KPMG virtual internship - job simulation

Task 1: Data Quality Assessment

Assessment of data quality and completeness in preparation for analysis

Provided Datasets: Customer Demographic, Customer Addresses, Transactions data in the past 3 months

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import LabelEncoder
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
```

Reading Data

In [47]:
```
data1 = pd.read_excel('KPMG_VI_New_raw_data_update_final.xlsx',sheet_name='Transact
data2 = pd.read_excel('KPMG_VI_New_raw_data_update_final.xlsx',sheet_name='Customer
data3 = pd.read_excel('KPMG_VI_New_raw_data_update_final.xlsx',sheet_name='Customer
data4 = pd.read_excel('KPMG_VI_New_raw_data_update_final.xlsx',sheet_name='NewCusto
```

Data 1 - Transactions

In [3]:
```
data1.head()
```

Out[3]:

Note: The data and information in this document is reflective of a hypothetical situation and client. This document is to be used for KPMG Virtual Internship purposes only.	Unnamed: 1	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5	Unnamed: 6	U
0	transaction_id	product_id	customer_id	transaction_date	online_order	order_status	brand	prc
1	1	2	2950	2017-02-25 00:00:00	False	Approved	Solex	
2	2	3	3120	2017-05-21 00:00:00	True	Approved	Trek Bicycles	
3	3	37	402	2017-10-16 00:00:00	False	Approved	OHM Cycles	
4	4	88	3135	2017-08-31 00:00:00	False	Approved	Norco Bicycles	

Data columns are in messed up form in data frame, they require preprocessig for better understanding of data

In [7]:
```
data1.columns = data1.iloc[0]
df1 = data1.iloc[1:]
df1.head()
```

Out[7]:

	transaction_id	product_id	customer_id	transaction_date	online_order	order_status	brand	p
1	1	2	2950	2017-02-25 00:00:00	False	Approved	Solex	
2	2	3	3120	2017-05-21 00:00:00	True	Approved	Trek Bicycles	
3	3	37	402	2017-10-16 00:00:00	False	Approved	OHM Cycles	
4	4	88	3135	2017-08-31 00:00:00	False	Approved	Norco Bicycles	
5	5	78	787	2017-10-01 00:00:00	True	Approved	Giant Bicycles	

In [8]:
```
# checking the shape of data
df1.shape
```

Out[8]:
```
(20000, 13)
```

In [31]:
```
print(df1.isna().sum())
df11 = df1.copy()
```

```
0
transaction_id               0
product_id                   0
customer_id                  0
transaction_date             0
online_order               360
order_status                 0
brand                      197
product_line               197
product_class              197
product_size               197
list_price                   0
standard_cost              197
product_first_sold_date    197
dtype: int64
```

There missing values in 7 columns. They need to be treated according to the nature of analysis

In [10]:
```
#checking for duplicated rows
df1.duplicated().sum()
```

Out[10]:
```
0
```

There are no duplicate values, the data is unique

In [11]:
```
#chekcing for uniqueness of each column
df1.nunique()
```

Out[11]:
```
0
transaction_id             20000
product_id                   101
customer_id                 3494
transaction_date             364
online_order                   2
order_status                   2
brand                          6
product_line                   4
product_class                  3
product_size                   3
list_price                   296
standard_cost                103
product_first_sold_date      100
dtype: int64
```

Exploring the attributes

In [19]:
```
df1.columns
```

Out[19]:
```
Index(['transaction_id', 'product_id', 'customer_id', 'transaction_date',
       'online_order', 'order_status', 'brand', 'product_line',
       'product_class', 'product_size', 'list_price', 'standard_cost',
       'product_first_sold_date'],
      dtype='object', name=0)
```

In [20]:
```
df1['order_status'].value_counts()
```

Out[20]:
```
order_status
Approved     19821
Cancelled      179
Name: count, dtype: int64
```

In [22]:
```
df1['brand'].value_counts()
```

Out[22]:
```
brand
Solex              4253
Giant Bicycles     3312
WeareA2B           3295
OHM Cycles         3043
Trek Bicycles      2990
Norco Bicycles     2910
Name: count, dtype: int64
```

In [23]:
```
df1['product_line'].value_counts()
```

Out[23]:
```
product_line
Standard    14176
Road         3970
Touring      1234
Mountain      423
Name: count, dtype: int64
```

In [24]:
```
df1['product_class'].value_counts()
```

Out[24]:
```
product_class
medium    13826
high       3013
low        2964
Name: count, dtype: int64
```

In [25]:
```
df1['product_size'].value_counts()
```

Out[25]:
```
product_size
medium    12990
large      3976
small      2837
Name: count, dtype: int64
```

In [26]:
```
df1['product_first_sold_date'].value_counts()
```

Out[26]:
```
product_first_sold_date
33879    234
41064    229
37823    227
39880    222
38216    220
        ...
41848    169
42404    168
41922    166
37659    163
34586    162
Name: count, Length: 100, dtype: int64
```

In [28]:
```
#converting data column from integer to datetime
df1['product_first_sold_date'] = pd.to_datetime(df1['product_first_sold_date'],unit
df1['product_first_sold_date']
```

```
C:\Users\DELL\AppData\Local\Temp\ipykernel_13804\1696406794.py:2: SettingWithCopyW
arning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  df1['product_first_sold_date'] = pd.to_datetime(df1['product_first_sold_date'],u
nit='s')
```

Out[28]:

```
1       1970-01-01 11:27:25
2       1970-01-01 11:35:01
3       1970-01-01 10:06:01
4       1970-01-01 10:02:25
5       1970-01-01 11:43:46
               ...
19996   1970-01-01 10:30:23
19997   1970-01-01 09:52:40
19998   1970-01-01 11:13:30
19999   1970-01-01 10:36:56
20000   1970-01-01 10:05:34
Name: product_first_sold_date, Length: 20000, dtype: datetime64[ns]
```

The values shown in this respective column might not be correct as it is displaying every product sold on same date but different timings

Basic preprocessing ideas

In [32]:

```
df11['online_order'] = df11['online_order'].fillna(method='ffill')
df11['brand'] = df11['brand'].fillna(method='ffill')
df11['product_line'] = df11['product_line'].fillna(method='ffill')
df11['product_class'] = df11['product_class'].fillna(method='ffill')
df11['product_size'] = df11['product_size'].fillna(method='ffill')
df11['standard_cost'] = df11['standard_cost'].fillna(method='ffill')
df11['product_first_sold_date'] = df11['product_first_sold_date'].fillna(method='ff
```

In [33]:

```
df11.isna().sum()
```

Out[33]:

```
0
transaction_id             0
product_id                 0
customer_id                0
transaction_date           0
online_order               0
order_status               0
brand                      0
product_line               0
product_class              0
product_size               0
list_price                 0
standard_cost              0
product_first_sold_date    0
dtype: int64
```

In [34]:

```
df11.tail()
```

Out[34]:

	transaction_id	product_id	customer_id	transaction_date	online_order	order_status	bran
19996	19996	51	1018	2017-06-24 00:00:00	True	Approved	OH Cycl
19997	19997	41	127	2017-11-09 00:00:00	True	Approved	Sol
19998	19998	87	2284	2017-04-14 00:00:00	True	Approved	OH Cycl
19999	19999	6	2764	2017-07-03 00:00:00	False	Approved	OH Cycl
20000	20000	11	1144	2017-09-22 00:00:00	True	Approved	Tre Bicycl

In [35]:
```
lbl = LabelEncoder()
df11['trans_date'] = lbl.fit_transform(df1['transaction_date'])
df11['on_order'] = lbl.fit_transform(df1['online_order'])
df11['status'] = lbl.fit_transform(df1['order_status'])
df11['brands'] = lbl.fit_transform(df1['brand'])
df11['pro_line'] = lbl.fit_transform(df1['product_line'])
df11['pro_class'] = lbl.fit_transform(df1['product_class'])
df11['pro_size'] = lbl.fit_transform(df1['product_size'])
```

In [36]:
```
df11.tail()
```

Out[36]:

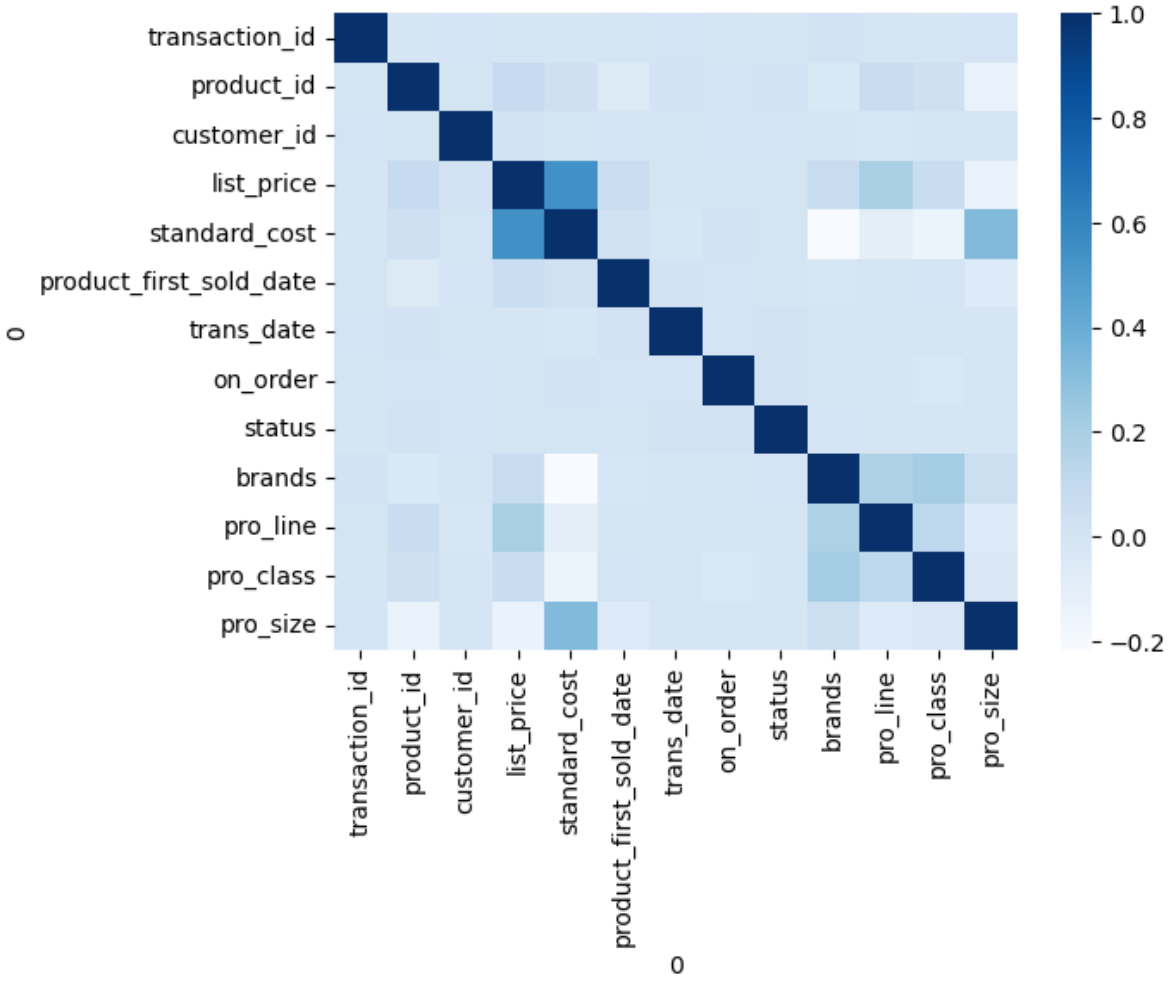
	transaction_id	product_id	customer_id	transaction_date	online_order	order_status	bran
19996	19996	51	1018	2017-06-24 00:00:00	True	Approved	OH Cycl
19997	19997	41	127	2017-11-09 00:00:00	True	Approved	Sol
19998	19998	87	2284	2017-04-14 00:00:00	True	Approved	OH Cycl
19999	19999	6	2764	2017-07-03 00:00:00	False	Approved	OH Cycl
20000	20000	11	1144	2017-09-22 00:00:00	True	Approved	Tre Bicycl

In [37]:
```
df12 = df11.drop(['transaction_date','online_order','order_status','brand','product
df12.tail()
```

Out[37]:

	transaction_id	product_id	customer_id	list_price	standard_cost	product_first_sold_date	t
19996	19996	51	1018	2005.66	1203.40	1970-01-01 10:30:23	
19997	19997	41	127	416.98	312.74	1970-01-01 09:52:40	
19998	19998	87	2284	1636.9	44.71	1970-01-01 11:13:30	
19999	19999	6	2764	227.88	136.73	1970-01-01 10:36:56	
20000	20000	11	1144	1775.81	1580.47	1970-01-01 10:05:34	

In [38]:
```
sns.heatmap(df12.corr(),cmap='Blues')
plt.show()
```



Data 2 - Customer Demographic

In [68]:
```
data2.head()
```

Out[68]:

	Note: The data and information in this document is reflective of a hypothetical situation and client. This document is to be used for KPMG Virtual Internship purposes only.	Unnamed: 1	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5
0	customer_id	first_name	last_name	gender	past_3_years_bike_related_purchases	DOB
1	1	Laraine	Medendorp	F	93	1953-10-12 00:00:00
2	2	Eli	Bockman	Male	81	1980-12-16 00:00:00
3	3	Arlin	Dearle	Male	61	1954-01-20 00:00:00
4	4	Talbot	NaN	Male	33	1961-10-03 00:00:00

In [69]:
```
data2.columns = data2.iloc[0]
df2 = data2.iloc[1:]
df2.head()
```

Out[69]:

	customer_id	first_name	last_name	gender	past_3_years_bike_related_purchases	DOB	
1	1	Laraine	Medendorp	F	93	1953-10-12 00:00:00	
2	2	Eli	Bockman	Male	81	1980-12-16 00:00:00	Adm
3	3	Arlin	Dearle	Male	61	1954-01-20 00:00:00	
4	4	Talbot	NaN	Male	33	1961-10-03 00:00:00	
5	5	Sheila-kathryn	Calton	Female	56	1977-05-13 00:00:00	Se

In [84]:
```
print(df2.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4000 entries, 1 to 4000
Data columns (total 13 columns):
 #   Column                               Non-Null Count  Dtype 
---  ------                               --------------  ----- 
 0   customer_id                          4000 non-null   object
 1   first_name                           4000 non-null   object
 2   last_name                            3875 non-null   object
 3   gender                               4000 non-null   object
 4   past_3_years_bike_related_purchases  4000 non-null   object
 5   DOB                                  3913 non-null   object
 6   job_title                            3494 non-null   object
 7   job_industry_category                3344 non-null   object
 8   wealth_segment                       4000 non-null   object
 9   deceased_indicator                   4000 non-null   object
 10  default                              3698 non-null   object
 11  owns_car                             4000 non-null   object
 12  tenure                               3913 non-null   object
dtypes: object(13)
memory usage: 406.4+ KB
None
```

In [72]:
```
df2.isnull().sum()
```

Out[72]:
```
0
customer_id                            0
first_name                             0
last_name                            125
gender                                 0
past_3_years_bike_related_purchases    0
DOB                                   87
job_title                            506
job_industry_category                656
wealth_segment                         0
deceased_indicator                     0
default                              302
owns_car                               0
tenure                                87
dtype: int64
```

There are missing values in 5 columns, they need to be treated accordingly

In [73]:
```
df2.duplicated().sum()
```

Out[73]:
```
0
```

There are no duplicated rows

In [75]:
```
# check for columnwise duplicate values
df2.nunique()
```

Out[75]:
```
0
customer_id                          4000
first_name                           3139
last_name                            3725
gender                                  6
past_3_years_bike_related_purchases   100
DOB                                  3448
job_title                             195
job_industry_category                   9
wealth_segment                          3
deceased_indicator                      2
default                                90
owns_car                                2
tenure                                 22
dtype: int64
```

Exploring the columns

In [76]:
```
df2.columns
```

Out[76]:
```
Index(['customer_id', 'first_name', 'last_name', 'gender',
       'past_3_years_bike_related_purchases', 'DOB', 'job_title',
       'job_industry_category', 'wealth_segment', 'deceased_indicator',
       'default', 'owns_car', 'tenure'],
      dtype='object', name=0)
```

In [77]:
```
df2['gender'].value_counts()
```

Out[77]:
```
gender
Female    2037
Male      1872
U           88
F            1
Femal        1
M            1
Name: count, dtype: int64
```

Gender categorisation is'nt proper. They needed to be more precised and category wise

In [78]:
```
df2['past_3_years_bike_related_purchases'].value_counts()
```

Out[78]:
```
past_3_years_bike_related_purchases
16    56
19    56
67    54
20    54
2     50
      ..
8     28
95    27
85    27
86    27
92    24
Name: count, Length: 100, dtype: int64
```

In [79]:
```
df2['DOB'].value_counts()
```

Out[79]:
```
DOB
1978-01-30    7
1964-07-08    4
1962-12-17    4
1978-08-19    4
1977-05-13    4
             ..
1989-06-16    1
1998-09-30    1
1985-03-11    1
1989-10-23    1
1991-11-05    1
Name: count, Length: 3448, dtype: int64
```

In [80]:
```
df2['job_title'].value_counts()
```

Out[80]:
```
job_title
Business Systems Development Analyst    45
Tax Accountant                          44
Social Worker                           44
Internal Auditor                        42
Recruiting Manager                      41
                                        ..
Database Administrator I                 4
Health Coach I                           3
Health Coach III                         3
Research Assistant III                   3
Developer I                              1
Name: count, Length: 195, dtype: int64
```

In [81]:
```
df2['wealth_segment'].value_counts()
```

Out[81]:
```
wealth_segment
Mass Customer        2000
High Net Worth       1021
Affluent Customer     979
Name: count, dtype: int64
```

In [82]:
```
df2['deceased_indicator'].value_counts()
```

Out[82]:
```
deceased_indicator
N    3998
Y       2
Name: count, dtype: int64
```

In [83]:
```
df2['default'].value_counts()
```

Out[83]:
```
default
100                                      113
1                                        112
-1                                       111
-100                                      99
Ù¡Ù¢Ù£                                    53
                                        ...
testâ testâ«                              31
/dev/null; touch /tmp/blns.fail ; echo    30
âªâªtestâª                                29
ì¸ëë°í ë¥´                               27
,ãã»:*:ã»ãâ( â» Ï â» )ãã»:*:ã»ãâ          25
Name: count, Length: 90, dtype: int64
```

The values are not consistent, the column is irrelevant and can be dropped.

In [85]:
```
df21 = df2.drop('default',axis='columns')
```

In [87]:
```
df21.head()
```

Out[87]:

	customer_id	first_name	last_name	gender	past_3_years_bike_related_purchases	DOB	
1	1	Laraine	Medendorp	F	93	1953-10-12 00:00:00	
2	2	Eli	Bockman	Male	81	1980-12-16 00:00:00	Adm
3	3	Arlin	Dearle	Male	61	1954-01-20 00:00:00	
4	4	Talbot	NaN	Male	33	1961-10-03 00:00:00	
5	5	Sheila-kathryn	Calton	Female	56	1977-05-13 00:00:00	Se

In [88]:
```
df2['owns_car'].value_counts()
```

Out[88]:
```
owns_car
Yes    2024
No     1976
Name: count, dtype: int64
```

In [89]:
```
df2['tenure'].value_counts()
```

Out[89]:
```
tenure
7     235
5     228
11    221
10    218
16    215
8     211
18    208
12    202
9     200
14    200
6     192
13    191
4     191
17    182
15    179
1     166
3     160
19    159
2     150
20     96
22     55
21     54
Name: count, dtype: int64
```

Data 3 - Customer Address

In [90]:
```
data3.head()
```

Out[90]:

	Note: The data and information in this document is reflective of a hypothetical situation and client. This document is to be used for KPMG Virtual Internship purposes only.	Unnamed: 1	Unnamed: 2	Unnamed: 3	Unnamed: 4	Unnamed: 5
0	customer_id	address	postcode	state	country	property_valuation
1	1	060 Morning Avenue	2016	New South Wales	Australia	10
2	2	6 Meadow Vale Court	2153	New South Wales	Australia	10
3	4	0 Holy Cross Court	4211	QLD	Australia	9
4	5	17979 Del Mar Point	2448	New South Wales	Australia	4

In [91]:
```
data3.columns = data3.iloc[0]
df3 = data3.iloc[1:]
df3.head()
```

Out[91]:

	customer_id	address	postcode	state	country	property_valuation
1	1	060 Morning Avenue	2016	New South Wales	Australia	10
2	2	6 Meadow Vale Court	2153	New South Wales	Australia	10
3	4	0 Holy Cross Court	4211	QLD	Australia	9
4	5	17979 Del Mar Point	2448	New South Wales	Australia	4
5	6	9 Oakridge Court	3216	VIC	Australia	9

In [92]:
```
print(df3.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3999 entries, 1 to 3999
Data columns (total 6 columns):
 #   Column              Non-Null Count  Dtype 
---  ------              --------------  ----- 
 0   customer_id         3999 non-null   object
 1   address             3999 non-null   object
 2   postcode            3999 non-null   object
 3   state               3999 non-null   object
 4   country             3999 non-null   object
 5   property_valuation  3999 non-null   object
dtypes: object(6)
memory usage: 187.6+ KB
None
```

In [93]:
```
df3.isnull().sum()
```

Out[93]:
```
0
customer_id           0
address               0
postcode              0
state                 0
country               0
property_valuation    0
dtype: int64
```

There are no null values,

In [94]:
```
df3.duplicated().sum()
```

Out[94]:
```
0
```

There are no duplicated rows

In [95]:
```
df3.nunique()
```

Out[95]:
```
0
customer_id           3999
address               3996
postcode               873
state                    5
country                  1
property_valuation      12
dtype: int64
```

Exploring the columns

In [96]:
```
df3['postcode'].value_counts()
```

Out[96]:
```
postcode
2170    31
2155    30
2145    30
2153    29
3977    26
        ..
3808     1
3114     1
4721     1
4799     1
3089     1
Name: count, Length: 873, dtype: int64
```

In [97]:
```
df3['state'].value_counts()
```

Out[97]:
```
state
NSW                2054
VIC                 939
QLD                 838
New South Wales      86
Victoria             82
Name: count, dtype: int64
```

In [98]:
```
df3['property_valuation'].value_counts()
```

Out[98]:
```
property_valuation
9      647
8      646
10     577
7      493
11     281
6      238
5      225
4      214
12     195
3      186
1      154
2      143
Name: count, dtype: int64
```

All the columns have consistent values and apparantly correct information

Data 4 - New Customer List

In [44]:
```
data4.head()
```

Out[44]:

	first_name	last_name	gender	past_3_years_bike_related_purchases	DOB	job_title	job
0	first_name	last_name	gender	past_3_years_bike_related_purchases	DOB	job_title	jo
1	Chickie	Brister	Male	86	1957-07-12	General Manager	
2	Morly	Genery	Male	69	1970-03-22	Structural Engineer	
3	Ardelis	Forrester	Female	10	1974-08-28 00:00:00	Senior Cost Accountant	
4	Lucine	Stutt	Female	64	1979-01-28	Account Representative III	

5 rows × 23 columns

In [48]:
```
#Dropping the unnamed columns
data4.drop(['Unnamed: 16', 'Unnamed: 17', 'Unnamed: 18','Unnamed: 19', 'Unnamed: 20
```

In [49]:
```
data4.columns = data4.iloc[0]
df4 = data4.iloc[1:]
df4.head()
```

Out[49]:

	first_name	last_name	gender	past_3_years_bike_related_purchases	DOB	job_title	job
1	Chickie	Brister	Male	86	1957-07-12	General Manager	
2	Morly	Genery	Male	69	1970-03-22	Structural Engineer	
3	Ardelis	Forrester	Female	10	1974-08-28 00:00:00	Senior Cost Accountant	
4	Lucine	Stutt	Female	64	1979-01-28	Account Representative III	
5	Melinda	Hadlee	Female	34	1965-09-21	Financial Analyst	

In [50]:
```
df4.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 1 to 1000
Data columns (total 18 columns):
 #   Column                               Non-Null Count  Dtype 
---  ------                               --------------  ----- 
 0   first_name                           1000 non-null   object
 1   last_name                            971 non-null    object
 2   gender                               1000 non-null   object
 3   past_3_years_bike_related_purchases  1000 non-null   object
 4   DOB                                  983 non-null    object
 5   job_title                            894 non-null    object
 6   job_industry_category                835 non-null    object
 7   wealth_segment                       1000 non-null   object
 8   deceased_indicator                   1000 non-null   object
 9   owns_car                             1000 non-null   object
 10  tenure                               1000 non-null   object
 11  address                              1000 non-null   object
 12  postcode                             1000 non-null   object
 13  state                                1000 non-null   object
 14  country                              1000 non-null   object
 15  property_valuation                   1000 non-null   object
 16  Rank                                 1000 non-null   object
 17  Value                                1000 non-null   object
dtypes: object(18)
memory usage: 140.8+ KB
```

In [51]:
```
df4.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 1 to 1000
Data columns (total 18 columns):
 #   Column                               Non-Null Count  Dtype 
---  ------                               --------------  ----- 
 0   first_name                           1000 non-null   object
 1   last_name                            971 non-null    object
 2   gender                               1000 non-null   object
 3   past_3_years_bike_related_purchases  1000 non-null   object
 4   DOB                                  983 non-null    object
 5   job_title                            894 non-null    object
 6   job_industry_category                835 non-null    object
 7   wealth_segment                       1000 non-null   object
 8   deceased_indicator                   1000 non-null   object
 9   owns_car                             1000 non-null   object
 10  tenure                               1000 non-null   object
 11  address                              1000 non-null   object
 12  postcode                             1000 non-null   object
 13  state                                1000 non-null   object
 14  country                              1000 non-null   object
 15  property_valuation                   1000 non-null   object
 16  Rank                                 1000 non-null   object
 17  Value                                1000 non-null   object
dtypes: object(18)
memory usage: 140.8+ KB
```

In [52]:
```
df4.shape
```

Out[52]:
```
(1000, 18)
```

In [53]:
```
df4.isnull().sum()
```

Out[53]:
```
0
first_name                               0
last_name                               29
gender                                   0
past_3_years_bike_related_purchases      0
DOB                                     17
job_title                              106
job_industry_category                  165
wealth_segment                           0
deceased_indicator                       0
owns_car                                 0
tenure                                   0
address                                  0
postcode                                 0
state                                    0
country                                  0
property_valuation                       0
Rank                                     0
Value                                    0
dtype: int64
```

There are missing values in 4 columns, they needed to be treated accordingly

In [56]:
```
#check for duplicated rows
df4.duplicated().sum()
```

Out[56]:
```
0
```

In [58]:
```
#check for columnwise duplicated values
df4.nunique()
```

Out[58]:
```
0
first_name                             940
last_name                              961
gender                                   3
past_3_years_bike_related_purchases    100
DOB                                    961
job_title                              184
job_industry_category                    9
wealth_segment                           3
deceased_indicator                       1
owns_car                                 2
tenure                                  23
address                               1000
postcode                               522
state                                    3
country                                  1
property_valuation                      16
Rank                                   324
Value                                  324
dtype: int64
```

Exploring the columns

In [59]:
```
df4.columns
```

Out[59]:
```
Index(['first_name', 'last_name', 'gender',
       'past_3_years_bike_related_purchases', 'DOB', 'job_title',
       'job_industry_category', 'wealth_segment', 'deceased_indicator',
       'owns_car', 'tenure', 'address', 'postcode', 'state', 'country',
       'property_valuation', 'Rank', 'Value'],
      dtype='object', name=0)
```

In [60]:
```
df4['gender'].value_counts()
```

Out[60]:
```
gender
Female    513
Male      470
U          17
Name: count, dtype: int64
```

there are 17 values with gender U can be considered as unspecified

In [61]:
```
df4['DOB'].value_counts()
```

Out[61]:
```
DOB
1965-07-03    2
1978-01-15    2
1979-07-28    2
1995-08-13    2
1941-07-21    2
             ..
1978-05-27    1
1945-08-08    1
1943-08-27    1
1999-10-24    1
1955-10-02    1
Name: count, Length: 961, dtype: int64
```

In [62]:
```
df4['job_industry_category'].value_counts()
```

Out[62]:
```
job_industry_category
Financial Services    203
Manufacturing         199
Health                152
Retail                 78
Property               64
IT                     51
Entertainment          37
Argiculture            26
Telecommunications     25
Name: count, dtype: int64
```

In [63]:
```
df4['job_title'].value_counts()
```

Out[63]:
```
job_title
Associate Professor         15
Environmental Tech          14
Software Consultant         14
Chief Design Engineer       13
Assistant Manager           12
                            ..
Accountant II                1
Programmer IV                1
Administrative Officer       1
Accounting Assistant III     1
Web Developer I              1
Name: count, Length: 184, dtype: int64
```

In [64]:
```
df4['wealth_segment'].value_counts()
```

Out[64]:
```
wealth_segment
Mass Customer        508
High Net Worth       251
Affluent Customer    241
Name: count, dtype: int64
```

In [65]:
```
df4['state'].value_counts()
```

Out[65]:
```
state
NSW    506
VIC    266
QLD    228
Name: count, dtype: int64
```

In [66]:
```
df4['owns_car'].value_counts()
```

Out[66]:
```
owns_car
No     507
Yes    493
Name: count, dtype: int64
```

In [67]:
```
df4['deceased_indicator'].value_counts()
```

Out[67]:
```
deceased_indicator
N    1000
Name: count, dtype: int64
```