1.Write a Pandas program to select distinct department id from employees file.

```
+---------------+----------------------+------------+-------------+
| DEPARTMENT_ID | DEPARTMENT_NAME      | MANAGER_ID | LOCATION_ID |
+---------------+----------------------+------------+-------------+
|            10 | Administration       |        200 |        1700 |
|            20 | Marketing            |        201 |        1800 |
|            30 | Purchasing           |        114 |        1700 |
|            40 | Human Resources      |        203 |        2400 |
|            50 | Shipping             |        121 |        1500 |
|            60 | IT                   |        103 |        1400 |
|            70 | Public Relations     |        204 |        2700 |
|            80 | Sales                |        145 |        2500 |
|            90 | Executive            |        100 |        1700 |
|           100 | Finance              |        108 |        1700 |
|           110 | Accounting           |        205 |        1700 |
|           120 | Treasury             |          0 |        1700 |
|           130 | Corporate Tax        |          0 |        1700 |
|           140 | Control And Credit   |          0 |        1700 |
|           150 | Shareholder Services |          0 |        1700 |
|           160 | Benefits             |          0 |        1700 |
|           170 | Manufacturing        |          0 |        1700 |
|           180 | Construction         |          0 |        1700 |
|           190 | Contracting          |          0 |        1700 |
|           200 | Operations           |          0 |        1700 |
|           210 | IT Support           |          0 |        1700 |
|           220 | NOC                  |          0 |        1700 |
|           230 | IT Helpdesk          |          0 |        1700 |
|           240 | Government Sales     |          0 |        1700 |
|           250 | Retail Sales         |          0 |        1700 |
|           260 | Recruiting           |          0 |        1700 |
|           270 | Payroll              |          0 |        1700 |
+---------------+----------------------+------------+------------
```

INPUT:

```
import pandas as pd
# Creating a DataFrame with the provided data
data = {
    'DEPARTMENT_ID': [10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200,
210, 220, 230, 240, 250, 260, 270],
    'DEPARTMENT_NAME': ['Administration', 'Marketing', 'Purchasing', 'Human Resources', 'Shipping', 'IT',
'Public Relations', 'Sales', 'Executive', 'Finance', 'Accounting', 'Treasury', 'Corporate Tax', 'Control And Credit',
'Shareholder Services', 'Benefits', 'Manufacturing', 'Construction', 'Contracting', 'Operations', 'IT Support',
'NOC', 'IT Helpdesk', 'Government Sales', 'Retail Sales', 'Recruiting', 'Payroll'],
    'MANAGER_ID': [200, 201, 114, 203, 121, 103, 204, 145, 100, 108, 205, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0],
    'LOCATION_ID': [1700, 1800, 1700, 2400, 1500, 1400, 2700, 2500, 1700, 1700, 1700, 1700, 1700, 1700, 1700,
1700, 1700, 1700, 1700, 1700, 1700, 1700, 1700, 1700, 1700, 1700, 1700]
}
employees_df = pd.DataFrame(data)
print(employees_df)
# Select distinct department IDs
distinct_department_ids = employees_df['DEPARTMENT_ID'].unique()
# Print the distinct department IDs
print(distinct_department_ids)
```

OUTPUT:

```
   DEPARTMENT_ID        DEPARTMENT_NAME  MANAGER_ID  LOCATION_ID
0             10         Administration         200         1700
1             20              Marketing         201         1800
2             30             Purchasing         114         1700
3             40        Human Resources         203         2400
4             50               Shipping         121         1500
5             60                     IT         103         1400
6             70       Public Relations         204         2700
7             80                  Sales         145         2500
8             90              Executive         100         1700
9            100                Finance         108         1700
10           110             Accounting         205         1700
11           120               Treasury           0         1700
12           130          Corporate Tax           0         1700
13           140     Control And Credit           0         1700
14           150   Shareholder Services           0         1700
15           160               Benefits           0         1700
16           170          Manufacturing           0         1700
17           180           Construction           0         1700
18           190            Contracting           0         1700
19           200             Operations           0         1700
20           210             IT Support           0         1700
21           220                    NOC           0         1700
22           230            IT Helpdesk           0         1700
23           240      Government Sales           0         1700
24           250           Retail Sales           0         1700
25           260             Recruiting           0         1700
26           270                Payroll           0         1700
[ 10  20  30  40  50  60  70  80  90 100 110 120 130 140 150 160 170 180
 190 200 210 220 230 240 250 260 270]
```

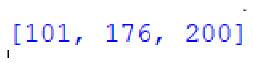
2.Write a Pandas program to display the ID for those employees who did two or more jobs in the past.

```
+-------------+------------+------------+------------+---------------+
| EMPLOYEE_ID | START_DATE | END_DATE   | JOB_ID     | DEPARTMENT_ID |
+-------------+------------+------------+------------+---------------+
|         102 | 2001-01-13 | 2006-07-24 | IT_PROG    |            60 |
|         101 | 1997-09-21 | 2001-10-27 | AC_ACCOUNT |           110 |
|         101 | 2001-10-28 | 2005-03-15 | AC_MGR     |           110 |
|         201 | 2004-02-17 | 2007-12-19 | MK_REP     |            20 |
|         114 | 2006-03-24 | 2007-12-31 | ST_CLERK   |            50 |
|         122 | 2007-01-01 | 2007-12-31 | ST_CLERK   |            50 |
|         200 | 1995-09-17 | 2001-06-17 | AD_ASST    |            90 |
|         176 | 2006-03-24 | 2006-12-31 | SA_REP     |            80 |
|         176 | 2007-01-01 | 2007-12-31 | SA_MAN     |            80 |
|         200 | 2002-07-01 | 2006-12-31 | AC_ACCOUNT |            90 |
+-------------+------------+------------+------------+---------------+
```

INPUT:

```
import pandas as pd
# Create a DataFrame with the provided data
data = {
   'EMPLOYEE_ID': [102, 101, 101, 201, 114, 122, 200, 176, 176, 200],
   'START_DATE': ['2001-01-13', '1997-09-21', '2001-10-28', '2004-02-17', '2006-03-24', '2007-01-01', '1995-09-
17', '2006-03-24', '2007-01-01', '2002-07-01'],
    'END_DATE': ['2006-07-24', '2001-10-27', '2005-03-15', '2007-12-19', '2007-12-31', '2007-12-31', '2001-06-17', '2006-12-31', '2007-12-31', '2006-12-31'],
    'JOB_ID': ['IT_PROG', 'AC_ACCOUNT', 'AC_MGR', 'MK_REP', 'ST_CLERK', 'ST_CLERK', 'AD_ASST', 'SA_REP', 'SA_MAN', 'AC_ACCOUNT'],
    'DEPARTMENT_ID': [60, 110, 110, 20, 50, 50, 90, 80, 80, 90]
}
df = pd.DataFrame(data)
# Convert START_DATE and END_DATE to datetime format
df['START_DATE'] = pd.to_datetime(df['START_DATE'])
df['END_DATE'] = pd.to_datetime(df['END_DATE'])
# Group by EMPLOYEE_ID and count the number of unique JOB_IDs
employee_jobs_count = df.groupby('EMPLOYEE_ID')['JOB_ID'].nunique()
# Filter employees who have worked two or more jobs
employees_with_multiple_jobs = employee_jobs_count[employee_jobs_count >= 2]
# Display the EMPLOYEE_IDs
print(employees_with_multiple_jobs.index.tolist())
```

OUTPUT:



```
[101, 176, 200]
```

3.Write a Pandas program to display the details of jobs in descending sequence on job title.

```
+------------+---------------------------------+------------+------------+
| JOB_ID     | JOB_TITLE                       | MIN_SALARY | MAX_SALARY |
+------------+---------------------------------+------------+------------+
| AD_PRES    | President                       |      20080 |      40000 |
| AD_VP      | Administration Vice President   |      15000 |      30000 |
| AD_ASST    | Administration Assistant        |       3000 |       6000 |
| FI_MGR     | Finance Manager                 |       8200 |      16000 |
| FI_ACCOUNT | Accountant                      |       4200 |       9000 |
| AC_MGR     | Accounting Manager              |       8200 |      16000 |
| AC_ACCOUNT | Public Accountant               |       4200 |       9000 |
| SA_MAN     | Sales Manager                   |      10000 |      20080 |
| SA_REP     | Sales Representative            |       6000 |      12008 |
| PU_MAN     | Purchasing Manager              |       8000 |      15000 |
| PU_CLERK   | Purchasing Clerk                |       2500 |       5500 |
| ST_MAN     | Stock Manager                   |       5500 |       8500 |
| ST_CLERK   | Stock Clerk                     |       2008 |       5000 |
| SH_CLERK   | Shipping Clerk                  |       2500 |       5500 |
| IT_PROG    | Programmer                      |       4000 |      10000 |
| MK_MAN     | Marketing Manager               |       9000 |      15000 |
| MK_REP     | Marketing Representative        |       4000 |       9000 |
| HR_REP     | Human Resources Representative  |       4000 |       9000 |
| PR_REP     | Public Relations Representative |       4500 |      10500 |
+------------+---------------------------------+------------+------------+
```

INPUT:

```
import pandas as pd
# Define the data
data = {
    'JOB_ID': ['AD_PRES', 'AD_VP', 'AD_ASST', 'FI_MGR', 'FI_ACCOUNT', 'AC_MGR', 'AC_ACCOUNT', 'SA_MAN', 'SA_REP', 'PU_MAN', 'PU_CLERK', 'ST_MAN', 'ST_CLERK', 'SH_CLERK', 'IT_PROG', 'MK_MAN', 'MK_REP', 'HR_REP', 'PR_REP'],
    'JOB_TITLE': ['President', 'Administration Vice President', 'Administration Assistant', 'Finance Manager', 'Accountant', 'Accounting Manager', 'Public Accountant', 'Sales Manager', 'Sales Representative', 'Purchasing Manager', 'Purchasing Clerk', 'Stock Manager', 'Stock Clerk', 'Shipping Clerk', 'Programmer', 'Marketing Manager', 'Marketing Representative', 'Human Resources Representative', 'Public Relations Representative'],
  'MIN_SALARY': [20080, 15000, 3000, 8200, 4200, 8200, 4200, 10000, 6000, 8000, 2500, 5500, 2008, 2500,
4000, 9000, 4000, 4000, 4500],
  'MAX_SALARY': [40000, 30000, 6000, 16000, 9000, 16000, 9000, 20080, 12008, 15000, 5500, 8500, 5000,
5500, 10000, 15000, 9000, 9000, 10500]
}
df = pd.DataFrame(data)
print("original_data")
print(df)
# Sort the DataFrame by 'JOB_TITLE' in descending order
df_sorted = df.sort_values(by='JOB_TITLE', ascending=False)
print("sorted_data")
# Print the sorted DataFrame
print(df_sorted)
```

OUTPUT:

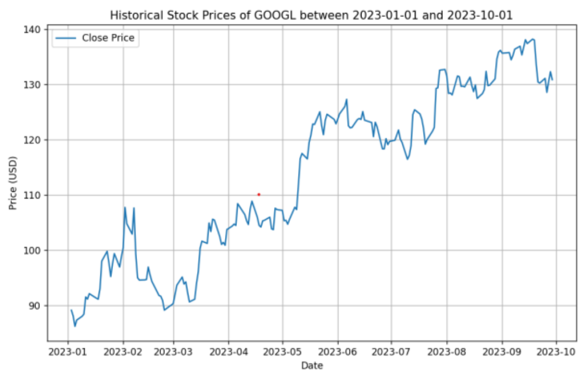
```
original_data
        JOB_ID                        JOB_TITLE  MIN_SALARY  MAX_SALARY
0      AD_PRES                        President       20080       40000
1        AD_VP    Administration Vice President       15000       30000
2      AD_ASST         Administration Assistant        3000        6000
3       FI_MGR                  Finance Manager        8200       16000
4   FI_ACCOUNT                       Accountant        4200        9000
5       AC_MGR               Accounting Manager        8200       16000
6   AC_ACCOUNT                Public Accountant        4200        9000
7       SA_MAN                    Sales Manager       10000       20080
8       SA_REP             Sales Representative        6000       12008
9       PU_MAN               Purchasing Manager        8000       15000
10    PU_CLERK                 Purchasing Clerk        2500        5500
11      ST_MAN                    Stock Manager        5500        8500
12    ST_CLERK                      Stock Clerk        2008        5000
13    SH_CLERK                   Shipping Clerk        2500        5500
14     IT_PROG                       Programmer        4000       10000
15      MK_MAN                Marketing Manager        9000       15000
16      MK_REP         Marketing Representative        4000        9000
17      HR_REP   Human Resources Representative        4000        9000
18      PR_REP  Public Relations Representative        4500       10500
sorted_data
        JOB_ID                        JOB_TITLE  MIN_SALARY  MAX_SALARY
11      ST_MAN                    Stock Manager        5500        8500
12    ST_CLERK                      Stock Clerk        2008        5000
13    SH_CLERK                   Shipping Clerk        2500        5500
8       SA_REP             Sales Representative        6000       12008
7       SA_MAN                    Sales Manager       10000       20080
9       PU_MAN               Purchasing Manager        8000       15000
10    PU_CLERK                 Purchasing Clerk        2500        5500
18      PR_REP  Public Relations Representative        4500       10500
6   AC_ACCOUNT                Public Accountant        4200        9000
14     IT_PROG                       Programmer        4000       10000
0      AD_PRES                        President       20080       40000
16      MK_REP         Marketing Representative        4000        9000
15      MK_MAN                Marketing Manager        9000       15000
17      HR_REP   Human Resources Representative        4000        9000
3       FI_MGR                  Finance Manager        8200       16000
1        AD_VP    Administration Vice President       15000       30000
2      AD_ASST         Administration Assistant        3000        6000
5       AC_MGR               Accounting Manager        8200       16000
4   FI_ACCOUNT                       Accountant        4200        9000
```

4.Write a Pandas program to create a line plot of the historical stock prices of Alphabet Inc. between two specific dates.

INPUT:

```
import yfinance as yf

import pandas as pd

import matplotlib.pyplot as plt

# Define the ticker symbol for Alphabet Inc. (GOOGL)

ticker = 'GOOGL'

# Define the start and end dates

start_date = '2023-01-01'

end_date = '2023-10-01'

# Fetch historical data from Yahoo Finance

data = yf.download(ticker, start=start_date, end=end_date)

# Create a line plot

plt.figure(figsize=(10, 6))

plt.plot(data['Close'], label='Close Price')

plt.title(f'Historical Stock Prices of {ticker} between {start_date} and {end_date}')

plt.xlabel('Date')

plt.ylabel('Price (USD)')

plt.legend()

plt.grid(True)

plt.show()
```

OUTPUT:

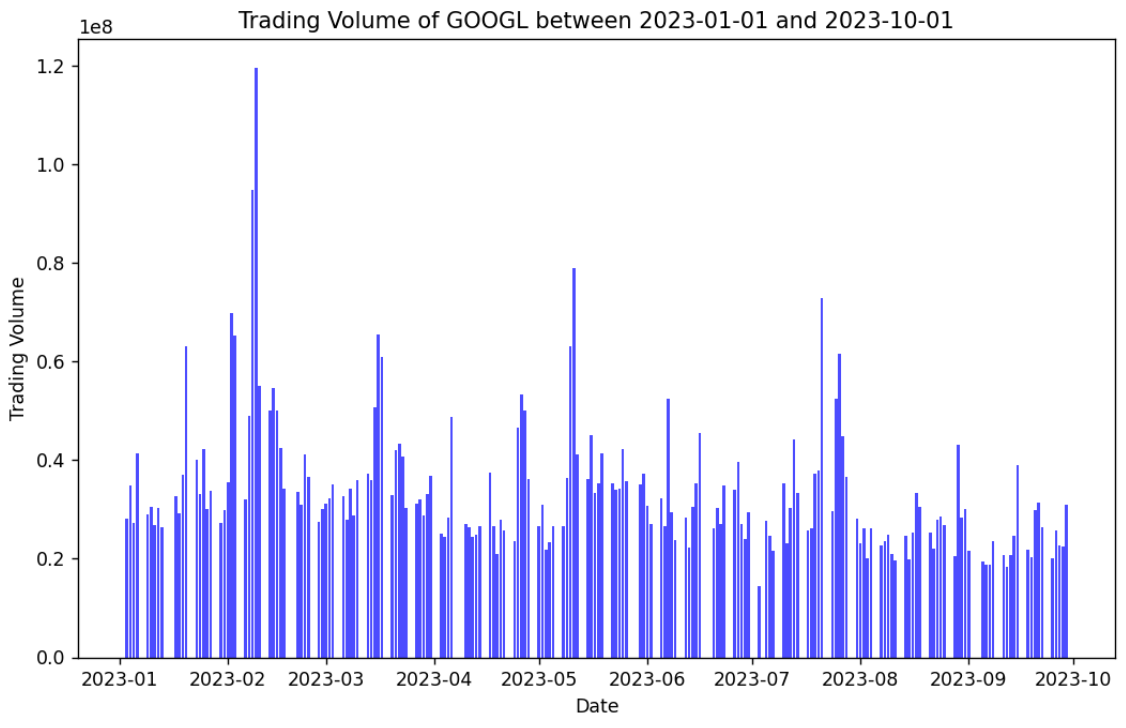


5.Write a Pandas program to create a bar plot of the trading volume of Alphabet Inc. stock between two specific dates.

INPUT:

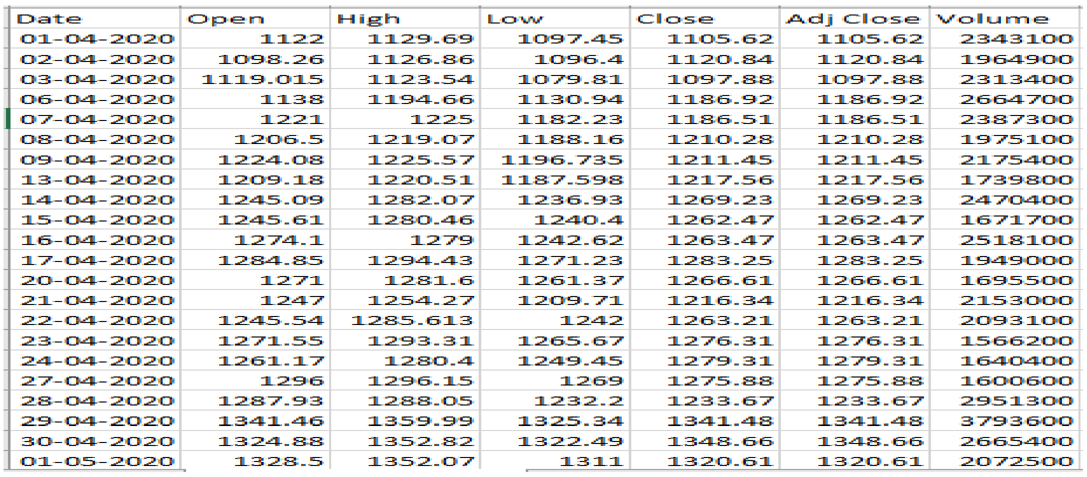
```
import pandas as pd
import yfinance as yf
import matplotlib.pyplot as plt

# Step 2: Retrieve historical stock data
ticker = "GOOGL"  # Ticker symbol for Alphabet Inc.
start_date = "2023-01-01"
end_date = "2023-10-01"

# Using yfinance to get the stock data
data = yf.download(ticker, start=start_date, end=end_date)

# Step 3: Filter the data for the desired date range
# Since we're interested in trading volume, we only need that
column
data = data['Volume']

# Step 4: Create a bar plot
plt.figure(figsize=(10, 6))
plt.bar(data.index, data.values, color='blue', alpha=0.7)
plt.title(f'Trading Volume of {ticker} between {start_date}
and {end_date}')
plt.xlabel('Date')
plt.ylabel('Trading Volume')
plt.show()
```

OUTPUT:



6.Write a Pandas program to create a scatter plot of the trading volume/stock prices of Alphabet Inc. stock between two specific dates.

alphabet_stock_data:

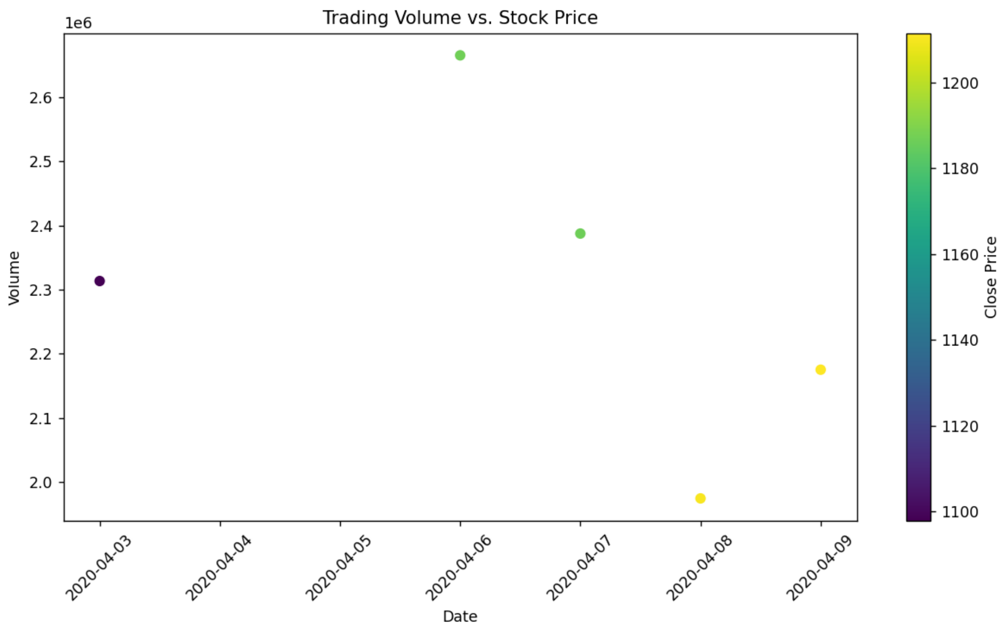


Date	Open	High	Low	Close	Adj Close	Volume
01-04-2020	1122	1129.69	1097.45	1105.62	1105.62	2343100
02-04-2020	1098.26	1126.86	1096.4	1120.84	1120.84	1964900
03-04-2020	1119.015	1123.54	1079.81	1097.88	1097.88	2313400
06-04-2020	1138	1194.66	1130.94	1186.92	1186.92	2664700
07-04-2020	1221	1225	1182.23	1186.51	1186.51	2387300
08-04-2020	1206.5	1219.07	1188.16	1210.28	1210.28	1975100
09-04-2020	1224.08	1225.57	1196.735	1211.45	1211.45	2175400
13-04-2020	1209.18	1220.51	1187.598	1217.56	1217.56	1739800
14-04-2020	1245.09	1282.07	1236.93	1269.23	1269.23	2470400
15-04-2020	1245.61	1280.46	1240.4	1262.47	1262.47	1671700
16-04-2020	1274.1	1279	1242.62	1263.47	1263.47	2518100
17-04-2020	1284.85	1294.43	1271.23	1283.25	1283.25	1949000
20-04-2020	1271	1281.6	1261.37	1266.61	1266.61	1695500
21-04-2020	1247	1254.27	1209.71	1216.34	1216.34	2153000
22-04-2020	1245.54	1285.613	1242	1263.21	1263.21	2093100
23-04-2020	1271.55	1293.31	1265.67	1276.31	1276.31	1566200
24-04-2020	1261.17	1280.4	1249.45	1279.31	1279.31	1640400
27-04-2020	1296	1296.15	1269	1275.88	1275.88	1600600
28-04-2020	1287.93	1288.05	1232.2	1233.67	1233.67	2951300
29-04-2020	1341.46	1359.99	1325.34	1341.48	1341.48	3793600
30-04-2020	1324.88	1352.82	1322.49	1348.66	1348.66	2665400
01-05-2020	1328.5	1352.07	1311	1320.61	1320.61	2072500

INPUT:

```
import pandas as pd

import matplotlib.pyplot as plt

# Creating a DataFrame from the provided data

data = {

    'Date': ['01-04-2020', '02-04-2020', '03-04-2020', '06-04-2020', '07-04-2020', '08-04-2020', '09-04-2020',

             '13-04-2020', '14-04-2020', '15-04-2020', '16-04-2020', '17-04-2020', '20-04-2020', '21-04-2020',

             '22-04-2020', '23-04-2020', '24-04-2020', '27-04-2020', '28-04-2020', '29-04-2020', '30-04-2020',

             '01-05-2020'],

    'Open': [1122, 1098.26, 1119.015, 1138, 1221, 1206.5, 1224.08, 1209.18, 1245.09, 1245.61, 1274.1,
1284.85, 1271, 1247, 1245.54, 1271.55, 1261.17, 1296, 1287.93, 1341.46, 1324.88, 1328.5],

    'High': [1129.69, 1126.86, 1123.54, 1194.66, 1225, 1219.07, 1225.57, 1220.51, 1282.07, 1280.46, 1279,
1294.43, 1281.6, 1254.27, 1285.613, 1293.31, 1280.4, 1296.15, 1288.05, 1359.99, 1352.82, 1352.07],

    'Low': [1097.45, 1096.4, 1079.81, 1130.94, 1182.23, 1188.16, 1196.735, 1187.598, 1236.93, 1240.4,
1242.62, 1271.23, 1261.37, 1209.71, 1242, 1265.67, 1249.45, 1269, 1232.2, 1325.34, 1322.49, 1311],

    'Close': [1105.62, 1120.84, 1097.88, 1186.92, 1186.51, 1210.28, 1211.45, 1217.56, 1269.23, 1262.47,
1263.47, 1283.25, 1266.61, 1216.34, 1263.21, 1276.31, 1279.31, 1275.88, 1233.67, 1341.48, 1348.66,
1320.61],

    'Adj Close': [1105.62, 1120.84, 1097.88, 1186.92, 1186.51, 1210.28, 1211.45, 1217.56, 1269.23,
1262.47, 1263.47, 1283.25, 1266.61, 1216.34, 1263.21, 1276.31, 1279.31, 1275.88, 1233.67, 1341.48,
1348.66, 1320.61],

    'Volume': [2343100, 1964900, 2313400, 2664700, 2387300, 1975100, 2175400, 1739800, 2470400,
1671700, 2518100, 1949000, 1695500, 2153000, 2093100, 1566200, 1640400, 1600600, 2951300,
3793600, 2665400, 2072500]
}

# Convert the 'Date' column to datetime format

data['Date'] = pd.to_datetime(data['Date'], format='%d-%m-%Y')

# Creating a DataFrame

df = pd.DataFrame(data)

# Filter data between two specific dates

start_date = '2020-04-03'

end_date = '2020-04-10'

filtered_data = df[(df['Date'] >= start_date) & (df['Date'] <= end_date)]

# Create a scatter plot

plt.figure(figsize=(10, 6))

plt.scatter(filtered_data['Date'], filtered_data['Volume'], c=filtered_data['Close'], cmap='viridis',
marker='o')

plt.title('Trading Volume vs. Stock Price')

plt.xlabel('Date')

plt.ylabel('Volume')

plt.colorbar(label='Close Price')

plt.xticks(rotation=45)

plt.tight_layout()

# Show the plot

plt.show()
```

OUTPUT:

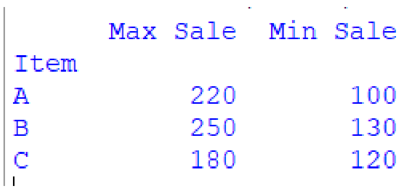


7.Write a Pandas program to create a Pivot table and find the maximum and minimum sale value of the items.(refer sales_data table)

INPUT:

```
import pandas as pd
# Sample sales data
data = {
   'Item': ['A', 'B', 'A', 'C', 'B', 'C', 'A', 'B', 'C'],
   'Sale': [100, 150, 200, 120, 250, 180, 220, 130, 160]
}
# Create a DataFrame from the sample data
sales_data = pd.DataFrame(data)
# Create a pivot table to find maximum and minimum sale values for each item
pivot_table = sales_data.pivot_table(index='Item', values='Sale', aggfunc={'Sale': ['max', 'min']})
# Reset column names for the pivot table
pivot_table.columns = ['Max Sale', 'Min Sale']
# Display the pivot table
print(pivot_table)
```

OUTPUT:



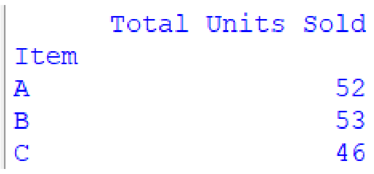
```
      Max Sale  Min Sale
Item
A          220       100
B          250       130
C          180       120
```

8.Write a Pandas program to create a Pivot table and find the item wise unit sold. .(refer sales_data table)

INPUT:

```
import pandas as pd
# Sample sales data
data = {
   'Item': ['A', 'B', 'A', 'C', 'B', 'C', 'A', 'B', 'C'],
   'Units Sold': [10, 15, 20, 12, 25, 18, 22, 13, 16]
}
# Create a DataFrame from the sample data
sales_data = pd.DataFrame(data)
# Create a pivot table to find unit sold for each item
pivot_table = sales_data.pivot_table(index='Item', values='Units Sold', aggfunc='sum')
# Reset the column name for the pivot table
pivot_table.columns = ['Total Units Sold']
# Display the pivot table
print(pivot_table)
```

OUTPUT:



```
      Total Units Sold
Item
A                   52
B                   53
C                   46
```