```
In [1]:  # [Import] Import the OS
         import os

         # [Message] Write a friendly message for the user.
         print("Welcome to the Software Developer Assessment:")
```

```
Welcome to the Software Developer Assessment:
```

```
In [2]:  # [Import] Import Pandas & Matplotlib or install them
         try:
             import pandas as pd
             import matplotlib.pyplot as plt
             print("Success : Matplotlib and Pandas were imported successfully into
         except ImportError:
             !pip install pandas matplotlib
             import pandas as pd
             import matplotlib.pyplot as plt
             print("Success : Matplotlib and Pandas were installed successfully intc
```

```
Success : Matplotlib and Pandas were imported successfully into the proje
ct
```

```
In [3]:  # [Import] Importing required MySQL dependencies.
         import mysql.connector # MySQL connector was installed using terminal separ
```

```
In [4]:  # [Create a Configuration Variable to specify Database Connection Details]
         config = {
             'user': 'root',
             'password': 'password',
             'host': '127.0.0.1',
             'port': '3306',
             'database': 'fastfoods'
         }

         # [Establish Connection with Database] Using a try-except block to establis
         try:
             connection_object = mysql.connector.connect(**config)
             print("Success: Connection with MySQL successful using the provided cre
         except ERROR_Connection_Failed:
             print("ERROR: Connection could not be established with MySQL Server. Pl
```

```
Success: Connection with MySQL successful using the provided credentials!
```

In [5]:

```python
# [Database Setup] Drop and Create a new table to hold the data from the CS

# create cursor objects
cursor = connection_object.cursor()

# check if table exists
table_name = "fast_foods"

try:
    # [Execute a query using cursor]
    cursor.execute(f"SHOW TABLES LIKE '{table_name}'")
    result = cursor.fetchone()

    if result:
        # drop table if it exists
        cursor.execute(f"DROP TABLE {table_name}")
        print("Success: Table with old data was deleted. A new one has been
    else:
        print("Success: A new table has been created.")

except mysql.connector.Error as error:
    print(f"Error: {error.msg}")

# create table
#cursor.execute(f"CREATE TABLE {table_name} (restaurant varchar(50), item v
cursor.execute(f"CREATE TABLE {table_name} (restaurant varchar(50), item va


# commit changes to database
connection_object.commit()
```

```
Success: Table with old data was deleted. A new one has been created in i
ts place.
```

In [6]:

```python
# [Test] Testing Insertion into the above created table.

try:
    cursor.execute("INSERT INTO fast_foods (restaurant, item, calories, cal
    connection_object.commit()
    print("Success: Inserted data into fast_foods table.")
except mysql.connector.Error as error:
    print(f"Error: {error.msg}")
```

```
Success: Inserted data into fast_foods table.
```

In [7]:

```
# [Cleaning the table] Deleting all the data from the table and preparing i

try:
    cursor.execute("DELETE from fast_foods")
    print("Success: All records have been deleted from the table.")
except mysql.connector.Error as error:
    print(f"Error: {error.msg}")
```

```
Success: All records have been deleted from the table.
```

In [8]:

```
# [Open the CSV File] Open the CSV file and read its contents.

# get the current working directory
cwd = os.getcwd()

# specify the path to the CSV file
csv_file_path = os.path.join(cwd, 'resources', 'fastfood.csv')
print (csv_file_path)

# read the CSV file using pandas
fastfoods_csv = pd.read_csv(csv_file_path)

# [Inline Test Statements]
# print(fastfoods_csv.head(5)) # print the first 5 lines of the CSV file
#
print(fastfoods_csv) # print all the lines of the CSV file
#
print("Total Number of Rows in CSV File : ")
print(fastfoods_csv.shape[0]) # get the number of rows in the DataFrame

fastfoods_csv.fillna(0, inplace=True)
print(fastfoods_csv) # print all the lines of the CSV file

# # replace all occurrences of 'n with 'and'
# fastfoods_csv = fastfoods_csv.replace({"'n": "and"}, regex=True)

# # replace all occurrences of n' with 'and'
# fastfoods_csv = fastfoods_csv.replace({"n'": "and"}, regex=True)

# # replace all occurrences of n' with 'and'
fastfoods_csv = fastfoods_csv.replace({"'": ""}, regex=True)

#fastfoods_csv = fastfoods_csv.replace({"'": ''}, regex=True, inplace=True)
```

```
C:\Users\itsad\Desktop\2023_04_10_Assessment\SRC\resources\fastfood.csv
    restaurant                                       item  calories  cal_
fat  \
0    Mcdonalds           Artisan Grilled Chicken Sandwich       380
60
1    Mcdonalds             Single Bacon Smokehouse Burger       840
410
2    Mcdonalds             Double Bacon Smokehouse Burger      1130
600
3    Mcdonalds  Grilled Bacon Smokehouse Chicken Sandwich       750
280
4    Mcdonalds   Crispy Bacon Smokehouse Chicken Sandwich       920
410
..         ...                                        ...       ...
...
510  Taco Bell             Spicy Triple Double Crunchwrap       780
340
511  Taco Bell                Express Taco Salad w/ Chips       580
260
512  Taco Bell                     Fiesta Taco Salad-Beef       780
380
513  Taco Bell                  Fiesta Taco Salad-Chicken       720
320
514  Taco Bell                    Fiesta Taco Salad-Steak       720
320

     total_fat  sat_fat  trans_fat  cholesterol  sodium  total_carb  fibe
r  \
0            7      2.0        0.0           95    1110          44    3.
0
1           45     17.0        1.5          130    1580          62    2.
0
2           67     27.0        3.0          220    1920          63    3.
0
3           31     10.0        0.5          155    1940          62    2.
0
4           45     12.0        0.5          120    1980          81    4.
0
..         ...      ...        ...          ...     ...         ...
...
510         38     10.0        0.5           50    1850          87    9.
0
511         29      9.0        1.0           60    1270          59    8.
0
512         42     10.0        1.0           60    1340          74   11.
0
513         35      7.0        0.0           70    1260          70    8.
0
514         36      8.0        1.0           55    1340          70    8.
0

     sugar  protein  vit_a  vit_c  calcium  salad
0       11     37.0    4.0   20.0     20.0  Other
1       18     46.0    6.0   20.0     20.0  Other
2       18     70.0   10.0   20.0     50.0  Other
3       18     55.0    6.0   25.0     20.0  Other
4       18     46.0    6.0   20.0     20.0  Other
```

```
..     ...      ...    ...    ...      ...    ...
510      8     23.0   20.0   10.0     25.0  Other
511      7     23.0    NaN    NaN      NaN  Other
512      7     26.0    NaN    NaN      NaN  Other
513      8     32.0    NaN    NaN      NaN  Other
514      8     28.0    NaN    NaN      NaN  Other

[515 rows x 17 columns]
Total Number of Rows in CSV File :
515
    restaurant                                       item  calories  cal_
fat  \
0    Mcdonalds           Artisan Grilled Chicken Sandwich       380
60
1    Mcdonalds             Single Bacon Smokehouse Burger       840
410
2    Mcdonalds             Double Bacon Smokehouse Burger      1130
600
3    Mcdonalds  Grilled Bacon Smokehouse Chicken Sandwich       750
280
4    Mcdonalds   Crispy Bacon Smokehouse Chicken Sandwich       920
410
..         ...                                        ...       ...
...
510  Taco Bell             Spicy Triple Double Crunchwrap       780
340
511  Taco Bell                Express Taco Salad w/ Chips       580
260
512  Taco Bell                      Fiesta Taco Salad-Beef       780
380
513  Taco Bell                   Fiesta Taco Salad-Chicken       720
320
514  Taco Bell                     Fiesta Taco Salad-Steak       720
320

     total_fat  sat_fat  trans_fat  cholesterol  sodium  total_carb  fibe
r  \
0            7      2.0        0.0           95    1110          44    3.
0
1           45     17.0        1.5          130    1580          62    2.
0
2           67     27.0        3.0          220    1920          63    3.
0
3           31     10.0        0.5          155    1940          62    2.
0
4           45     12.0        0.5          120    1980          81    4.
0
..         ...      ...        ...          ...     ...         ...
...
510         38     10.0        0.5           50    1850          87    9.
0
511         29      9.0        1.0           60    1270          59    8.
0
512         42     10.0        1.0           60    1340          74   11.
0
513         35      7.0        0.0           70    1260          70    8.
0
```

```
514          36       8.0         1.0           55    1340           70    8.
0

     sugar  protein  vit_a  vit_c  calcium  salad
0       11     37.0    4.0   20.0     20.0  Other
1       18     46.0    6.0   20.0     20.0  Other
2       18     70.0   10.0   20.0     50.0  Other
3       18     55.0    6.0   25.0     20.0  Other
4       18     46.0    6.0   20.0     20.0  Other
..     ...      ...    ...    ...      ...    ...
510      8     23.0   20.0   10.0     25.0  Other
511      7     23.0    0.0    0.0      0.0  Other
512      7     26.0    0.0    0.0      0.0  Other
513      8     32.0    0.0    0.0      0.0  Other
514      8     28.0    0.0    0.0      0.0  Other

[515 rows x 17 columns]
```

In [9]:

```
# [Replacing NaN fields]
```

In [10]:

```python
# insert data into table
for i, row in fastfoods_csv.iterrows():
    restaurant = str(row['restaurant'])
    item = str(row['item'])
    calories = int(row['calories'])
    cal_fat = int(row['cal_fat'])
    total_fat = float(row['total_fat'])
    sat_fat = float(row['sat_fat'])
    trans_fat = float(row['trans_fat'])
    cholesterol = float(row['cholesterol'])
    sodium = float(row['sodium'])
    total_carb = float(row['total_carb'])
    fiber = float(row['fiber'])
    sugar = float(row['sugar'])
    protein = float(row['protein'])
    vit_a = float(row['vit_a'])
    vit_c = float(row['vit_c'])
    calcium = float(row['calcium'])
    salad = str(row['salad'])
    try:
        insert_query = f"INSERT INTO fast_foods (restaurant, item, calories
        #[Inline Test Statement]
        print("---------------------------------------------")
        print(insert_query)
        # execute the insert query
        cursor.execute(insert_query)
        # commit changes to database
        connection_object.commit()
        #print(f"Successfully inserted {restaurant} - {item}")
    except mysql.connector.Error as error:
        # catch any errors and print the message
        print("---------------------------------------------")
        print(f"Error inserting {restaurant} - {item}: {error}")
```

```
---------------------------------------------
INSERT INTO fast_foods (restaurant, item, calories, cal_fat, total_fat,
sat_fat, trans_fat, cholesterol, sodium, total_carb, fiber, sugar, prot
ein, vit_a, vit_c, calcium, salad) VALUES ('Mcdonalds', '10 Piece Chick
en McNuggets', 440, 240, 27.0, 4.5, 0.0, 75.0, 840.0, 26.0, 2.0, 0.0, 2
4.0, 0.0, 4.0, 2.0, 'Other')
---------------------------------------------
INSERT INTO fast_foods (restaurant, item, calories, cal_fat, total_fat,
sat_fat, trans_fat, cholesterol, sodium, total_carb, fiber, sugar, prot
ein, vit_a, vit_c, calcium, salad) VALUES ('Mcdonalds', '20 Piece Chick
en McNuggets', 890, 480, 53.0, 9.0, 0.0, 145.0, 1680.0, 53.0, 4.0, 0.0,
49.0, 0.0, 8.0, 4.0, 'Other')
---------------------------------------------
INSERT INTO fast_foods (restaurant, item, calories, cal_fat, total_fat,
sat_fat, trans_fat, cholesterol, sodium, total_carb, fiber, sugar, prot
ein, vit_a, vit_c, calcium, salad) VALUES ('Mcdonalds', '40 piece Chick
en McNuggets', 1770, 960, 107.0, 18.0, 0.5, 295.0, 3370.0, 105.0, 7.0,
1.0, 98.0, 0.0, 15.0, 6.0, 'Other')
---------------------------------------------
INSERT INTO fast_foods (restaurant, item, calories, cal_fat, total_fat,
```

In [11]:

```
# [Count the total number of rows in the table]

# execute a SELECT COUNT(*) statement on the table
table_name = 'fast_foods'
query = f"SELECT COUNT(*) FROM {table_name}"
cursor.execute(query)

# retrieve the result
result = cursor.fetchone()
total_records = result[0]

# print the total number of records
print(f"Total records in {table_name} table: {total_records} and total numb
print(f"Note-  If both these numbers is equal then all the data is properly
```

```
Total records in fast_foods table: 515 and total number of rows in CSV fi
le is : 515
Note-  If both these numbers is equal then all the data is properly inser
ted into the table.
```

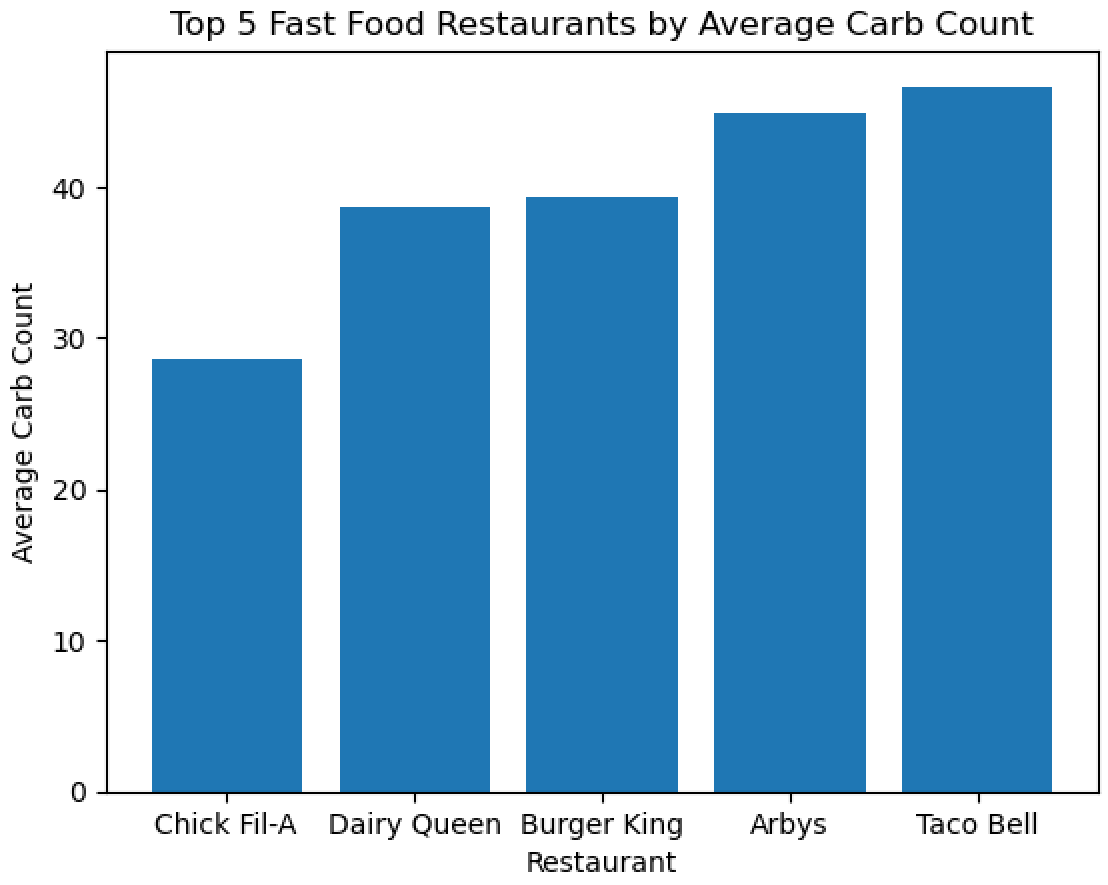
In [12]:

```
# [Calculations]
# Define the query
query = "USE fastfoods; SELECT restaurant, AVG(calories) AS avg_calories, M

# Execute the query
cursor.execute(query)

# Call cursor.nextset() to move to the next query result
cursor.nextset()

# Fetch the results
results = cursor.fetchall()

# Print the results
for row in results:
    print(row)
```

```
('Chick Fil-A', Decimal('384.4444'), 70, 970, Decimal('28.629630'))
('Dairy Queen', Decimal('520.2381'), 20, 1260, Decimal('38.690476'))
('Burger King', Decimal('608.5714'), 190, 1550, Decimal('39.314286'))
('Arbys', Decimal('532.7273'), 70, 1030, Decimal('44.872727'))
('Taco Bell', Decimal('443.6522'), 140, 880, Decimal('46.634783'))
('Sonic', Decimal('631.6981'), 100, 1350, Decimal('47.207547'))
('Mcdonalds', Decimal('640.3509'), 140, 2430, Decimal('48.789474'))
('Subway', Decimal('503.0208'), 50, 1160, Decimal('54.718750'))
```

In [13]:

```python
# [Building a Plot] Building a plot using the Matplotlib and Numpy to demon

import matplotlib.pyplot as plt
import numpy as np

# Define the query
query = "SELECT restaurant, AVG(calories) AS avg_calories, MIN(calories) AS

# Execute the query
cursor.execute(query)

# Fetch the results
results = cursor.fetchall()

# Extract data for the top 5 restaurants
top_restaurants = []
for i in range(min(5, len(results))):
    top_restaurants.append(results[i])

# Extract the restaurant names and average carb counts
restaurant_names = [row[0] for row in top_restaurants]
avg_carbs = [float(row[4]) for row in top_restaurants]

# Create a bar chart of the top 5 restaurants by average carb count
plt.bar(restaurant_names, avg_carbs)
plt.title("Top 5 Fast Food Restaurants by Average Carb Count")
plt.xlabel("Restaurant")
plt.ylabel("Average Carb Count")
plt.show()
```


Top 5 Fast Food Restaurants by Average Carb Count
Average Carb Count
0
10
20
30
40
Chick Fil-A
Dairy Queen
Burger King
Arbys
Taco Bell
Restaurant

In [16]:

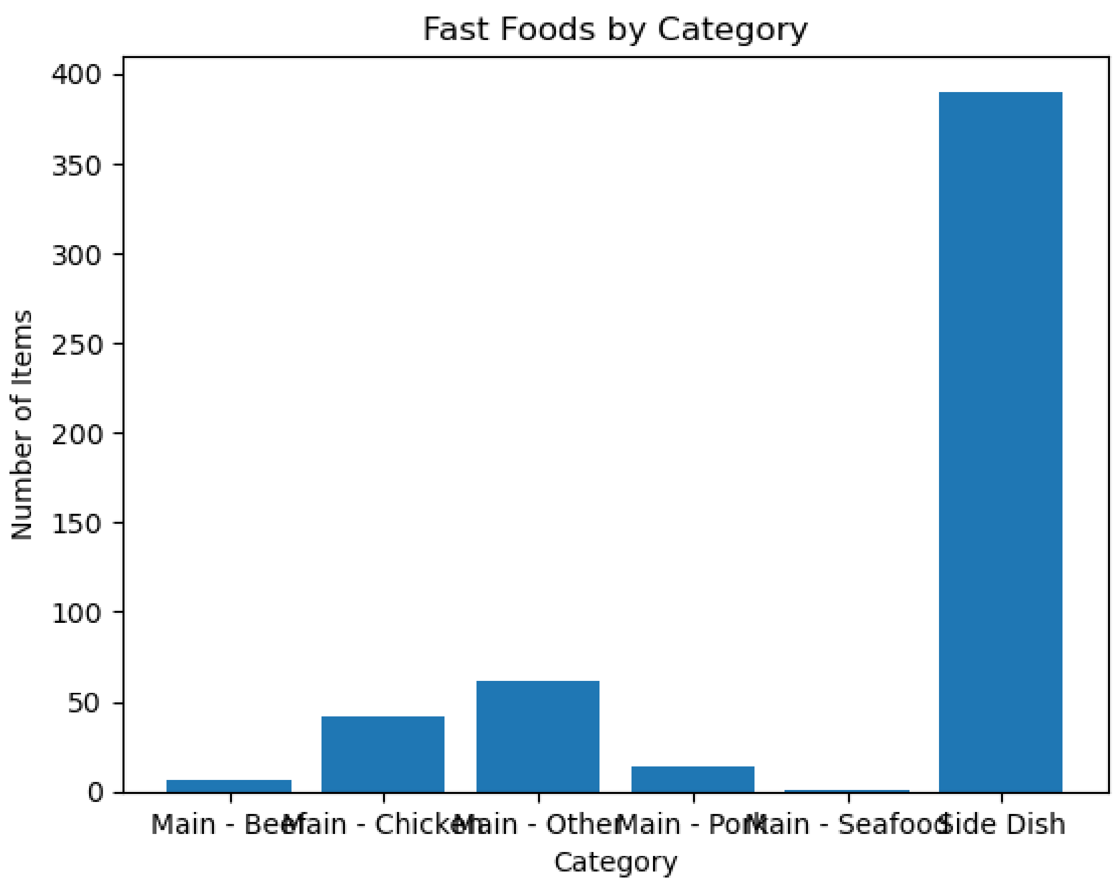
```
# [Classification of Items] Items classified based on calories (Side Dish =
# define the query
query = "SELECT item, calories, \
    CASE \
        WHEN (item LIKE '%cake%' OR item LIKE '%cookie%' OR item LIKE '%\\b
        WHEN calories < 700 THEN 'Side Dish' \
        WHEN item LIKE '%chicken%' THEN 'Main - Chicken' \
        WHEN item LIKE '%beef%' THEN 'Main - Beef' \
        WHEN item LIKE '%pork%' OR item LIKE '%sausage%' OR item LIKE '%bac
        WHEN item LIKE '%seafood%' OR item LIKE '%lobster%' OR item LIKE '%
        ELSE 'Main - Other' \
    END AS category \
FROM fast_foods"

# execute the query
cursor.execute(query)

# fetch all rows from the result set
results = cursor.fetchall()

# print the results
for row in results:
  print(row)
```

```
('Artisan Grilled Chicken Sandwich', 380, 'Side Dish')
('Single Bacon Smokehouse Burger', 840, 'Main - Pork')
('Double Bacon Smokehouse Burger', 1130, 'Main - Pork')
('Grilled Bacon Smokehouse Chicken Sandwich', 750, 'Main - Chicken')
('Crispy Bacon Smokehouse Chicken Sandwich', 920, 'Main - Chicken')
('Big Mac', 540, 'Side Dish')
('Cheeseburger', 300, 'Side Dish')
('Classic Chicken Sandwich', 510, 'Side Dish')
('Double Cheeseburger', 430, 'Side Dish')
('Double Quarter Pounder® with Cheese', 770, 'Main - Other')
('Filet-O-Fish®', 380, 'Side Dish')
('Garlic White Cheddar Burger', 620, 'Side Dish')
('Grilled Garlic White Cheddar Chicken Sandwich', 530, 'Side Dish')
('Crispy Garlic White Cheddar Chicken Sandwich', 700, 'Main - Chicken')
('Hamburger', 250, 'Side Dish')
('Lobster Roll', 290, 'Side Dish')
('Maple Bacon Dijon 1/4 lb Burger', 640, 'Side Dish')
('Grilled Maple Bacon Dijon Chicken Sandwich', 580, 'Side Dish')
('Crispy Maple Bacon Dijon Chicken Sandwich', 740, 'Main - Chicken')
```

In [19]:

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
import pyodbc

# connect to SQL Server and execute the query
query = "SELECT item, calories, \
    CASE \
        WHEN (item LIKE '%cake%' OR item LIKE '%cookie%' OR item LIKE '%\\b
        WHEN calories < 700 THEN 'Side Dish' \
        WHEN item LIKE '%chicken%' THEN 'Main - Chicken' \
        WHEN item LIKE '%beef%' THEN 'Main - Beef' \
        WHEN item LIKE '%pork%' OR item LIKE '%sausage%' OR item LIKE '%bac
        WHEN item LIKE '%seafood%' OR item LIKE '%lobster%' OR item LIKE '%
        ELSE 'Main - Other' \
    END AS category \
FROM fast_foods"
results = pd.read_sql_query(query, connection_object)

# create a pivot table to group the items by category
pivot_table = pd.pivot_table(results, values='calories', index=['category']

# plot the pivot table as a bar chart
x_labels = pivot_table.index
y_values = pivot_table['calories']
plt.bar(x_labels, y_values)
plt.title('Fast Foods by Category')
plt.xlabel('Category')
plt.ylabel('Number of Items')
plt.show()
```

```
C:\Users\itsad\AppData\Local\Temp\ipykernel_15736\4282813893.py:18: UserW
arning: pandas only supports SQLAlchemy connectable (engine/connection) o
r database string URI or sqlite3 DBAPI2 connection. Other DBAPI2 objects
are not tested. Please consider using SQLAlchemy.
  results = pd.read_sql_query(query, connection_object)
```



In [23]:
```python
# close the cursor
try:
    cursor.close()
    print("Success: Cursor is closed")
except:
    print("Error: Cursor is not closed")
    pass

# close the database connection
try:
    connection_object.close()
    print("Success: Database Connection is closed")
except:
    print("Error: Database Connection is not closed")
    pass
```

```
Success: Cursor is closed
Success: Database Connection is closed
```

In [ ]: