MySQL Connection Implementation

```
In [1]: import mysql.connector
        import pandas as pd
        import matplotlib.pyplot as plt
        from sqlalchemy import create_engine
```

```
In [2]: connection = mysql.connector.connect(
                host='localhost',
                database='bank_database',
                user='root',
                password='pramothguhan12',
        #           auth_plugin='mysql_native_password'
            )
```

```
In [3]: if connection.is_connected():
                db_Info = connection.get_server_info()
                print(f"Connected to MySQL Server version {db_Info}")

                # Create a cursor object to execute SQL queries
                cursor = connection.cursor()
```

```
Connected to MySQL Server version 8.0.36
```

```
In [4]: connection
```

```
Out[4]: <mysql.connector.connection_cext.CMySQLConnection at 0x1c1d74735e0>
```

Query Implementation

```
In [5]: df = pd.read_sql_query("SELECT * FROM employee", connection)
        df
```

```
C:\Users\pramo\anaconda3\lib\site-packages\pandas\io\sql.py:761: UserWarning: pandas onl
y support SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBA
PI2 connectionother DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

Out[5]:

	EMPLOYEE ID	EMPLOYEE NAME	EMPLOYEE EMAIL	SALARY	BRANCH ID
0	555	Tonia Schermick	tschermick0@cnbc.com	5358.86	2808
1	839	Derrick Bettenay	dbettenay1@netvibes.com	7313.88	2946
2	506	Sharyl Yankov	syankov2@elpais.com	7048.32	2508
3	714	Marcella Allbones	mallbones3@bizjournals.com	7148.82	3021
4	878	Desdemona MacParlan	dmacparlan4@bigcartel.com	9672.85	4131
...	...	...	...	...	...
95	300	Colas Handrik	chandrik2n@auda.org.au	4514.90	2847
96	124	Harv Allgood	hallgood2o@mediafire.com	6186.83	4720
97	406	Claudio Hunting	chunting2p@opensource.org	6566.09	1252
98	100	Sharyl Meenehan	smeenehan2q@addthis.com	7877.04	4826
99	701	Rawley Forestel	rforestel2r@foxnews.com	8518.41	4999

100 rows × 5 columns

```
In [6]: df = pd.read_sql_query("SELECT * FROM reward;", connection)
        df.head(10)
```

```
C:\Users\pramo\anaconda3\lib\site-packages\pandas\io\sql.py:761: UserWarning: pandas onl
y support SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBA
PI2 connectionother DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

Out[6]:

	REWARD ID	REWARD AMOUNT	REQUEST DATE	REDEMPTION OPTION	CUSTOMER ID
0	66067474	$1172.47	04/21/2022	COUPON	57849
1	15901910	$2667.44	07/29/2022	WEBSITE	42148
2	61884675	$3612.69	08-11-2023	APP	99941
3	48276456	$4060.61	04/29/2023	COUPON	37152
4	58233430	$2795.17	02-03-2023	APP	40824
5	51236128	$5175.59	01-06-2024	COUPON	82764
6	62919492	$603.09	10/31/2022	COUPON	66412
7	87440465	$3596.64	10/13/2023	COUPON	71486
8	56243724	$8769.97	05-01-2022	APP	19623
9	78616818	$4456.46	05-11-2022	COUPON	63798

```
In [7]: df = pd.read_sql_query("SELECT `CUSTOMER ID`, `INCOME`, `BRANCH ID` FROM `CUSTOMER` ORDE
        df.head(10)
```

```
C:\Users\pramo\anaconda3\lib\site-packages\pandas\io\sql.py:761: UserWarning: pandas onl
y support SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBA
PI2 connectionother DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

Out[7]:

	CUSTOMER ID	INCOME	BRANCH ID
0	99808	$93011.26	4999
1	28273	$91975.45	2508
2	31971	$88840.39	2946
3	48478	$86338.92	4131
4	10271	$85718.19	4999
5	27260	$7856.16	2847
6	22858	$76483.65	2508
7	47870	$69730.82	2946
8	24816	$67659.02	4826
9	47555	$67461.52	4999

```
In [8]: df = pd.read_sql_query("SELECT `BRANCH ID`, COUNT(`CUSTOMER ID`) AS NUMBER_OF_CUSTOMERS
        df.head(10)
```

```
C:\Users\pramo\anaconda3\lib\site-packages\pandas\io\sql.py:761: UserWarning: pandas onl
y support SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBA
```

```
PI2 connectionother DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

Out[8]:

	BRANCH ID	NUMBER_OF_CUSTOMERS
0	2808	10
1	2946	10
2	2508	10
3	3021	10
4	4131	10
5	2847	10
6	4720	10
7	1252	10
8	4826	10
9	4999	10

In [9]:
```
df = pd.read_sql_query("SELECT * FROM TRANSACTION WHERE status = 'success';", connection
df.head(10)
```

```
C:\Users\pramo\anaconda3\lib\site-packages\pandas\io\sql.py:761: UserWarning: pandas onl
y support SQLAlchemy connectable(engine/connection) ordatabase string URI or sqlite3 DBA
PI2 connectionother DBAPI2 objects are not tested, please consider using SQLAlchemy
  warnings.warn(
```

Out[9]:

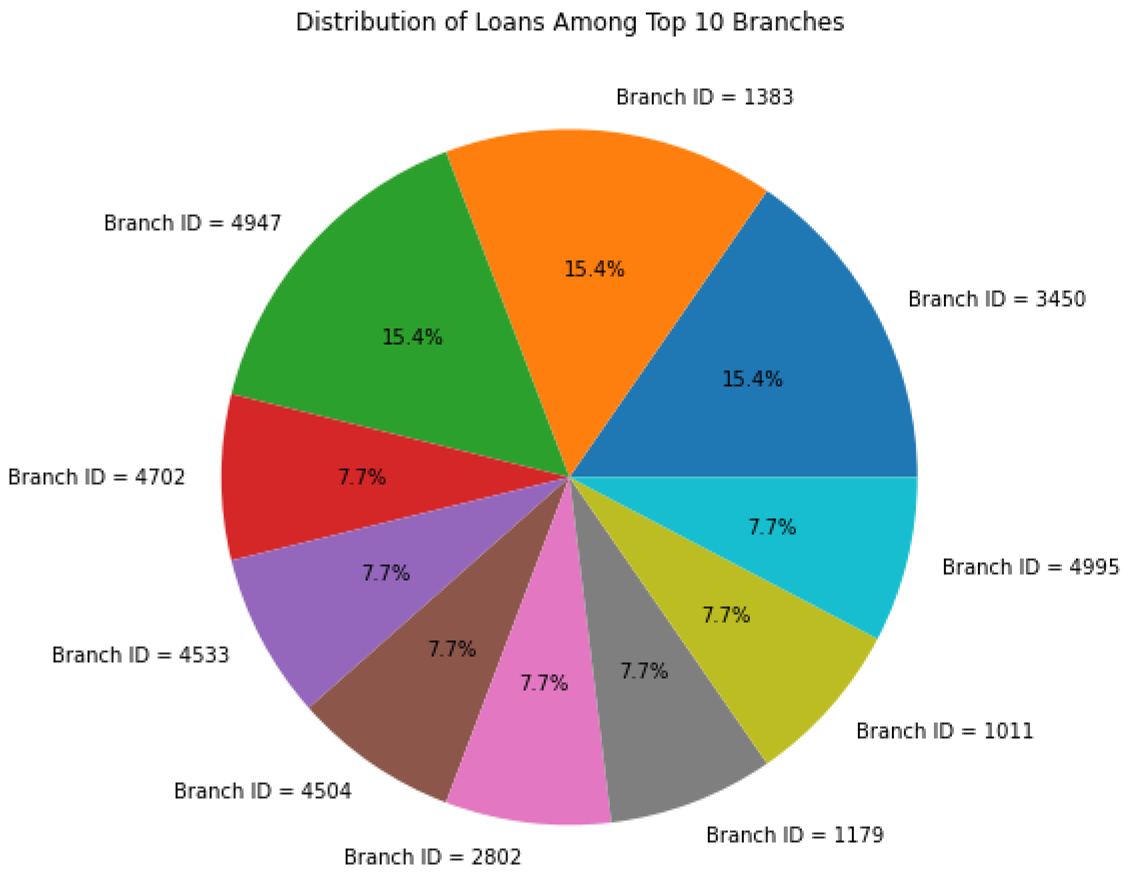
	TRANSACTION ID	TRANSACTION AMOUNT	TRANSACTION TIME	STATUS	CUSTOMER ID
0	8341882	$42001.28	19:15:49	SUCCESS	57849
1	8299034	$28211.43	21:06:46	SUCCESS	37152
2	9968591	$38568.93	22:29:00	SUCCESS	82764
3	3247352	$56198.97	20:43:55	SUCCESS	63798
4	4507010	$2991.17	14:25:15	SUCCESS	12157
5	1796926	$35433.24	16:45:02	SUCCESS	64932
6	4426801	$56370.28	00:11:14	SUCCESS	74289
7	4915518	$22432.00	20:33:22	SUCCESS	97280
8	6304158	$79451.55	05:08:00	SUCCESS	66641
9	5219665	$90261.02	00:36:12	SUCCESS	31971

Data Visualization

In [10]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

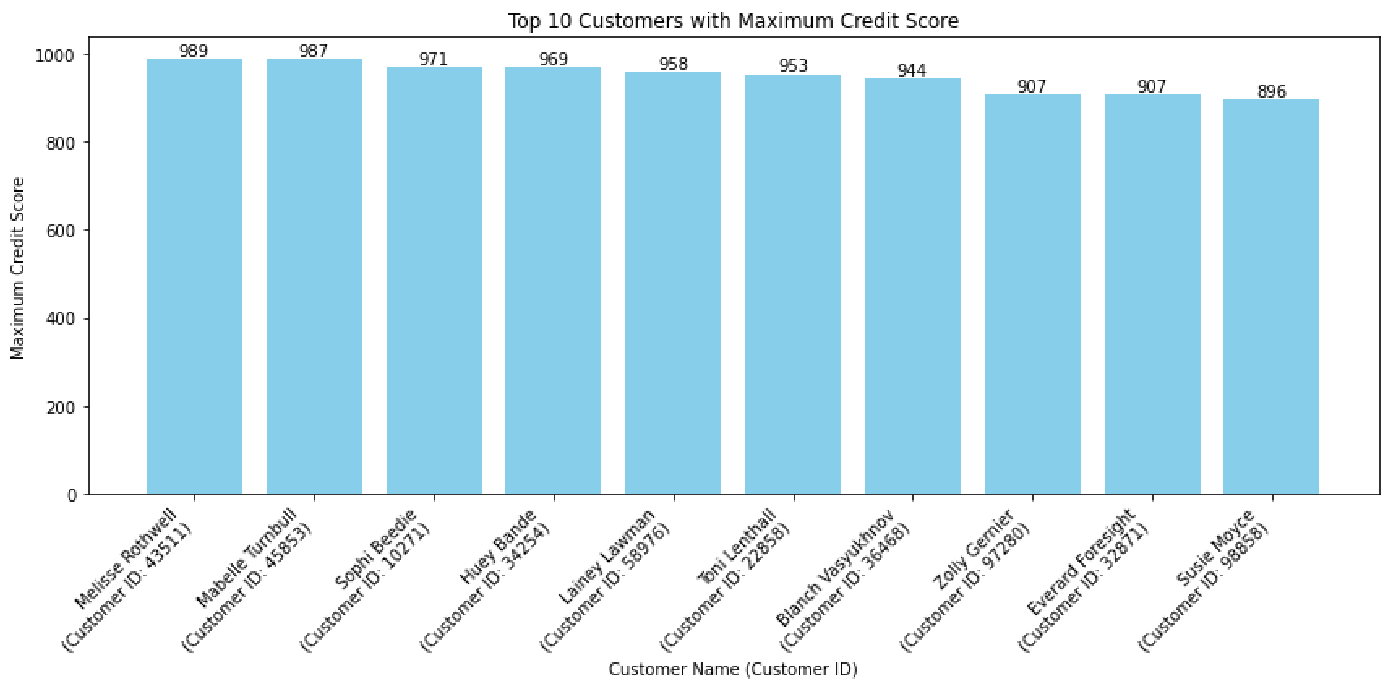
In [11]:
```
connection = mysql.connector.connect(
    host='localhost',
    database='bank_database',
    user='root',
    password='pramothguhan12'
)
```

```
cursor = connection.cursor()

# Execute the SQL query to get the number of loans in each branch
query = """
SELECT `BRANCH ID`, COUNT(*) AS NUMBER_OF_LOANS
FROM `LOAN`
GROUP BY `BRANCH ID`
ORDER BY NUMBER_OF_LOANS DESC
LIMIT 10;
"""
cursor.execute(query)

# Fetch the data and convert it into a pandas DataFrame
data = cursor.fetchall()
df = pd.DataFrame(data, columns=['BRANCH ID', 'NUMBER_OF_LOANS'])

cursor.close()
connection.close()



custom_colors = ['#1f77b4', '#ff7f0e', '#2ca02c', '#d62728', '#9467bd',
                 '#8c564b', '#e377c2', '#7f7f7f', '#bcbd22', '#17becf']

plt.figure(figsize=(8, 8))
plt.pie(df['NUMBER_OF_LOANS'], labels = ['Branch ID = ' + str(branch_id) for branch_id i
plt.title('Distribution of Loans Among Top 10 Branches')
plt.show()
```



In [12]:
```
connection = mysql.connector.connect(
    host='localhost',
    database='bank_database',
    user='root',
    password='pramothguhan12'
```

```
)


cursor = connection.cursor()

# Execute the SQL query to get the top 10 customers with the maximum credit score
query = """
SELECT `CUSTOMER`.`CUSTOMER NAME`, `CREDITCARD`.`CUSTOMER ID`, MAX(`CREDITCARD`.`SCORE`)
FROM `CREDITCARD`
JOIN `CUSTOMER` ON `CREDITCARD`.`CUSTOMER ID` = `CUSTOMER`.`CUSTOMER ID`
GROUP BY `CREDITCARD`.`CUSTOMER ID`, `CUSTOMER`.`CUSTOMER NAME`
ORDER BY `MAX_CREDIT_SCORE` DESC
LIMIT 10;
"""
cursor.execute(query)

# Fetch the data and convert it into a pandas DataFrame
data = cursor.fetchall()
df = pd.DataFrame(data, columns=['CUSTOMER NAME', 'CUSTOMER ID', 'MAX_CREDIT_SCORE'])

cursor.close()
connection.close()



x_labels = [f'{name}\n(Customer ID: {customer_id})' for name, customer_id in zip(df['CUS

plt.figure(figsize=(12, 6))
bars = plt.bar(range(len(df)), df['MAX_CREDIT_SCORE'], color='skyblue')
plt.xlabel('Customer Name (Customer ID)')
plt.ylabel('Maximum Credit Score')
plt.title('Top 10 Customers with Maximum Credit Score')
plt.xticks(range(len(df)), x_labels, rotation=45, ha='right')
plt.tight_layout()

for bar, score in zip(bars, df['MAX_CREDIT_SCORE']):
    plt.text(bar.get_x() + bar.get_width() / 2, bar.get_height(), f'{score}',
             ha='center', va='bottom', color='black')

plt.show()
```


Top 10 Customers with Maximum Credit Score
Maximum Credit Score
Melisse Rothwell (Customer ID: 43511)
Mabelle Turnbull (Customer ID: 45853)
Sophi Beedie (Customer ID: 10271)
Huey Bande (Customer ID: 34254)
Lainey Lawman (Customer ID: 58976)
Toni Lenthall (Customer ID: 22858)
Blanch Vasyukhnov (Customer ID: 36468)
Zolly Gernier (Customer ID: 97280)
Everard Foresight (Customer ID: 32871)
Susie Moyce (Customer ID: 98858)
Customer Name (Customer ID)