```
In [ ]:
         #1
         import pandas as pd
         my_dataset = pd.read_csv('../csvs/dom_data_ecom.csv')
         my dataset
Out[]:
                                                                                          Transact
               State
                        City
                               Category Customer_Login_type Delivery_Type Quantity
                                                                                                Si
                        New
                                                                      one-day
               State
                        York Accessories
                                                       Member
                                                                                    NaN
                                                                        deliver
                        City
                         Los
                                                                      one-day
                              Accessories
                                                       Member
                                                                                    17.0
               State
                      Angles
                                                                        deliver
                                                                       Normal
                                                                                    23.0
               State Seattle Accessories
                                                       Member
                                                                       Delivery
                                                                       Normal
               State Seattle Accessories
                                                                                    23.0
                                                       Member
                                                                       Delivery
                                                                       Normal
               State Seattle Accessories
                                                       Member
                                                                                    23.0
                                                                       Delivery
                        New
                                                                      one-day
               New
           97
                        York
                                Clothing
                                                       Member
                                                                                    16.0
                                                                        deliver
                York
                        City
                        New
                                                                      one-day
                New
           98
                        York
                                Clothing
                                                       Member
                                                                                    15.0
                York
                                                                        deliver
                        City
                        New
                New
                                                                      one-day
           99
                                Clothing
                                                       Member
                                                                                    15.0
                        York
                York
                                                                        deliver
                        City
                        New
               New
                                                                      one-day
         100
                                                                                    15.0
                                Clothing
                        York
                                                       Member
                York
                                                                        deliver
                        City
                        New
                                                                      one-day
               New
         101
                                                                                    18.0
                        York
                                Clothing
                                                       Member
                York
                                                                        deliver
                        City
        102 rows × 12 columns
In [ ]: #2
         print(my_dataset.describe())
         print("Shape:", my_dataset.shape)
         print(my_dataset.info())
```

```
Quantity Transaction Start Transaction Result
count 101.000000
                              102.0
                                              102.000000
mean
       17.732673
                                 1.0
                                                0.774510
std
        3.255430
                                 0.0
                                                0.419968
min
       12.000000
                                 1.0
                                                0.000000
25%
       15.000000
                                 1.0
                                                1.000000
50%
       19.000000
                                 1.0
                                                1.000000
75%
       20.000000
                                 1.0
                                                1.000000
max
       23.000000
                                 1.0
                                                1.000000
Shape: (102, 12)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 102 entries, 0 to 101
Data columns (total 12 columns):
#
     Column
                          Non-Null Count Dtype
     ----
---
                           -----
                                           ----
0
     State
                                           object
                           102 non-null
1
    City
                           102 non-null
                                           object
2
     Category
                           102 non-null
                                           object
3
     Customer_Login_type
                          102 non-null
                                           object
4
     Delivery_Type
                           102 non-null
                                           object
5
                           101 non-null
                                           float64
    Quantity
    Transaction Start
                          102 non-null
                                           int64
7
    Transaction_Result
                          102 non-null
                                           int64
8
     Amount US$
                           102 non-null
                                           object
9
     Individual_Price_US$ 102 non-null
                                           object
10 Year_Month
                           102 non-null
                                           object
11 Time
                           102 non-null
                                           object
dtypes: float64(1), int64(2), object(9)
memory usage: 9.7+ KB
None
 my_dataset_delete = my_dataset.dropna()
```

```
In [ ]: #3
        my dataset delete
```

Transact Out[]: **State** City Category Customer_Login_type Delivery_Type Quantity Si Los one-day State Accessories Member 17.0 1 Angles deliver Normal State Seattle Accessories Member 23.0 Delivery Normal State Seattle Accessories Member 23.0 Delivery Normal State Seattle Accessories Member 23.0 Delivery Normal State Seattle Accessories 19.0 Member Delivery New one-day New 97 York Clothing Member 16.0 deliver York City New New one-day 98 Clothing Member 15.0 York deliver York City New one-day New 99 York Clothing Member 15.0 York deliver City New one-day New 100 York Clothing Member 15.0 York deliver City New one-day New 101 York Clothing Member 18.0 York deliver City 101 rows × 12 columns

my_dataset_replace = my_dataset.fillna(0)

print(my_dataset_replace)

```
State
                        City
                                  Category Customer_Login_type
0
        State New York City Accessories
                                                        Member
1
        State
                  Los Angles Accessories
                                                        Member
2
        State
                     Seattle Accessories
                                                        Member
3
        State
                     Seattle Accessories
                                                        Member
4
        State
                     Seattle Accessories
                                                        Member
97
     New York New York City
                                  Clothing
                                                        Member
98
     New York New York City
                                  Clothing
                                                        Member
99
     New York New York City
                                  Clothing
                                                        Member
100
                                  Clothing
                                                        Member
     New York New York City
101
     New York New York City
                                  Clothing
                                                        Member
       Delivery_Type Quantity Transaction Start Transaction_Result
0
     one-day deliver
                           0.0
                                                 1
1
     one-day deliver
                          17.0
                                                 1
                                                                      1
2
                                                 1
     Normal Delivery
                          23.0
                                                                      0
3
                                                                      0
     Normal Delivery
                          23.0
                                                 1
4
     Normal Delivery
                                                 1
                                                                      1
                          23.0
. .
                           . . .
                                                . . .
                                                                    . . .
97
     one-day deliver
                          16.0
                                                 1
                                                                      1
98
     one-day deliver
                          15.0
                                                 1
                                                                      1
99
     one-day deliver
                          15.0
                                                 1
                                                                      1
                                                 1
                                                                      1
100
    one-day deliver
                          15.0
101
     one-day deliver
                          18.0
                                                 1
                                                                      1
    Amount US$ Individual Price US$ Year Month
                                                     Time
0
         6,910
                                 576
                                         13-Nov
                                                 22:35:51
1
         1,699
                                 100
                                         13-Nov
                                                  6:44:41
2
         4,998
                                 217
                                         13-0ct
                                                  0:41:24
           736
3
                                  32
                                         13-Oct 22:04:03
4
         4,389
                                 191
                                         13-Oct 15:00:46
           . . .
                                 . . .
                                            . . .
                                 432
97
         6,915
                                         13-0ct
                                                  7:04:38
98
         4,845
                                 323
                                         13-0ct
                                                  9:34:20
99
         1,898
                                         13-0ct 13:45:21
                                 127
100
           799
                                  53
                                         13-0ct 10:44:01
101
        16,563
                                 920
                                         13-0ct 16:57:02
[102 rows x 12 columns]
```

```
In [ ]: my_dataset_fill_forward = my_dataset.ffill()
    print(my_dataset_fill_forward)
```

```
State
                        City
                                  Category Customer_Login_type
0
        State New York City Accessories
                                                         Member
1
        State
                  Los Angles Accessories
                                                         Member
2
        State
                     Seattle Accessories
                                                         Member
3
        State
                     Seattle Accessories
                                                         Member
4
        State
                     Seattle Accessories
                                                         Member
97
     New York New York City
                                  Clothing
                                                         Member
98
     New York New York City
                                  Clothing
                                                         Member
99
     New York New York City
                                  Clothing
                                                         Member
100
                                  Clothing
                                                         Member
     New York New York City
101
     New York New York City
                                  Clothing
                                                         Member
       Delivery_Type Quantity Transaction Start Transaction_Result
0
     one-day deliver
                           NaN
                                                 1
1
     one-day deliver
                           17.0
                                                 1
                                                                      1
2
     Normal Delivery
                           23.0
                                                 1
                                                                      0
3
                                                                      0
     Normal Delivery
                           23.0
                                                 1
4
     Normal Delivery
                                                                      1
                           23.0
                                                 1
. .
                           . . .
                                                . . .
                                                                     . . .
97
     one-day deliver
                          16.0
                                                 1
                                                                      1
98
     one-day deliver
                           15.0
                                                 1
                                                                      1
99
     one-day deliver
                           15.0
                                                 1
                                                                      1
                                                 1
                                                                      1
100
     one-day deliver
                           15.0
101
     one-day deliver
                           18.0
                                                 1
                                                                      1
    Amount US$ Individual Price US$ Year Month
                                                      Time
0
         6,910
                                 576
                                         13-Nov
                                                 22:35:51
1
         1,699
                                 100
                                         13-Nov
                                                  6:44:41
2
         4,998
                                 217
                                         13-0ct
                                                  0:41:24
           736
3
                                  32
                                         13-Oct 22:04:03
4
         4,389
                                 191
                                         13-Oct 15:00:46
           . . .
                                 . . .
                                            . . .
                                 432
97
         6,915
                                         13-0ct
                                                  7:04:38
98
         4,845
                                 323
                                         13-0ct
                                                  9:34:20
99
         1,898
                                         13-Oct 13:45:21
                                 127
100
           799
                                  53
                                         13-Oct 10:44:01
101
        16,563
                                 920
                                         13-0ct 16:57:02
```

[102 rows x 12 columns]

```
In [ ]: my_dataset_fill_backward = my_dataset.bfill()
    print(my_dataset_fill_backward)
```

```
State
                               City
                                        Category Customer_Login_type
       0
               State New York City Accessories
                                                               Member
       1
               State Los Angles Accessories
                                                               Member
       2
               State
                            Seattle Accessories
                                                               Member
       3
               State
                            Seattle Accessories
                                                               Member
       4
               State
                            Seattle Accessories
                                                               Member
       97
            New York New York City
                                        Clothing
                                                               Member
                                        Clothing
       98
            New York New York City
                                                               Member
       99
            New York New York City
                                        Clothing
                                                               Member
       100
            New York New York City
                                        Clothing
                                                               Member
       101
            New York New York City
                                        Clothing
                                                               Member
              Delivery_Type Quantity Transaction Start Transaction_Result
       0
            one-day deliver
                                 17.0
                                                        1
       1
            one-day deliver
                                 17.0
                                                        1
                                                                            1
       2
            Normal Delivery
                                 23.0
                                                        1
                                                                            0
                                                                            0
       3
                                                        1
            Normal Delivery
                                 23.0
       4
                                                                            1
            Normal Delivery
                                 23.0
                                                        1
       . .
                                  . . .
                                                      . . .
                                                                           . . .
       97
            one-day deliver
                                 16.0
                                                        1
                                                                            1
       98
            one-day deliver
                                 15.0
                                                        1
                                                                            1
       99
            one-day deliver
                                                        1
                                                                            1
                                 15.0
       100 one-day deliver
                                 15.0
                                                        1
                                                                            1
           one-day deliver
                                                        1
                                                                            1
       101
                                 18.0
           Amount US$ Individual Price US$ Year Month
                                                            Time
       0
                6,910
                                                13-Nov
                                        576
                                                        22:35:51
       1
                1,699
                                       100
                                                13-Nov
                                                        6:44:41
       2
                4,998
                                       217
                                               13-0ct
                                                         0:41:24
       3
                  736
                                        32
                                                13-0ct 22:04:03
       4
                4,389
                                       191
                                                13-Oct 15:00:46
                  . . .
                                       . . .
                                                  . . .
       97
                6,915
                                       432
                                                13-0ct
                                                         7:04:38
       98
                4,845
                                       323
                                                13-0ct
                                                        9:34:20
       99
                1,898
                                       127
                                                13-0ct 13:45:21
                  799
       100
                                        53
                                                13-Oct 10:44:01
       101
               16,563
                                       920
                                                13-0ct 16:57:02
       [102 rows x 12 columns]
In [ ]: #4
        state_groups = my_dataset.groupby('State')['Quantity'].mean()
        print(state_groups)
       State
       New York
                     17.259259
       State
                     19.400000
                     17.575758
       Washington
       Name: Quantity, dtype: float64
In [ ]: #5
        random_samples = my_dataset.sample(n=20)
        hierarchical_df = random_samples.set_index(['State', 'City'])
        print(hierarchical_df)
```

			Categor	y Customer_Login	_type	Delive	ry_Type	\
State	City							
Washington			Accessorie		lember	one-day o		
New York	New York	City	Clothin	g M	lember	one-day o		
Washington	Seattle		Accessorie	s M	lember	one-day o	deliver	
New York	New York	City	Clothin	g M	lember	one-day o		
	New York	City	Clothin	g M	lember	one-day o	deliver	
	New York	City	Clothin	g M	lember	Normal De	elivery	
	New York	City	Clothin	g M	lember	one-day o	deliver	
Washington	Seattle		Accessorie	s M	lember	one-day o	deliver	
New York	New York	City	Clothin	g M	lember	one-day o	deliver	
	New York	City	Clothin	g M	lember	one-day o	deliver	
	New York	City	Clothin	g M	lember	one-day o	deliver	
	New York	City	Clothin	g M	lember	one-day o	deliver	
	New York	-	Clothin	_	lember	one-day o		
State	Seattle		Accessorie	_	lember	Normal De		
	Seattle		Accessorie	s M	lember	one-day o	-	
Washington			Accessorie		lember	Normal De		
	Seattle		Accessorie		lember	Normal De	-	
	Seattle		Accessorie		lember	one-day	-	
New York	New York	Citv	Clothin		lember	one-day		
Washington		СТСУ	Accessorie	_	lember	one-day o		
Washington	Jeacere		Accessor ic		icilibei	one day e	ACTIVC!	
			Ouantity	Transaction Star	rt Tra	ansaction F	Result	\
State	City		,			_		
Washington	-		20.0		1		0	
New York	New York	City	15.0		1		1	
Washington		,	12.0		1		0	
New York	New York	Citv	13.0		1		1	
	New York	-	22.0		1		1	
	New York	-	15.0		1		1	
	New York	-	21.0		1		1	
Washington			20.0		1		1	
New York	New York	City	21.0		1		1	
New York	New York	-	15.0		1		1	
	New York	-	16.0		1		0	
	New York	-	20.0		1		1	
	New York	-	13.0		1		1	
State	Seattle	СТСУ	23.0		1		0	
State	Seattle		20.0		1		1	
Washington			15.0		1		1	
Washington	Seattle		13.0		1		1	
	Seattle				1		1	
New York		Ci+v	14.0 16.0		1		1	
	New York	CITY	20.0		1		0	
Washington	Seattle		20.0		T		0	
			Amount US\$	Individual_Price	. US\$ \	/ear Month	Ti	me
State	City				+			
Washington	-		1,563		78	13-Nov	5:19:	56
New York	New York	City	1,898		127	13-0ct	13:45:	
Washington			2,000		167	13-Nov	10:19:	
New York	New York	City	300		23	13-0ct	23:39:	
HEW TOTK	New York	-	800		36	13-0ct	20:01:	
	New York	-	6,900		460	13-0ct	10:29:	
	New York	-	7,395		352	13-0ct	13:32:	
Washington		стсу	7,393 25,635	1	.,282	13-0cc	9:17:	
New York		City	23,633	1	110	13-Nov	1:43:	
NEW TOTK	New York New York	-	2,300 5,391		359	13-0ct 13-0ct	5:12:	
		-						
	New York	-	699 594		44 20	13-0ct	18:21:	
	New York	CTCA	584		29	13-0ct	6:05:	Τ2

	New York City	3,086	237	13-0ct	18:51:36
State	Seattle	736	32	13-0ct	22:04:03
	Seattle	0	0	13-0ct	13:48:08
Washing	ton Seattle	3,003	200	13-Nov	11:05:12
	Seattle	1,270	98	13-Nov	3:24:54
	Seattle	2,879	206	13-Nov	17:43:51
New Yor	k New York City	1,999	125	13-0ct	3:50:06
Washing	ton Seattle	7.926	396	13-Nov	17:03:30