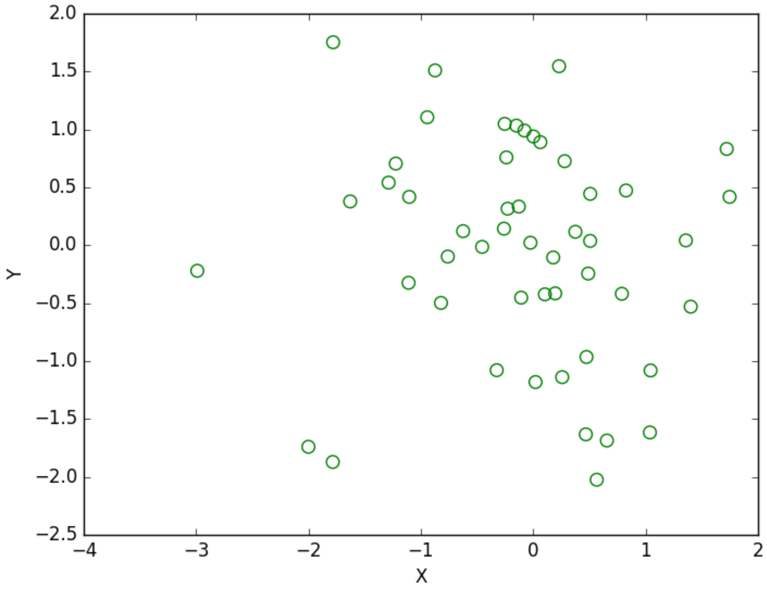
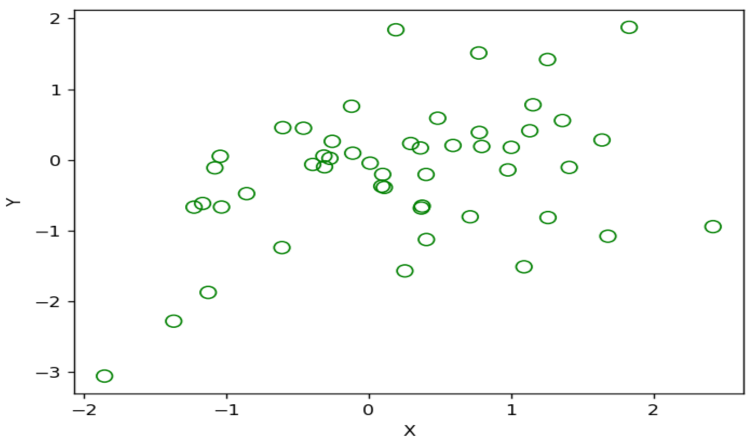
33.Write a Python program to draw a scatter plot with empty circles taking a random distribution in X and Y and plotted against each other.



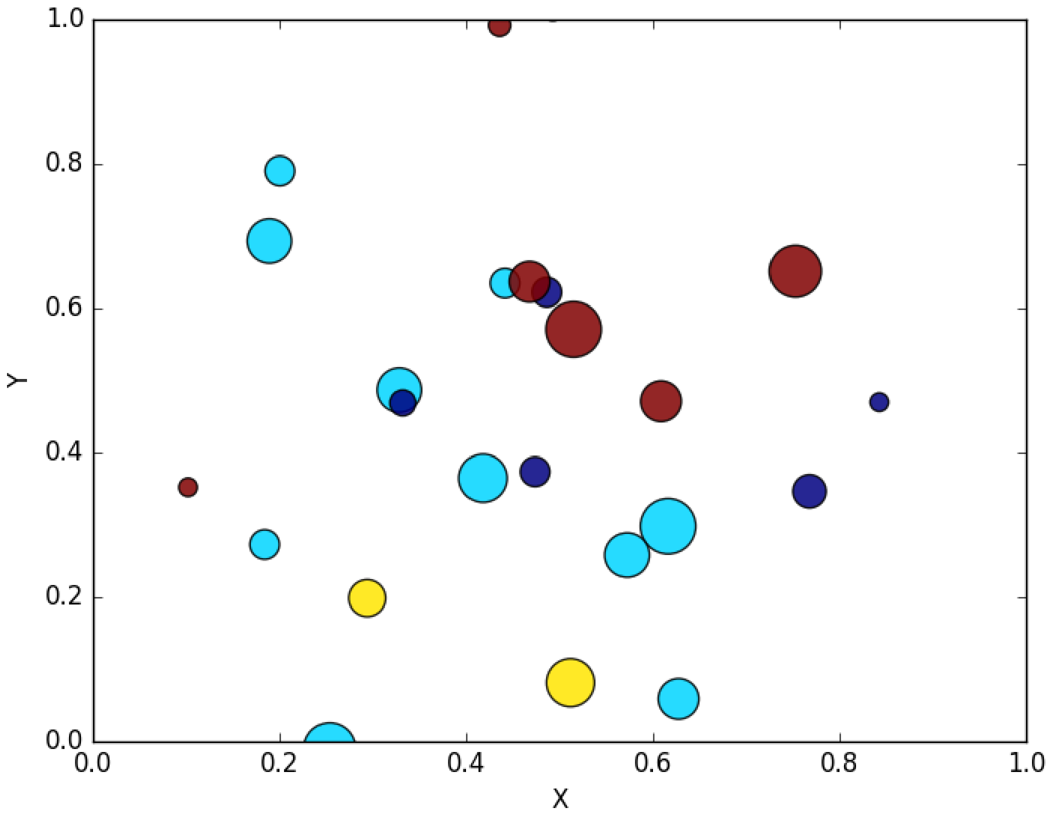
INPUT:

```
import matplotlib.pyplot as plt

import numpy as np

x = np.random.randn(50)

y = np.random.randn(50)

plt.scatter(x, y, s=70, facecolors='none', edgecolors='g')

plt.xlabel("X")

plt.ylabel("Y")

plt.show()
```

OUTPUT:



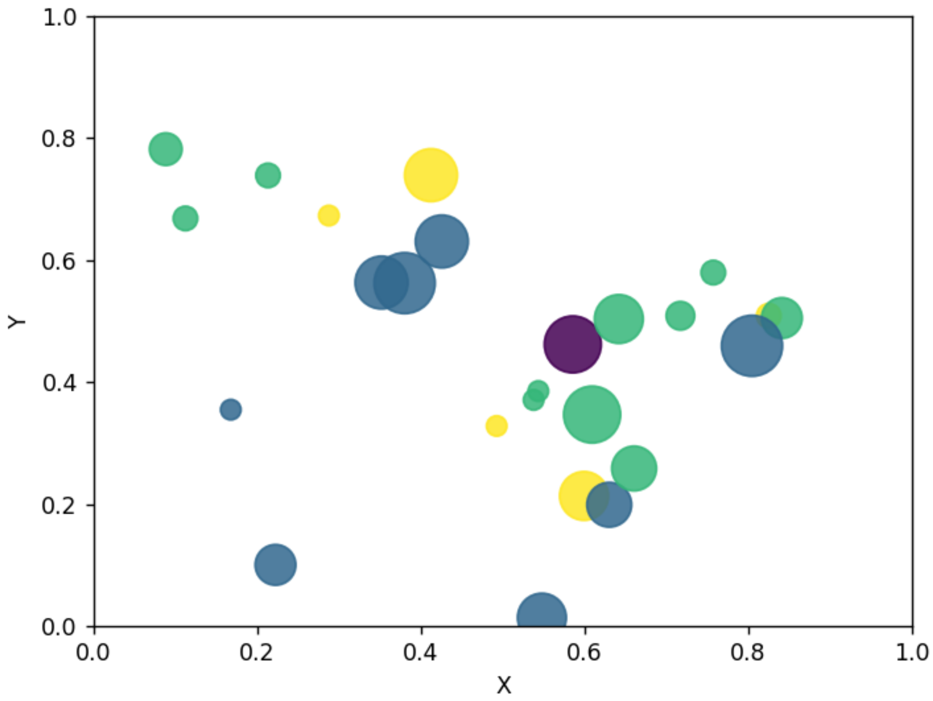
34.Write a Python program to draw a scatter plot using random distributions to generate balls of different sizes.



INPUT:

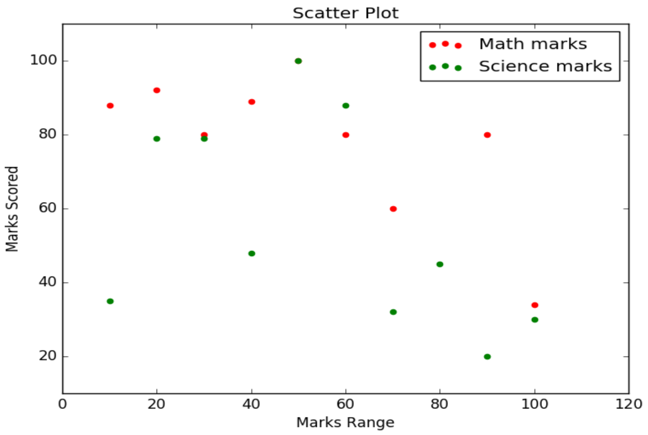
```
import math

import random

import matplotlib.pyplot as plt

# create random data

no_of_balls = 25

x = [random.triangular() for i in range(no_of_balls)]

y = [random.gauss(0.5, 0.25) for i in range(no_of_balls)]

colors = [random.randint(1, 4) for i in range(no_of_balls)]

areas = [math.pi * random.randint(5, 15)**2 for i in range(no_of_balls)]

# draw the plot

plt.figure()

plt.scatter(x, y, s=areas, c=colors, alpha=0.85)

plt.axis([0.0, 1.0, 0.0, 1.0])
plt.xlabel("X")

plt.ylabel("Y")

plt.show()
```

OUTPUT:



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:

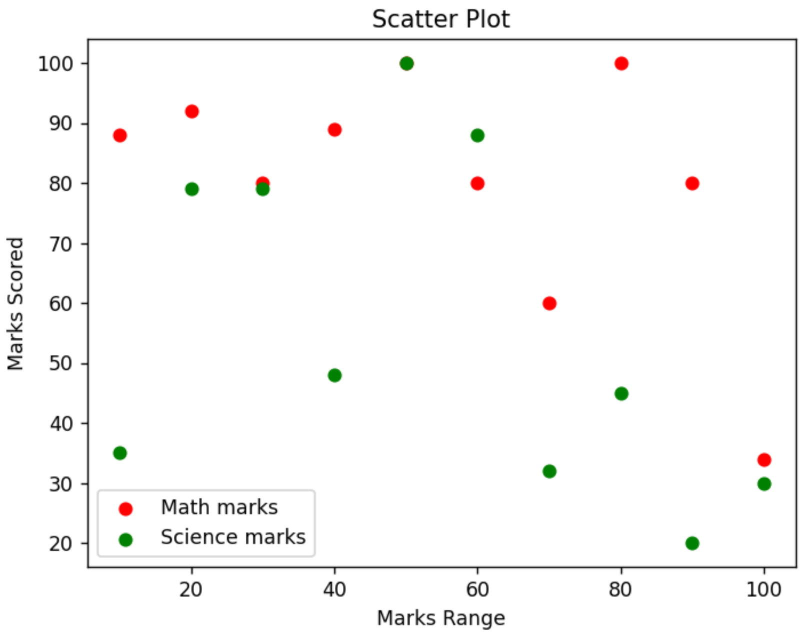
Test Data:
math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]
science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]
marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]



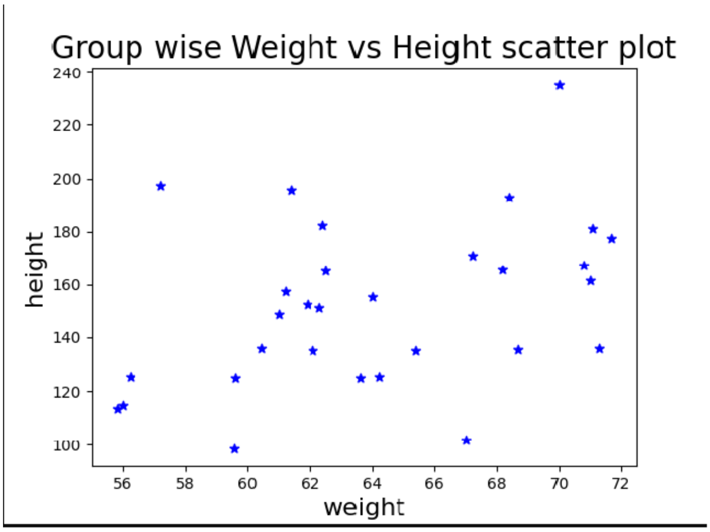
INPUT:

```
import matplotlib.pyplot as plt

import pandas as pd

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]

plt.scatter(marks_range, math_marks, label='Math marks', color='r')

plt.scatter(marks_range, science_marks, label='Science marks', color='g')

plt.title('Scatter Plot')

plt.xlabel('Marks Range')

plt.ylabel('Marks Scored')

plt.legend()

plt.show()
```

OUTPUT:



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



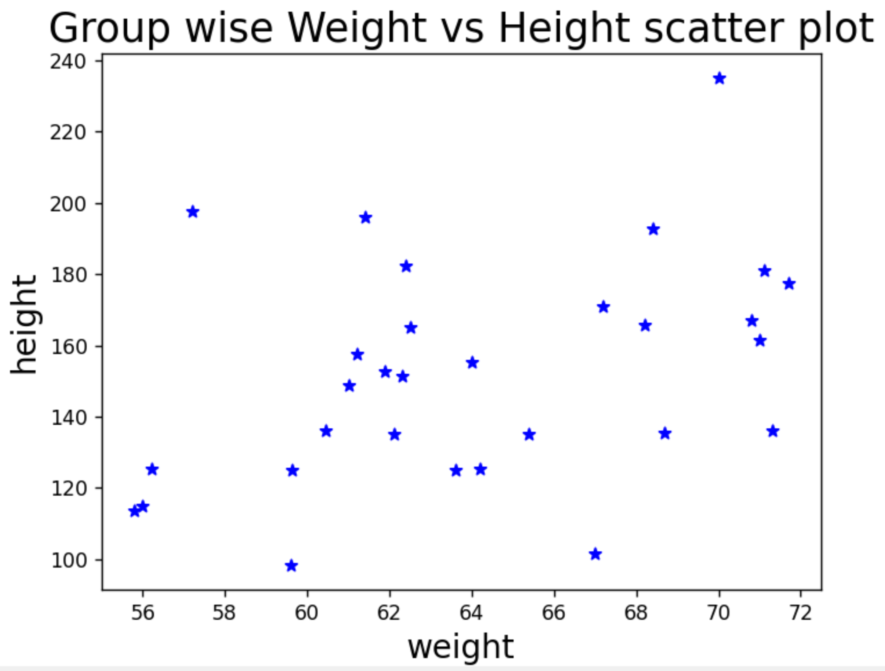
INPUT:

```
import matplotlib.pyplot as plt
import numpy as np
weight1=[67,57.2,59.6,59.64,55.8,61.2,60.45,61,56.23,56]
height1=[101.7,197.6,98.3,125.1,113.7,157.7,136,148.9,125.3,114.9]
weight2=[61.9,64,62.1,64.2,62.3,65.4,62.4,61.4,62.5,63.6]
height2=[152.8,155.3,135.1,125.2,151.3,135,182.2,195.9,165.1,125.1]
weight3=[68.2,67.2,68.4,68.7,71,71.3,70.8,70,71.1,71.7]
height3=[165.8,170.9,192.8,135.4,161.4,136.1,167.1,235.1,181.1,177.3]
weight=np.concatenate((weight1,weight2,weight3))
height=np.concatenate((height1,height2,height3))
plt.scatter(weight, height, marker='*', color=['blue'])
plt.xlabel('weight', fontsize=16)
plt.ylabel('height', fontsize=16)
```

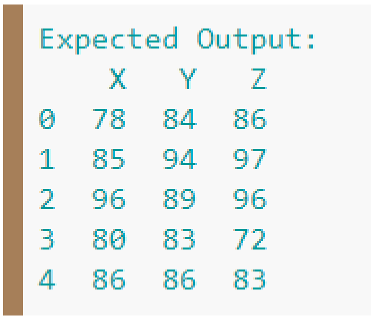
plt.title('Group wise Weight vs Height scatter plot',fontsize=20)

plt.show()

OUTPUT:



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]}



```
Expected Output:
    X   Y   Z
0  78  84  86
1  85  94  97
2  96  89  96
3  80  83  72
4  86  86  83
```

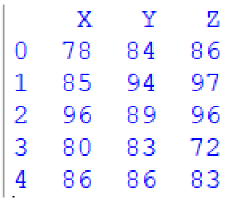
INPUT:

import pandas as pd

df = pd.DataFrame({'X':[78,85,96,80,86], 'Y':[84,94,89,83,86], 'Z':[86,97,96,72,83]});

print(df)

OUTPUT:



```
   X   Y   Z
0  78  84  86
1  85  94  97
2  96  89  96
3  80  83  72
4  86  86  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:

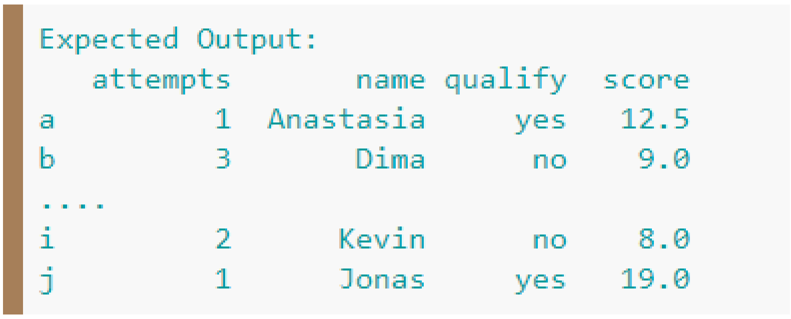
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],

'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']

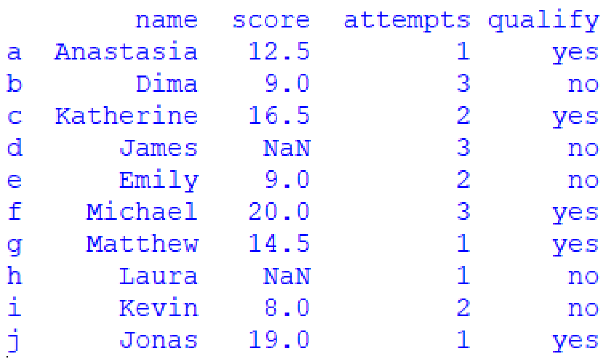


```
Expected Output:
   attempts       name qualify  score
a         1  Anastasia     yes   12.5
b         3       Dima      no    9.0
....
i         2      Kevin      no    8.0
j         1      Jonas     yes   19.0
```

INPUT:

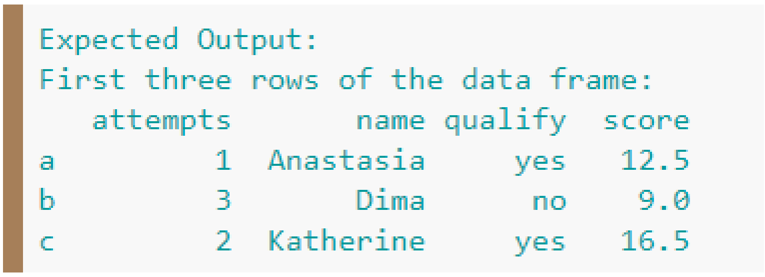
```
import pandas as pd

import numpy as np

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']

df = pd.DataFrame(exam_data , index=labels)

print(df)
```

OUTPUT:



```
        name  score  attempts qualify
a  Anastasia   12.5         1     yes
b       Dima    9.0         3      no
c  Katherine   16.5         2     yes
d      James    NaN         3      no
e      Emily    9.0         2      no
f    Michael   20.0         3     yes
g    Matthew   14.5         1     yes
h      Laura    NaN         1      no
i      Kevin    8.0         2      no
j      Jonas   19.0         1     yes
```

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']



```
Expected Output:
First three rows of the data frame:
   attempts       name qualify  score
a         1  Anastasia     yes   12.5
b         3       Dima      no    9.0
c         2  Katherine     yes   16.5
```

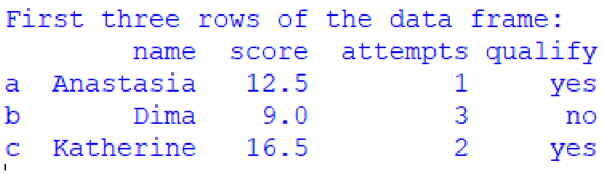
INPUT:

```
import pandas as pd

import numpy as np


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']


df = pd.DataFrame(exam_data , index=labels)
```

print("First three rows of the data frame:")

print(df.iloc[:3])

OUTPUT:

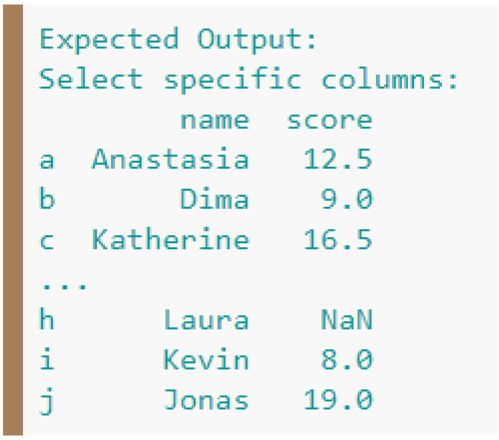


```
First three rows of the data frame:
        name  score  attempts qualify
a  Anastasia   12.5         1     yes
b       Dima    9.0         3      no
c  Katherine   16.5         2     yes
```

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']



```
Expected Output:
Select specific columns:
        name  score
a  Anastasia   12.5
b       Dima    9.0
c  Katherine   16.5
...
h      Laura    NaN
i      Kevin    8.0
j      Jonas   19.0
```

INPUT:

import pandas as pd

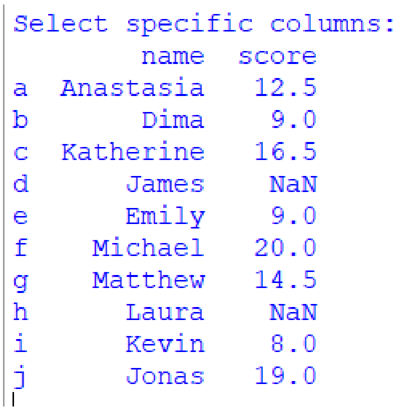
import numpy as np

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']



df = pd.DataFrame(exam_data , index=labels)

print("Select specific columns:")

print(df[['name', 'score']])
```

OUTPUT:



```
Select specific columns:
        name  score
a  Anastasia   12.5
b       Dima    9.0
c  Katherine   16.5
d      James    NaN
e      Emily    9.0
f    Michael   20.0
g    Matthew   14.5
h      Laura    NaN
i      Kevin    8.0
j      Jonas   19.0
```