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```
import numpy as np
import pandas as pd
```

```
all_data=pd.read_csv("all_data.csv")
```

```
all_data.head()
```

	Order ID	Product	Quantity Ordered	Price Each	\
0	176558	USB-C Charging Cable	2	11.95	
1	NaN	NaN	NaN	NaN	
2	176559	Bose SoundSport Headphones	1	99.99	
3	176560	Google Phone	1	600	
4	176560	Wired Headphones	1	11.99	

	Order Date	Purchase Address
0	04/19/19 8:46	917 1st St, Dallas, TX 75001
1	NaN	NaN
2	04/07/19 22:30	682 Chestnut St, Boston, MA 02215
3	04/12/19 14:38	669 Spruce St, Los Angeles, CA 90001
4	04/12/19 14:38	669 Spruce St, Los Angeles, CA 90001

```
nan_df = all_data[all_data.isna().any(axis=1)]
display(nan_df.head())
```

```
all_data = all_data.dropna(how='all')
all_data.head()
```

	Order ID	Product	Quantity Ordered	Price Each	Order Date	Purchase Address
1	NaN	NaN	NaN	NaN	NaN	NaN
356	NaN	NaN	NaN	NaN	NaN	NaN
735	NaN	NaN	NaN	NaN	NaN	NaN
1433	NaN	NaN	NaN	NaN	NaN	NaN
1553	NaN	NaN	NaN	NaN	NaN	NaN

	Order ID	Product	Quantity Ordered	Price Each	\
0	176558	USB-C Charging Cable	2	11.95	
2	176559	Bose SoundSport Headphones	1	99.99	
3	176560	Google Phone	1	600	
4	176560	Wired Headphones	1	11.99	
5	176561	Wired Headphones	1	11.99	

	Order Date	Purchase Address
0	04/19/19 8:46	917 1st St, Dallas, TX 75001

```

2 04/07/19 22:30      682 Chestnut St, Boston, MA 02215
3 04/12/19 14:38    669 Spruce St, Los Angeles, CA 90001
4 04/12/19 14:38    669 Spruce St, Los Angeles, CA 90001
5 04/30/19 9:27      333 8th St, Los Angeles, CA 90001

```

```
all_data = all_data[all_data['Order Date'].str[0:2]!='0r']
```

```
all_data['Quantity Ordered'] = pd.to_numeric(all_data['Quantity
Ordered'])
```

```
all_data['Price Each'] = pd.to_numeric(all_data['Price Each'])
```

```
all_data['Month'] = all_data['Order Date'].str[0:2]
```

```
all_data['Month'] = all_data['Month'].astype('int32')
```

```
all_data.head()
```

	Order ID	Product	Quantity Ordered	Price
0	176558	USB-C Charging Cable	2	11.95
2	176559	Bose SoundSport Headphones	1	99.99
3	176560	Google Phone	1	600.00
4	176560	Wired Headphones	1	11.99
5	176561	Wired Headphones	1	11.99

	Order Date	Purchase Address	Month
0	04/19/19 8:46	917 1st St, Dallas, TX 75001	4
2	04/07/19 22:30	682 Chestnut St, Boston, MA 02215	4
3	04/12/19 14:38	669 Spruce St, Los Angeles, CA 90001	4
4	04/12/19 14:38	669 Spruce St, Los Angeles, CA 90001	4
5	04/30/19 9:27	333 8th St, Los Angeles, CA 90001	4

```
all_data['Month 2'] = pd.to_datetime(all_data['Order Date']).dt.month
```

```
all_data.head()
```

	Order ID	Product	Quantity Ordered	Price
0	176558	USB-C Charging Cable	2	11.95
2	176559	Bose SoundSport Headphones	1	99.99
3	176560	Google Phone	1	600.00
4	176560	Wired Headphones	1	11.99
5	176561	Wired Headphones	1	11.99

```

2      Order Date      Purchase Address  Month  Month
0  04/19/19 8:46      917 1st St, Dallas, TX 75001      4
4
2  04/07/19 22:30      682 Chestnut St, Boston, MA 02215      4
4
3  04/12/19 14:38  669 Spruce St, Los Angeles, CA 90001      4
4
4  04/12/19 14:38  669 Spruce St, Los Angeles, CA 90001      4
4
5  04/30/19 9:27      333 8th St, Los Angeles, CA 90001      4
4

```

```

def get_city(address):
    return address.split(",")[1].strip(" ")

```

```

def get_state(address):
    return address.split(",")[2].split(" ")[1]

```

```

all_data['City'] = all_data['Purchase Address'].apply(lambda x:
f"{get_city(x)} ({get_state(x)})")
all_data.head()

```

```

Order ID      Product  Quantity Ordered  Price
Each \
0  176558      USB-C Charging Cable      2      11.95
2  176559  Bose SoundSport Headphones      1      99.99
3  176560      Google Phone      1      600.00
4  176560      Wired Headphones      1      11.99
5  176561      Wired Headphones      1      11.99

```

```

2      Order Date      Purchase Address  Month  Month
0  \
0  04/19/19 8:46      917 1st St, Dallas, TX 75001      4
4
2  04/07/19 22:30      682 Chestnut St, Boston, MA 02215      4
4
3  04/12/19 14:38  669 Spruce St, Los Angeles, CA 90001      4
4
4  04/12/19 14:38  669 Spruce St, Los Angeles, CA 90001      4
4
5  04/30/19 9:27      333 8th St, Los Angeles, CA 90001      4
4

```

```

0      Dallas  (TX)
2      Boston  (MA)
3  Los Angeles  (CA)
4  Los Angeles  (CA)
5  Los Angeles  (CA)

```

```

all_data['Sales'] = all_data['Quantity Ordered'].astype('int') *
all_data['Price Each'].astype('float')

```

```

all_data.groupby(['Month']).sum()

```

	Quantity Ordered	Price Each	Month 2	Sales
Month				
4	17739	2899439.68	63088	2918954.40
5	26	8851.62	125	8855.46

```

city_max=all_data.groupby(['City']).sum()
print(max(city_max))

```

Sales

```

df = all_data[all_data['Order ID'].duplicated(keep=False)]

```

```

df['Grouped'] = df.groupby('Order ID')['Product'].transform(lambda x:
', '.join(x))
df2 = df[['Order ID', 'Grouped']].drop_duplicates()
print(df['Grouped'])

```

```

3      Google Phone,Wired Headphones
4      Google Phone,Wired Headphones
18     Google Phone,USB-C Charging Cable
19     Google Phone,USB-C Charging Cable
30  Bose SoundSport Headphones,Bose SoundSport Hea...

```

```

15787     USB-C Charging Cable,Wired Headphones
15818  Vareebadd Phone,Lightning Charging Cable
15819  Vareebadd Phone,Lightning Charging Cable
15874     Google Phone,Bose SoundSport Headphones
15875     Google Phone,Bose SoundSport Headphones
Name: Grouped, Length: 1269, dtype: object

```

<ipython-input-14-4e8d2e73a67f>:4: SettingWithCopyWarning:
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/stable/user_guide/indexing.html#returning-a-view-versus-a-copy

```

df['Grouped'] = df.groupby('Order ID')['Product'].transform(lambda
x: ', '.join(x))

```

```

from itertools import combinations
from collections import Counter

count = Counter()

for row in df2['Grouped']:
    row_list = row.split(',')
    count.update(Counter(combinations(row_list, 2)))

for key,value in count.most_common(10):
    print(key, value)

('iPhone', 'Lightning Charging Cable') 94
('Google Phone', 'USB-C Charging Cable') 92
('Google Phone', 'Wired Headphones') 34
('iPhone', 'Wired Headphones') 33
('Vareebadd Phone', 'USB-C Charging Cable') 32
('iPhone', 'Apple Airpods Headphones') 29
('Google Phone', 'Bose SoundSport Headphones') 20
('Vareebadd Phone', 'Wired Headphones') 15
('USB-C Charging Cable', 'Wired Headphones') 11
('AA Batteries (4-pack)', 'Apple Airpods Headphones') 7

product_group = all_data.groupby('Product')
quantity_ordered = product_group.sum()['Quantity Ordered']

print(quantity_ordered)

Product
20in Monitor                345
27in 4K Gaming Monitor      491
27in FHD Monitor            633
34in Ultrawide Monitor      563
AA Batteries (4-pack)      2446
AAA Batteries (4-pack)     2559
Apple Airpods Headphones    1303
Bose SoundSport Headphones  1110
Flatscreen TV               398
Google Phone                497
LG Dryer                    69
LG Washing Machine          56
Lightning Charging Cable    2027
Macbook Pro Laptop          400
ThinkPad Laptop             329
USB-C Charging Cable        1938
Vareebadd Phone             185
Wired Headphones            1823
iPhone                      593
Name: Quantity Ordered, dtype: int64

prices = all_data.groupby('Product').mean()['Price Each']

```

```
print(prices)
```

Product	
20in Monitor	109.99
27in 4K Gaming Monitor	389.99
27in FHD Monitor	149.99
34in Ultrawide Monitor	379.99
AA Batteries (4-pack)	3.84
AAA Batteries (4-pack)	2.99
Apple AirPods Headphones	150.00
Bose SoundSport Headphones	99.99
Flatscreen TV	300.00
Google Phone	600.00
LG Dryer	600.00
LG Washing Machine	600.00
Lightning Charging Cable	14.95
Macbook Pro Laptop	1700.00
ThinkPad Laptop	999.99
USB-C Charging Cable	11.95
Vareebadd Phone	400.00
Wired Headphones	11.99
iPhone	700.00

Name: Price Each, dtype: float64