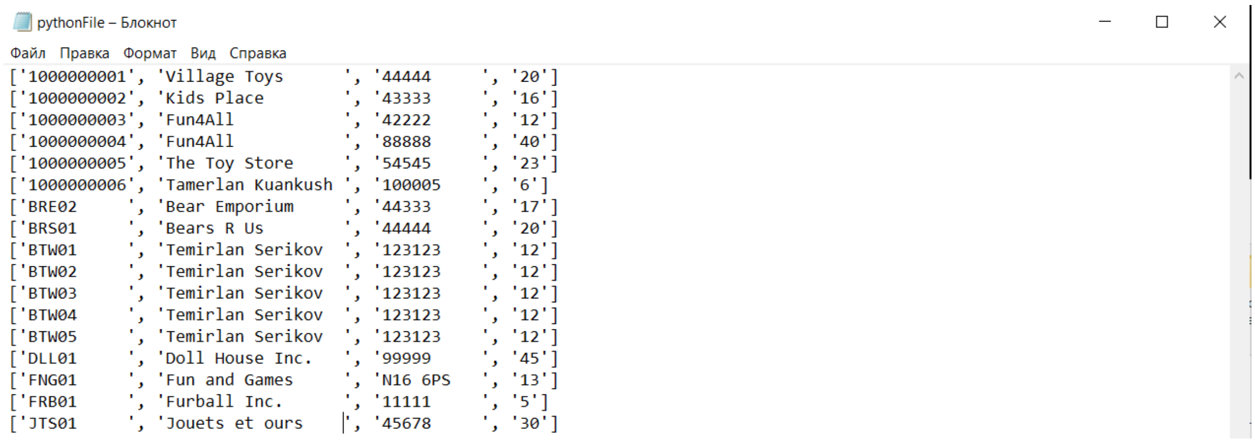
```python
cursor = conn.cursor()
cursor.execute('''select *, Market.dbo.sumOfZipNumbers(CAST(Market.dbo.people.person_zip as varchar)) from Market.dbo.people;;
''')
var_fix = []
for row in cursor:
    var_fix.append(list(map(str,list(row))))
f = open("C:/Users/temir/OneDrive/Рабочий стол/KBTU/Database/Practice/Exercises/Lab10/pythonFile.txt","a")

for k in var_fix:
    for j in k:
        j = j.replace('  ','')
        print(j,end = ' || ')
    print()
    f.write(str(k))
#   print(k)
    f.write('\n')
f.close()
```

**The Python output of the query in console:**



```
1000000001 || Village Toys || 44444  || 20 ||
1000000002 || Kids Place || 43333  || 16 ||
1000000003 || Fun4All  || 42222  || 12 ||
1000000004 || Fun4All  || 88888  || 40 ||
1000000005 || The Toy Store  || 54545  || 23 ||
1000000006 || Tamerlan Kuankush  || 100005 || 6 ||
BRE02  || Bear Emporium  || 44333  || 17 ||
BRS01  || Bears R Us || 44444  || 20 ||
BTW01  || Temirlan Serikov || 123123 || 12 ||
BTW02  || Temirlan Serikov || 123123 || 12 ||
BTW03  || Temirlan Serikov || 123123 || 12 ||
BTW04  || Temirlan Serikov || 123123 || 12 ||
BTW05  || Temirlan Serikov || 123123 || 12 ||
DLL01  || Doll House Inc.  || 99999  || 45 ||
FNG01  || Fun and Games  || N16 6PS  || 13 ||
FRB01  || Furball Inc. || 11111  || 5 ||
JTS01  || Jouets et ours || 45678  || 30 ||
```

**The Output in txt File:**



pythonFile – Блокнот

Файл  Правка  Формат  Вид  Справка

```
['1000000001', 'Village Toys      ', '44444     ', '20']
['1000000002', 'Kids Place        ', '43333     ', '16']
['1000000003', 'Fun4All           ', '42222     ', '12']
['1000000004', 'Fun4All           ', '88888     ', '40']
['1000000005', 'The Toy Store     ', '54545     ', '23']
['1000000006', 'Tamerlan Kuankush ', '100005    ', '6']
['BRE02     ', 'Bear Emporium     ', '44333     ', '17']
['BRS01     ', 'Bears R Us        ', '44444     ', '20']
['BTW01     ', 'Temirlan Serikov  ', '123123    ', '12']
['BTW02     ', 'Temirlan Serikov  ', '123123    ', '12']
['BTW03     ', 'Temirlan Serikov  ', '123123    ', '12']
['BTW04     ', 'Temirlan Serikov  ', '123123    ', '12']
['BTW05     ', 'Temirlan Serikov  ', '123123    ', '12']
['DLL01     ', 'Doll House Inc.   ', '99999     ', '45']
['FNG01     ', 'Fun and Games     ', 'N16 6PS   ', '13']
['FRB01     ', 'Furball Inc.      ', '11111     ', '5']
['JTS01     ', 'Jouets et ours    ', '45678     ', '30']
```