

```
In [1]: import pandas as pd
```

```
df=pd.read_csv('customer_shopping_behavior.csv')
```

```
In [2]: df.head()
```

```
Out[2]:
```

	Customer ID	Age	Gender	Item Purchased	Category	Purchase Amount (USD)	Location	Size	Color
0	1	55	Male	Blouse	Clothing	53	Kentucky	L	Gray
1	2	19	Male	Sweater	Clothing	64	Maine	L	Maroon
2	3	50	Male	Jeans	Clothing	73	Massachusetts	S	Maroon
3	4	21	Male	Sandals	Footwear	90	Rhode Island	M	Maroon
4	5	45	Male	Blouse	Clothing	49	Oregon	M	Turquoise



```
In [3]: df.shape
```

```
Out[3]: (3900, 18)
```

```
In [4]: df.info()
```

```

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3900 entries, 0 to 3899
Data columns (total 18 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   Customer ID                          3900 non-null   int64
1   Age                                  3900 non-null   int64
2   Gender                              3900 non-null   object
3   Item Purchased                       3900 non-null   object
4   Category                             3900 non-null   object
5   Purchase Amount (USD)                3900 non-null   int64
6   Location                             3900 non-null   object
7   Size                                 3900 non-null   object
8   Color                                3900 non-null   object
9   Season                               3900 non-null   object
10  Review Rating                        3863 non-null   float64
11  Subscription Status                  3900 non-null   object
12  Shipping Type                        3900 non-null   object
13  Discount Applied                     3900 non-null   object
14  Promo Code Used                      3900 non-null   object
15  Previous Purchases                   3900 non-null   int64
16  Payment Method                       3900 non-null   object
17  Frequency of Purchases                3900 non-null   object
dtypes: float64(1), int64(4), object(13)
memory usage: 548.6+ KB

```

In [5]: `df.describe(include='all')`

Out[5]:

	Customer ID	Age	Gender	Item Purchased	Category	Purchase Amount (USD)	Location	S
count	3900.000000	3900.000000	3900	3900	3900	3900.000000	3900	3900
unique	NaN	NaN	2	25	4	NaN	50	50
top	NaN	NaN	Male	Blouse	Clothing	NaN	Montana	Montana
freq	NaN	NaN	2652	171	1737	NaN	96	1737
mean	1950.500000	44.068462	NaN	NaN	NaN	59.764359	NaN	NaN
std	1125.977353	15.207589	NaN	NaN	NaN	23.685392	NaN	NaN
min	1.000000	18.000000	NaN	NaN	NaN	20.000000	NaN	NaN
25%	975.750000	31.000000	NaN	NaN	NaN	39.000000	NaN	NaN
50%	1950.500000	44.000000	NaN	NaN	NaN	60.000000	NaN	NaN
75%	2925.250000	57.000000	NaN	NaN	NaN	81.000000	NaN	NaN
max	3900.000000	70.000000	NaN	NaN	NaN	100.000000	NaN	NaN

In []:

```
In [6]: df.isnull().sum()
```

```
Out[6]: Customer ID      0
Age      0
Gender    0
Item Purchased  0
Category  0
Purchase Amount (USD)  0
Location  0
Size      0
Color     0
Season    0
Review Rating    37
Subscription Status  0
Shipping Type    0
Discount Applied  0
Promo Code Used  0
Previous Purchases  0
Payment Method   0
Frequency of Purchases  0
dtype: int64
```

```
In [8]: df['Review Rating']=df.groupby('Category')['Review Rating'].transform(lambda x: x.f
```

```
In [43]: df.isnull().sum()
```

```
Out[43]: customer_id      0
age      0
gender    0
item_purchased  0
category  0
purchase_amount_usd  0
location  0
size      0
color     0
season    0
review_rating    0
subscription_status  0
shipping_type    0
discount_applied  0
promo_code_used  0
previous_purchases  0
payment_method   0
frequency_of_purchases  0
dtype: int64
```

```
In [33]: df.columns = [''.join(col.split('_')) for col in df.columns]
```

```
In [34]: df.columns
```

```
Out[34]: Index(['customerid', 'age', 'gender', 'itempurchased', 'category',
               'purchaseamountusd', 'location', 'size', 'color', 'season',
               'reviewrating', 'subscriptionstatus', 'shippingtype', 'discountapplied',
               'promocodeused', 'previouspurchases', 'paymentmethod',
               'frequencyofpurchases'],
              dtype='object')
```

```
In [41]: df = df.rename(columns={
            'customerid': 'customer_id',
            'itempurchased': 'item_purchased',
            'purchaseamountusd': 'purchase_amount_usd',
            'reviewrating': 'review_rating',
            'subscriptionstatus': 'subscription_status',
            'shippingtype': 'shipping_type',
            'discountapplied': 'discount_applied',
            'promocodeused': 'promo_code_used',
            'previouspurchases': 'previous_purchases',
            'paymentmethod': 'payment_method',
            'frequencyofpurchases': 'frequency_of_purchases'
        })
```

```
In [42]: df.columns
```

```
Out[42]: Index(['customer_id', 'age', 'gender', 'item_purchased', 'category',
               'purchase_amount_usd', 'location', 'size', 'color', 'season',
               'review_rating', 'subscription_status', 'shipping_type',
               'discount_applied', 'promo_code_used', 'previous_purchases',
               'payment_method', 'frequency_of_purchases'],
              dtype='object')
```

```
In [44]: labels=['young Adult', 'Adult', 'Middle_aged', 'Senior']
         df['age_group']=pd.qcut(df['age'],q=4,labels=labels)
```

```
In [45]: df[['age', 'age_group']].head(10)
```

```
Out[45]:
```

	age	age_group
0	55	Middle_aged
1	19	young Adult
2	50	Middle_aged
3	21	young Adult
4	45	Middle_aged
5	46	Middle_aged
6	63	Senior
7	27	young Adult
8	26	young Adult
9	57	Middle_aged

```
In [46]: frequency_mapping = {  
        'Fortnightly': 14,  
        'Weekly': 7,  
        'Monthly': 30,  
        'Quarterly': 90,  
        'Bi-Weekly': 14,  
        'Annually': 365,  
        'Every 3 Months': 90  
        }  
  
df['purchase_frequency_days'] = df['frequency_of_purchases'].map(frequency_mapping)
```

```
In [47]: df[['purchase_frequency_days', 'frequency_of_purchases']].head(10)
```

```
Out[47]:
```

	purchase_frequency_days	frequency_of_purchases
0	14	Fortnightly
1	14	Fortnightly
2	7	Weekly
3	7	Weekly
4	365	Annually
5	7	Weekly
6	90	Quarterly
7	7	Weekly
8	365	Annually
9	90	Quarterly

```
In [48]: df[['discount_applied', 'promo_code_used']].head(10)
```

Out[48]:

	discount_applied	promo_code_used
0	Yes	Yes
1	Yes	Yes
2	Yes	Yes
3	Yes	Yes
4	Yes	Yes
5	Yes	Yes
6	Yes	Yes
7	Yes	Yes
8	Yes	Yes
9	Yes	Yes

In [49]: `(df['discount_applied'] == df['promo_code_used']).all()`

Out[49]: True

In [50]: `df = df.drop('promo_code_used', axis=1)`

In [51]: `df.columns`

Out[51]: Index(['customer_id', 'age', 'gender', 'item_purchased', 'category', 'purchase_amount_usd', 'location', 'size', 'color', 'season', 'review_rating', 'subscription_status', 'shipping_type', 'discount_applied', 'previous_purchases', 'payment_method', 'frequency_of_purchases', 'age_group', 'purchase_frequency_days'], dtype='object')

In [52]: `!pip install pymysql sqlalchemy`

Collecting pymysql

Downloading pymysql-1.1.2-py3-none-any.whl.metadata (4.3 kB)

Requirement already satisfied: sqlalchemy in c:\users\hp\anaconda3\lib\site-packages (2.0.34)

Requirement already satisfied: typing-extensions>=4.6.0 in c:\users\hp\anaconda3\lib\site-packages (from sqlalchemy) (4.11.0)

Requirement already satisfied: greenlet!=0.4.17 in c:\users\hp\anaconda3\lib\site-packages (from sqlalchemy) (3.0.1)

Downloading pymysql-1.1.2-py3-none-any.whl (45 kB)

Installing collected packages: pymysql

Successfully installed pymysql-1.1.2

In [55]: `from sqlalchemy import create_engine
import pandas as pd

MySQL connection details
username = "root"
password = "Sanjiv%402123" # @ replaced with %40`

```

host = "localhost"
port = "3306"
database = "customer_behavior"

engine = create_engine(
    f"mysql+pymysql://{username}:{password}@{host}:{port}/{database}"
)

# Write DataFrame to MySQL
df.to_sql("customer", engine, if_exists="replace", index=False)

# Read back sample
pd.read_sql("SELECT * FROM customer LIMIT 5;", engine)

```

Out[55]:

	customer_id	age	gender	item_purchased	category	purchase_amount_usd	location
0	1	55	Male	Blouse	Clothing	53	Kentucky
1	2	19	Male	Sweater	Clothing	64	Maine
2	3	50	Male	Jeans	Clothing	73	Massachusetts
3	4	21	Male	Sandals	Footwear	90	Rhode Island
4	5	45	Male	Blouse	Clothing	49	Oregon

In []: