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

```
+--------------+----------------------+------------+-------------+---
------------+----------------------+------------+-------------+    |
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 | +---------------+--------------------
-+------------+-------------
```

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 | +-------------+------------+------------+-----------
-+---------------+
```

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 | +------------+----------------------------------+---------
---+------------+
```

4. Write a Pandas program to create a line plot of the historical stock

prices of Alphabet Inc. between two specific dates.

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

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	2348100
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

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) 8. Write a Pandas program to create a Pivot table and find the item wise unit sold. .(refer sales_data table)
9. Write a Pandas program to create a Pivot table and find the total sale amount region wise, manager wise, sales man wise. .(refer sales_data table)

Sales_data:

	Item	

OrderDate Region Manager SalesMan Units Unit_price Sale_amt

East	Martha	Alexander	Television	95	1,198.00

1-6-18 1,13,810.00

Central	Hermann Shelli

	Home Theater	50

500.00

1-23-18 25,000.00

Central	Hermann Luis

	Television	36

1,198.00

2-9-18 43,128.00

Central	Timothy David

	Cell Phone	27

225.00

2-26-18 6,075.00

		56

West	Timothy Stephen

1,198.00

	Television	

3-15-18 67,088.00

East	Martha

Alexander	Home Theater	60

500.00

4-1-18 30,000.00

	Central Martha

Steven	Television	75

1,198.00

4-18-18 89,850.00

Central	Hermann Luis

	Television	90

1,198.00

5-5-18 1,07,820.00

West	Douglas

1,198.00

Michael	Television	32

5-22-18 38,336.00

East	Martha

Alexander	Home Theater	60

500.00

6-8-18 30,000.00

Central	Hermann Sigal

	Television	90

1,198.00

6-25-18 1,07,820.00

East	Martha

Diana	Home Theater	29

500.00

7-12-18 14,500.00

East	Douglas

500.00

Karen	Home Theater	81

7-29-18 40,500.00

East	Martha

Alexander	Television 35	

1,198.00

8-15-18 41,930.00

Central	Douglas

John	Desk	2

125.00

9-1-18 250.00

East	Martha

Alexander	Video Games	16

58.50

9-18-18 936.00

Central	Hermann Sigal

500.00

	Home Theater	28

10-5-18 14,000.00

East	Martha

Alexander	Cell Phone	64

225.00

10-22-18 14,400.00

10.Create a dataframe of ten rows, four columns with random values. Write a Pandas program to highlight the negative numbers red and positive numbers black.

Expected Output:

	A	B	C	D	E
0	1	1.32921	-0.770033	-0.31628	-0.99081
1	2	-1.07082	-1.43871	0.564417	0.295722
2	3	-1.6264	0.219565	0.678805	1.88927
3	4	0.961538	0.104011	-0.481165	0.850229
4	5	1.45342	1.05774	0.165562	0.515018
5	6	-1.33694	0.562861	1.39285	-0.063328
6	7	0.121668	1.2076	-0.00204021	1.6278
7	8	0.354493	1.03753	-0.385684	0.519818
8	9	1.68658	-1.32596	1.42898	-2.08935
9	10	-0.12982	0.631523	-0.586538	0.29072

11.Create a dataframe of ten rows, four columns with random values. Convert some values to nan values. Write a Pandas program which will highlight the nan values.

	A	B	C	D	E
0	1	1.32921	nan	-0.31628	-0.99081
1	2	-1.07082	-1.43871	0.564417	0.295722
2	3	-1.6264	0.219565	0.678805	1.88927
3	4	0.961538	0.104011	nan	0.850229
4	5	nan	1.05774	0.165562	0.515018
5	6	-1.33694	0.562861	1.39285	-0.063328
6	7	0.121668	1.2076	-0.00204021	1.6278
7	8	0.354493	1.03753	-0.385684	0.519818
8	9	1.68658	-1.32596	1.42898	-2.08935
9	10	-0.12982	0.631523	-0.586538	nan

12.Create a dataframe of ten rows, four columns with random values. Write a Pandas program to set dataframe background Color black and font color yellow.

	A	B	C	D	E
0	1	1.32921	nan	-0.31628	-0.99081
1	2	-1.07082	-1.43871	0.564417	0.295722
2	3	-1.6264	0.219565	0.678805	1.88927
3	4	0.961538	0.104011	nan	0.850229
4	5	nan	1.05774	0.165562	0.515018
5	6	-1.33694	0.562861	1.39285	-0.063328
6	7	0.121668	1.2076	-0.00204021	1.6278
7	8	0.354493	1.03753	-0.385684	0.519818
8	9	1.68658	-1.32596	1.42898	-2.08935
9	10	-0.12982	0.631523	-0.586538	nan

13.Write a Pandas program to detect missing values of a given DataFrame. Display True or False.

	ord_no	purch_amt	ord_date	customer_id	salesman_id
0	70001.0	150.50	2012-10-05	3002	5002.0
1	NaN	270.65	2012-09-10	3001	5003.0
2	70002.0	65.26	NaN	3001	5001.0
3	70004.0	110.50	2012-08-17	3003	NaN
4	NaN	948.50	2012-09-10	3002	5002.0
5	70005.0	2400.60	2012-07-27	3001	5001.0
6	NaN	5760.00	2012-09-10	3001	5001.0
7	70010.0	1983.43	2012-10-10	3004	NaN
8	70003.0	2480.40	2012-10-10	3003	5003.0
9	70012.0	250.45	2012-06-27	3002	5002.0
10	NaN	75.29	2012-08-17	3001	5003.0
11	70013.0	3045.60	2012-04-25	3001	NaN

14. Write a Pandas program to find and replace the missing values in a given DataFrame which do not have any valuable information.

	ord_no	purch_amt	ord_date	customer_id	salesman_id
0	70001	150.5	?	3002	5002
1	NaN	270.65	2012-09-10	3001	5003
2	70002	65.26	NaN	3001	?
3	70004	110.5	2012-08-17	3003	5001
4	NaN	948.5	2012-09-10	3002	NaN
5	70005	2400.6	2012-07-27	3001	5002
6	--	5760	2012-09-10	3001	5001
7	70010	?	2012-10-10	3004	?
8	70003	12.43	2012-10-10	--	5003
9	70012	2480.4	2012-06-27	3002	5002
10	NaN	250.45	2012-08-17	3001	5003
11	70013	3045.6	2012-04-25	3001	--

15.Write a Pandas program to keep the rows with at least 2 NaN values in a given DataFrame.

	ord_no	purch_amt	ord_date	customer_id
0	NaN	NaN	NaN	NaN
1	NaN	270.65	2012-09-10	3001.0
2	70002.0	65.26	NaN	3001.0
3	NaN	NaN	NaN	NaN
4	NaN	948.50	2012-09-10	3002.0
5	70005.0	2400.60	2012-07-27	3001.0
6	NaN	5760.00	2012-09-10	3001.0
7	70010.0	1983.43	2012-10-10	3004.0
8	70003.0	2480.40	2012-10-10	3003.0
9	70012.0	250.45	2012-06-27	3002.0
10	NaN	75.29	2012-08-17	3001.0
11	NaN	NaN	NaN	NaN

16.Write a Pandas program to split the following dataframe into groups based on school code. Also check the type of GroupBy object.

	school	class	name	date_Of_Birth	age	height	weight	address
S1	s001	V	Alberto Franco	15/05/2002	12	173	35	street1
S2	s002	V	Gino Mcneill	17/05/2002	12	192	32	street2
S3	s003	VI	Ryan Parkes	16/02/1999	13	186	33	street3
S4	s001	VI	Eesha Hinton	25/09/1998	13	167	30	street1
S5	s002	V	Gino Mcneill	11/05/2002	14	151	31	street2
S6	s004	VI	David Parkes	15/09/1997	12	159	32	street4

17.Write a Pandas program to split the following dataframe by school code and get mean, min, and max value of age for each school.

	school	class	name	date_Of_Birth	age	height	weight	address
S1	s001	V	Alberto Franco	15/05/2002	12	173	35	street1
S2	s002	V	Gino Mcneill	17/05/2002	12	192	32	street2
S3	s003	VI	Ryan Parkes	16/02/1999	13	186	33	street3
S4	s001	VI	Eesha Hinton	25/09/1998	13	167	30	street1
S5	s002	V	Gino Mcneill	11/05/2002	14	151	31	street2
S6	s004	VI	David Parkes	15/09/1997	12	159	32	street4

18.Write a Pandas program to split the following given dataframe into groups based on school code and class.

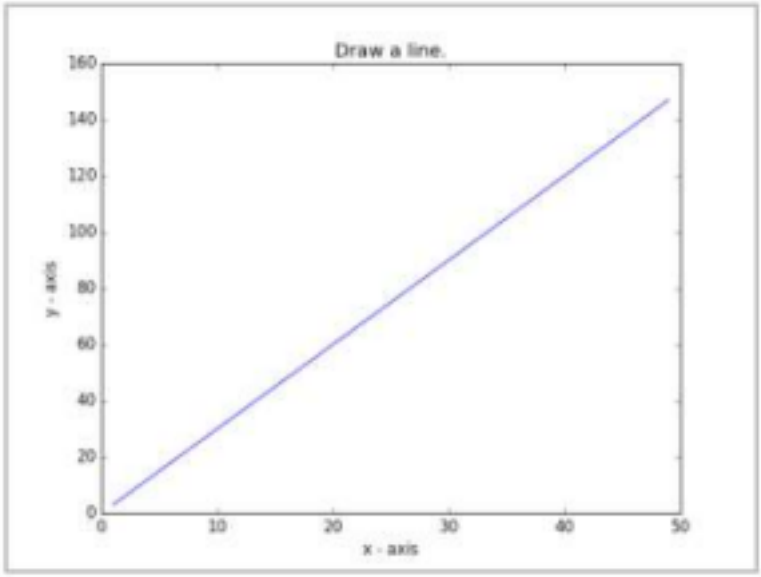
	school	class	name	date_Of_Birth	age	height	weight	address
S1	s001	V	Alberto Franco	15/05/2002	12	173	35	street1
S2	s002	V	Gino Mcneill	17/05/2002	12	192	32	street2
S3	s003	VI	Ryan Parkes	16/02/1999	13	186	33	street3
S4	s001	VI	Eesha Hinton	25/09/1998	13	167	30	street1
S5	s002	V	Gino Mcneill	11/05/2002	14	151	31	street2
S6	s004	VI	David Parkes	15/09/1997	12	159	32	street4

19.Write a Pandas program to display the dimensions or shape of the World alcohol consumption dataset. Also extract the column names from the dataset.

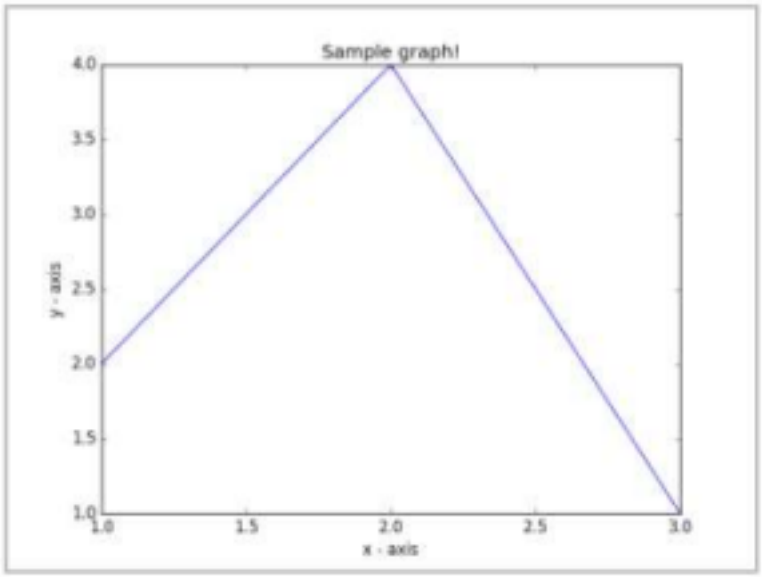
	Year	WHO region	Country	Beverage Types	Display Value
0	1986	Western Pacific	Viet Nam	Wine	0.00
1	1986	Americas	Uruguay	Other	0.50
2	1985	Africa	Cte d'Ivoire	Wine	1.62
3	1986	Americas	Colombia	Beer	4.27
4	1987	Americas	Saint Kitts and Nevis	Beer	1.98

20.Write a Pandas program to find the index of a given substring of a DataFrame column.

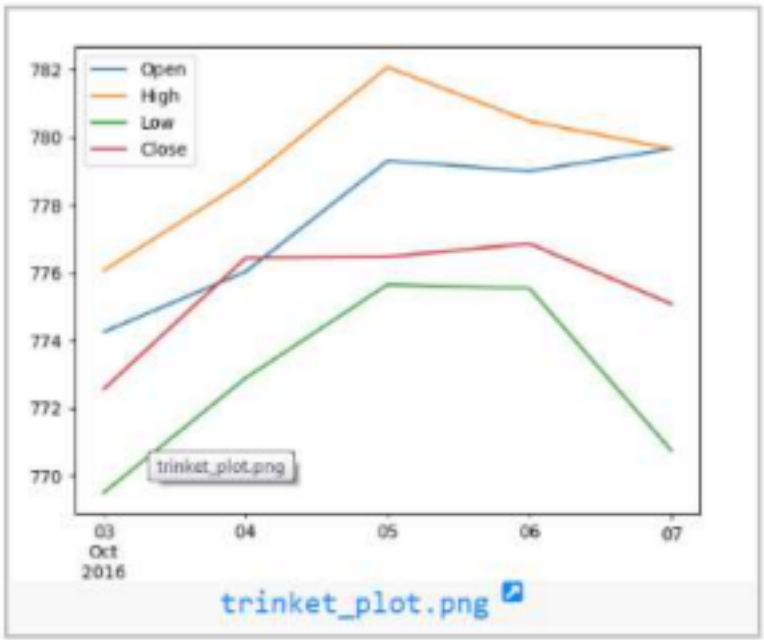
21.Write a Pandas program to swap the cases of a specified character column in a given DataFrame.
22.Write a Python program to draw a line with suitable label in the x axis, y axis and a title.



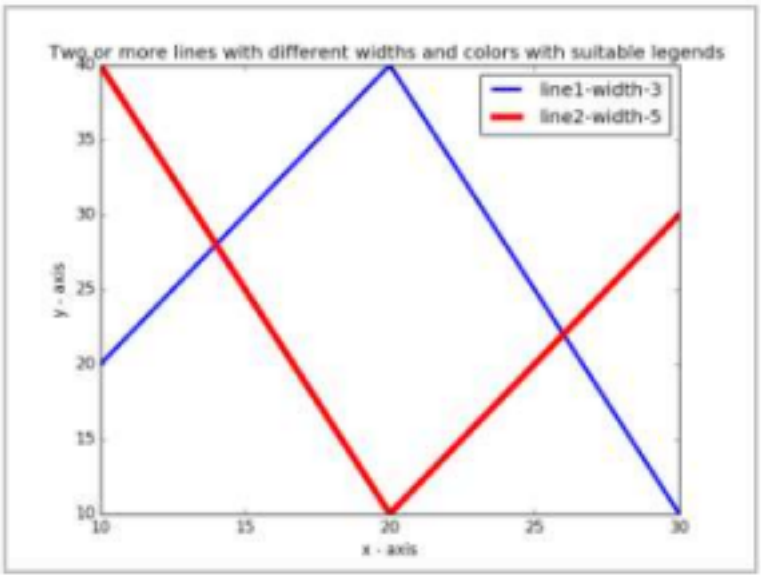
23.Write a Python program to draw a line using given axis values taken from a text file, with suitable label in the x axis, y axis and a title.
Test Data:
test.txt
1 2
2 4
3 1



24.Write a Python program to draw line charts of the financial data of Alphabet Inc. between October 3, 2016 to October 7, 2016.
Sample Financial data (fdata.csv):
Date,Open,High,Low,Close
10-03-16,774.25,776.065002,769.5,772.559998
10-04-16,776.030029,778.710022,772.890015,776.429993
10-05-16,779.309998,782.070007,775.650024,776.469971
10-06-16,779,780.47998,775.539978,776.859985
10-07-16,779.659973,779.659973,770.75,775.080017



25.Write a Python program to plot two or more lines with legends, different widths and colors.



26.Write a Python program to create multiple plots.

27.Write a Python programming to display a bar chart of the popularity of programming Languages.
Sample data:
Programming languages: Java, Python, PHP, JavaScript, C#,
C++ Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

28.Write a Python programming to display a horizontal bar chart of the popularity of programming Languages.
Sample data:
Programming languages: Java, Python, PHP, JavaScript, C#,
C++ Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

29.Write a Python programming to display a bar chart of the popularity of programming Languages. Use different color for each bar. Sample data:
Programming languages: Java, Python, PHP, JavaScript, C#,
C++ Popularity: 22.2, 17.6, 8.8, 8, 7.7, 6.7

30.Write a Python program to create bar plot of scores by group and gender. Use multiple X values on the same chart for men and women.

Sample Data:
Means (men) = (22, 30, 35, 35, 26)
Means (women) = (25, 32, 30, 35, 29)

31.Write a Python program to create a stacked bar plot with error bars.
Note: Use bottom to stack the women?s bars on top of the men?s bars.
Sample Data:
Means (men) = (22, 30, 35, 35, 26)
Means (women) = (25, 32, 30, 35, 29)
Men Standard deviation = (4, 3, 4, 1, 5)

Women Standard deviation = (3, 5, 2, 3, 3)

32.Write a Python program to draw a scatter graph taking a random distribution in X and Y and plotted against each other.

33.Write a Python program to draw a scatter plot with empty circles taking a random distribution in X and Y and plotted against each other.

34.Write a Python program to draw a scatter plot using random distributions to generate balls of different sizes.

35.Write a Python program to draw a scatter plot comparing two subject marks of Mathematics and Science. Use marks of 10 students. Sample data:

Test Data:
math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]
science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]
marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]

36.Write a Python program to draw a scatter plot for three different groups comparing weights and heights.

37.Write a Pandas program to create a dataframe from a dictionary and display it.
Sample data: {'X':[78,85,96,80,86], 'Y':[84,94,89,83,86],'Z':[86,97,96,72,83]}

38.Write a Pandas program to create and display a DataFrame from a specified dictionary data which has the index labels.
Sample Python dictionary data and list labels:
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

39.Write a Pandas program to get the first 3 rows of a given DataFrame.
Sample Python dictionary data and list labels:
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

40. Write a Pandas program to select the 'name' and 'score' columns from the following DataFrame.

    Sample Python dictionary data and list labels:

    exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
    'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
    'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
    'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
    labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']