Experiment 33

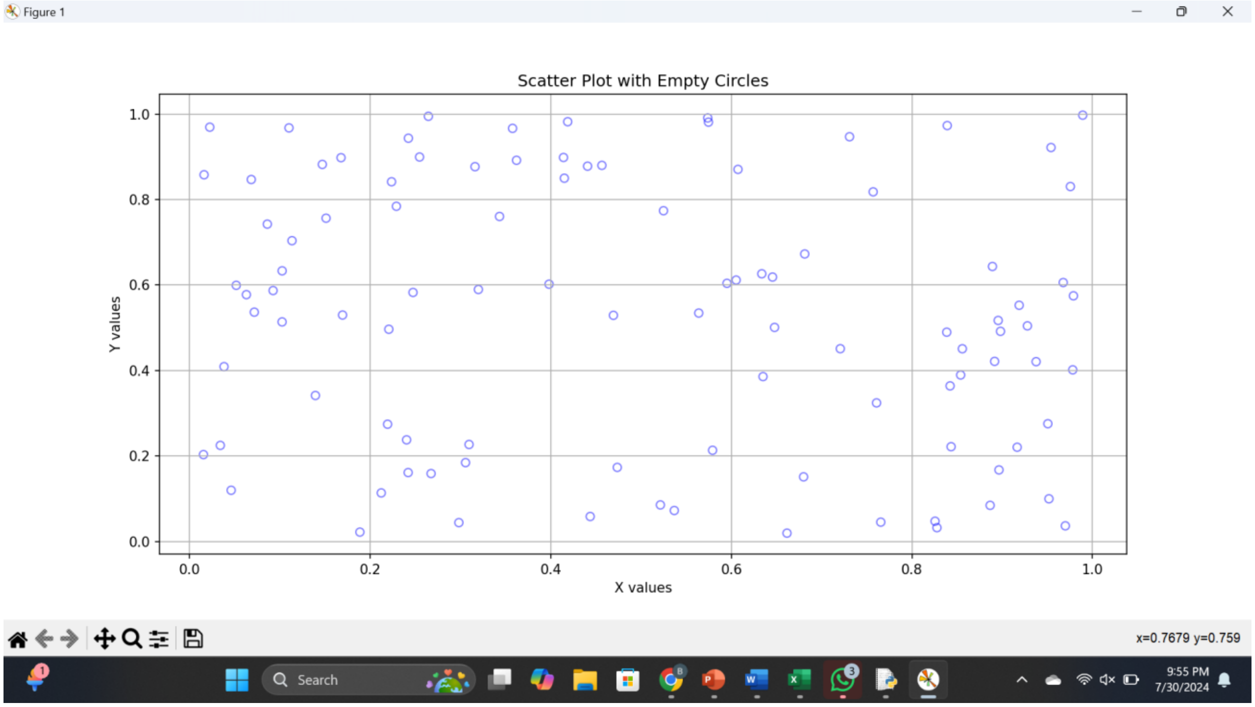
Aim

To 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.

Code:

```
import numpy as np

import matplotlib.pyplot as plt


# Generate random data

x = np.random.rand(100)  # 100 random values for X

y = np.random.rand(100)  # 100 random values for Y


# Create a scatter plot with empty circles

plt.figure(figsize=(8, 6))

plt.scatter(x, y, edgecolors='blue', facecolors='none', alpha=0.5)

plt.title('Scatter Plot with Empty Circles')

plt.xlabel('X values')

plt.ylabel('Y values')

plt.grid(True)

plt.show()
```

Output :



Results:

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

Experiment 34

Aim:

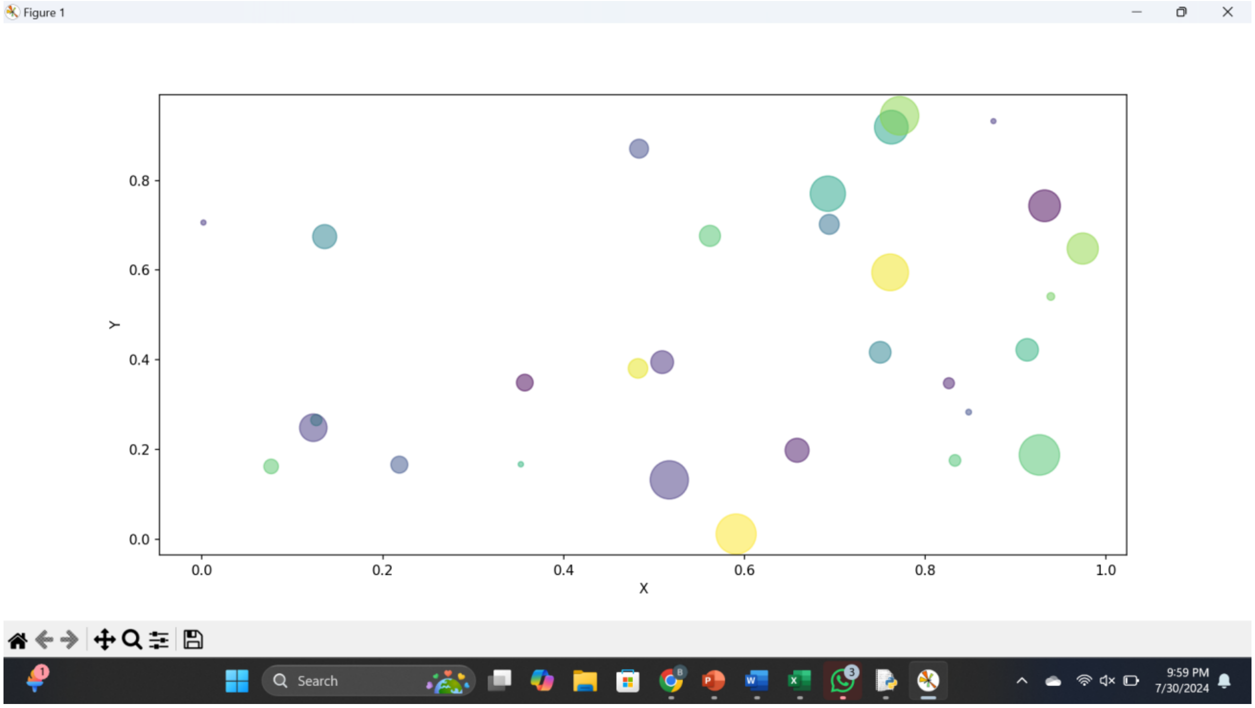
To Write a Python program to draw a scatter plot using random distributions to generate balls of different sizes.

Code

```
import matplotlib.pyplot as plt

import numpy as np

n = 30

x = np.random.rand(n)

y = np.random.rand(n)

colors = np.random.rand(n)

area = (30 * np.random.rand(n))**2  # 0 to 15 point radii


# Create the bubble plot
```

```
plt.scatter(x, y, s=area, c=colors, alpha=0.5)

plt.xlabel('X')

plt.ylabel('Y')

plt.show()
```

Output:



Results:

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

Experiment 35

Aim:

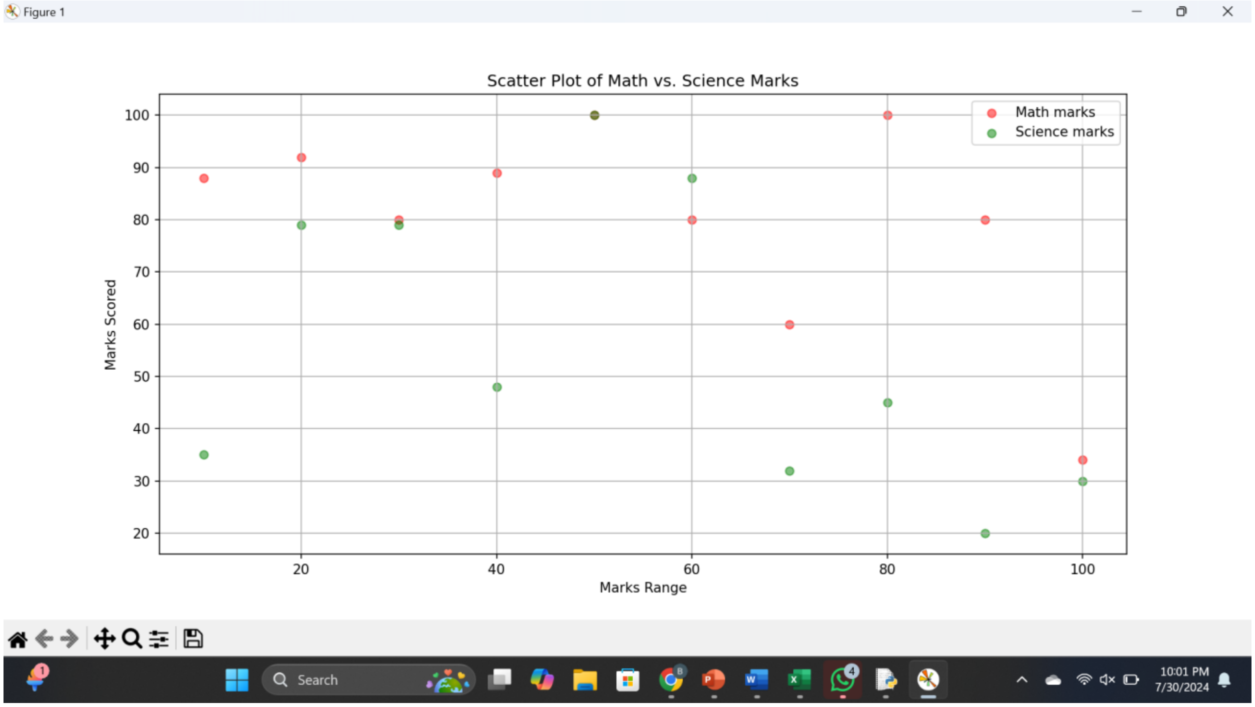
To.Write a Python program to draw a scatter plot comparing two subject marks of Mathematics and Science. Use marks of 10 students.

Code:

```
import matplotlib.pyplot as plt


# Sample 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]

# Create the scatter plot
plt.scatter(marks_range, math_marks, color='red', alpha=0.5, label='Math marks')
plt.scatter(marks_range, science_marks, color='green', alpha=0.5, label='Science marks')

# Add labels and title
plt.xlabel('Marks Range')
plt.ylabel('Marks Scored')
plt.title('Scatter Plot of Math vs. Science Marks')

# Add a legend
plt.legend()

# Display the plot
plt.grid(True)
plt.show()
```

Output:



Results:

Thus a Python program to draw a scatter plot comparing two subject marks of Mathematics and Science. Use marks of 10 students.

Experiment 36

Aim:

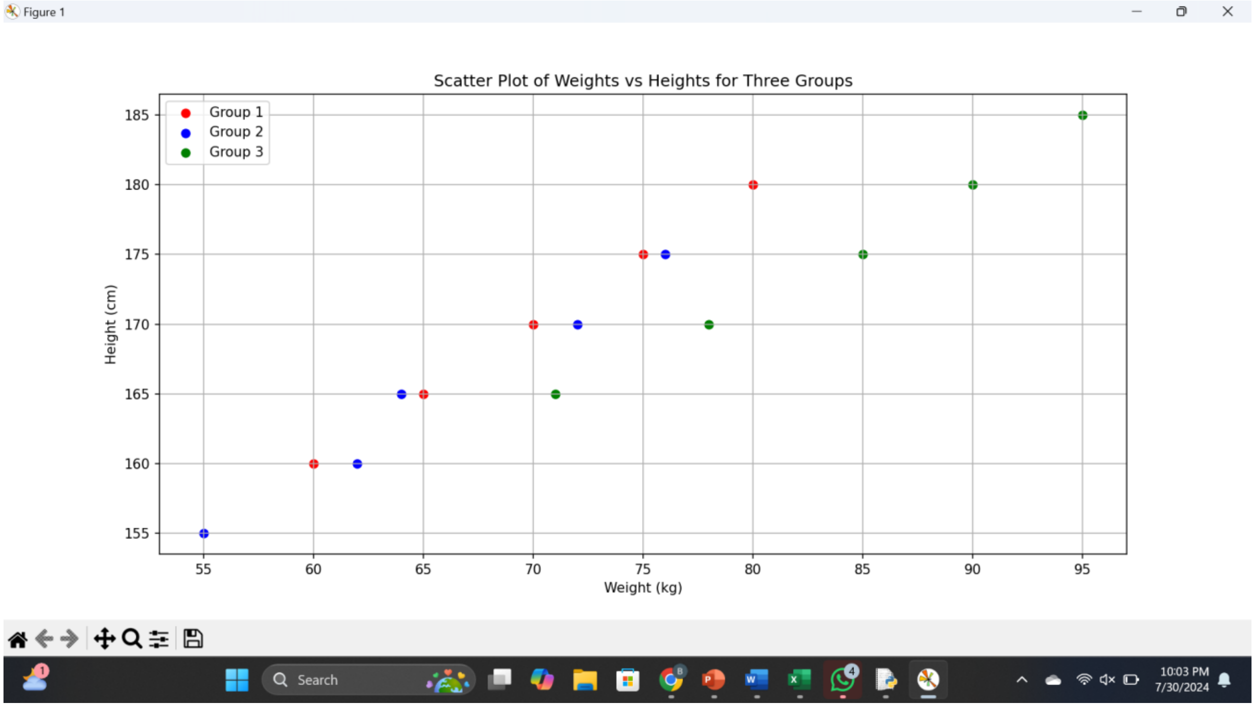
To Write a Python program to draw a scatter plot for three different groups comparing weights and heights.

Code

```
import matplotlib.pyplot as plt


# Sample data

group1_weights = [60, 65, 70, 75, 80]

group1_heights = [160, 165, 170, 175, 180]


group2_weights = [55, 62, 64, 72, 76]

group2_heights = [155, 160, 165, 170, 175]
```

```
group3_weights = [71, 78, 85, 90, 95]
group3_heights = [165, 170, 175, 180, 185]

# Create scatter plots
plt.figure(figsize=(10, 6))

plt.scatter(group1_weights, group1_heights, color='red', label='Group 1')
plt.scatter(group2_weights, group2_heights, color='blue', label='Group 2')
plt.scatter(group3_weights, group3_heights, color='green', label='Group 3')

# Add titles and labels
plt.title('Scatter Plot of Weights vs Heights for Three Groups')
plt.xlabel('Weight (kg)')
plt.ylabel('Height (cm)')
plt.legend()

# Show the plot
plt.grid(True)
plt.show()
```

Output:



Results:

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

Experiment 37

Aim:

To Write a Pandas program to create a dataframe from a dictionary and display it.

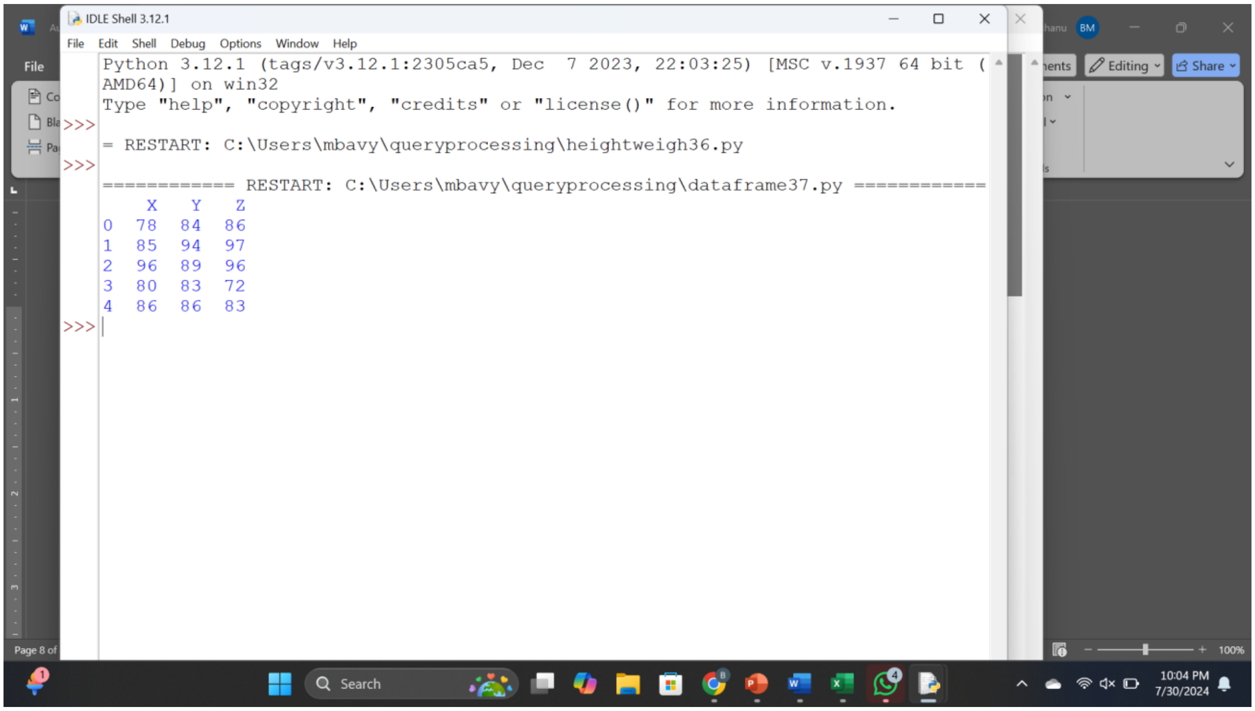
Code

```
import pandas as pd


# Sample data
data = {'X': [78, 85, 96, 80, 86],
        'Y': [84, 94, 89, 83, 86],
        'Z': [86, 97, 96, 72, 83]}


# Create DataFrame
df = pd.DataFrame(data)
```

# Display DataFrame

print(df)

Output:



```
Python 3.12.1 (tags/v3.12.1:2305ca5, Dec  7 2023, 22:03:25) [MSC v.1937 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\mbavy\queryprocessing\heightweigh36.py
>>>
============ RESTART: C:\Users\mbavy\queryprocessing\dataframe37.py ============
    X   Y   Z
0  78  84  86
1  85  94  97
2  96  89  96
3  80  83  72
4  86  86  83
>>>
```

Results:

Thus a Pandas program to create a dataframe from a dictionary and display it.

Experiment 38

Aim:

To Write a Pandas program to create and display a DataFrame from a specified dictionary data which has the index labels.

Code:

import pandas as pd

import numpy as np

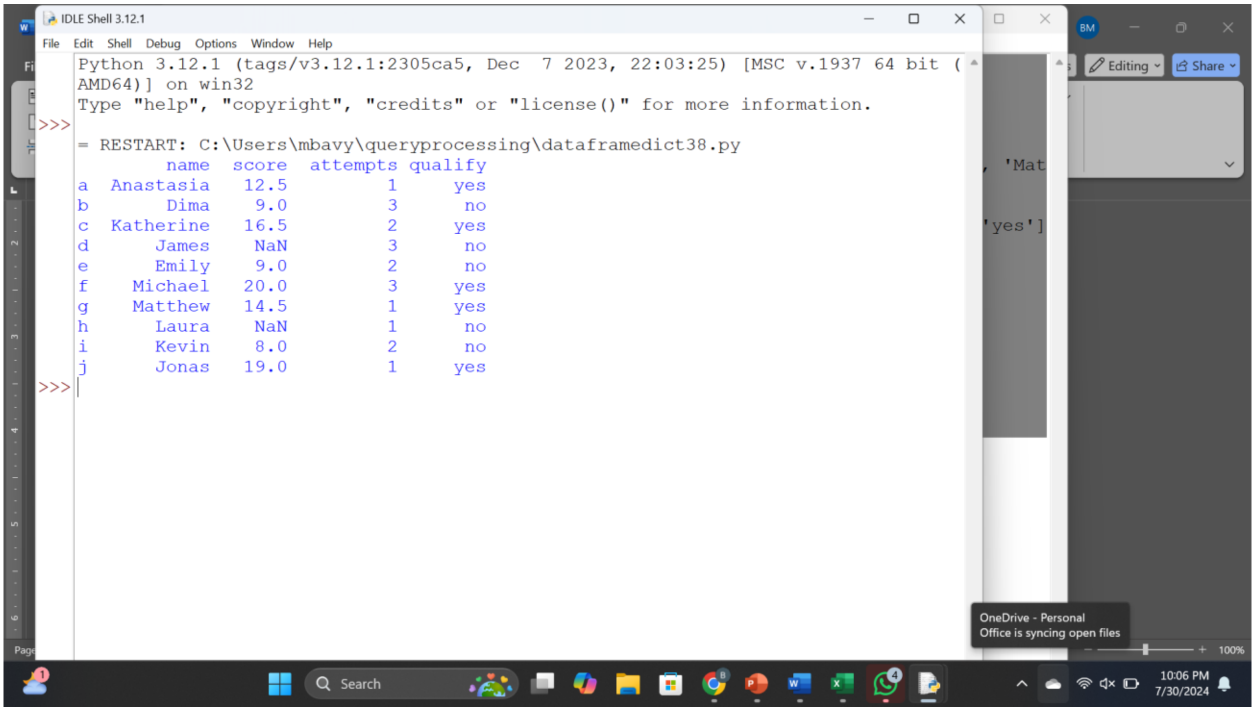
# Dictionary data

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']
}

# Index labels
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

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

# Display DataFrame
print(df)
```

Output:



```
Python 3.12.1 (tags/v3.12.1:2305ca5, Dec  7 2023, 22:03:25) [MSC v.1937 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\mbavy\queryprocessing\dataframedict38.py
        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
>>>
```

Results:

Thus a Pandas program to create and display a DataFrame from a specified dictionary data which has the index labels.

Experiment 39

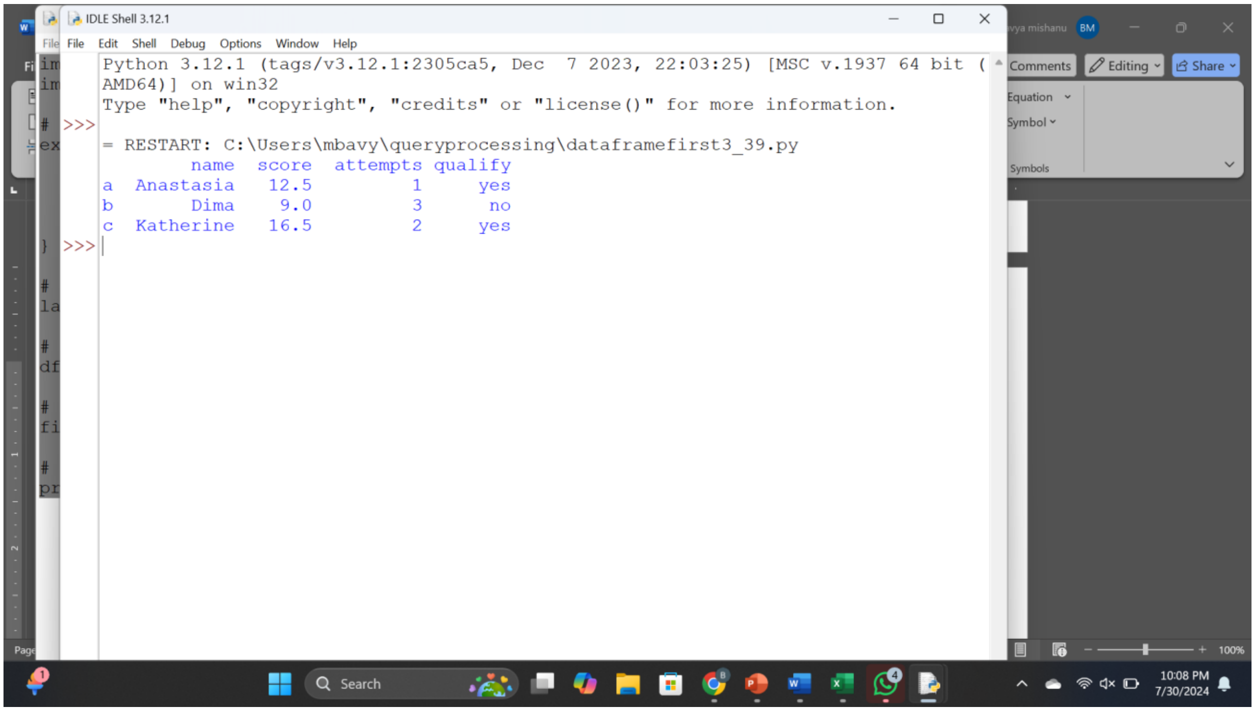
Aim:

To Write a Pandas program to get the first 3 rows of a given DataFrame.
Sample Python dictionary data and list labels:

Code:

```
import pandas as pd
import numpy as np

# Dictionary data
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']
}

# Index labels
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

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

# Get the first 3 rows
first_3_rows = df.head(3)

# Display the result
print(first_3_rows)
```

Output:



```
Python 3.12.1 (tags/v3.12.1:2305ca5, Dec  7 2023, 22:03:25) [MSC v.1937 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\mbavy\queryprocessing\dataframefirst3_39.py
        name  score  attempts qualify
a  Anastasia   12.5         1     yes
b       Dima    9.0         3      no
c  Katherine   16.5         2     yes
>>>
```

Results:

Thus a Pandas program to get the first 3 rows of a given DataFrame.
Sample Python dictionary data and list labels:

Experiment 40

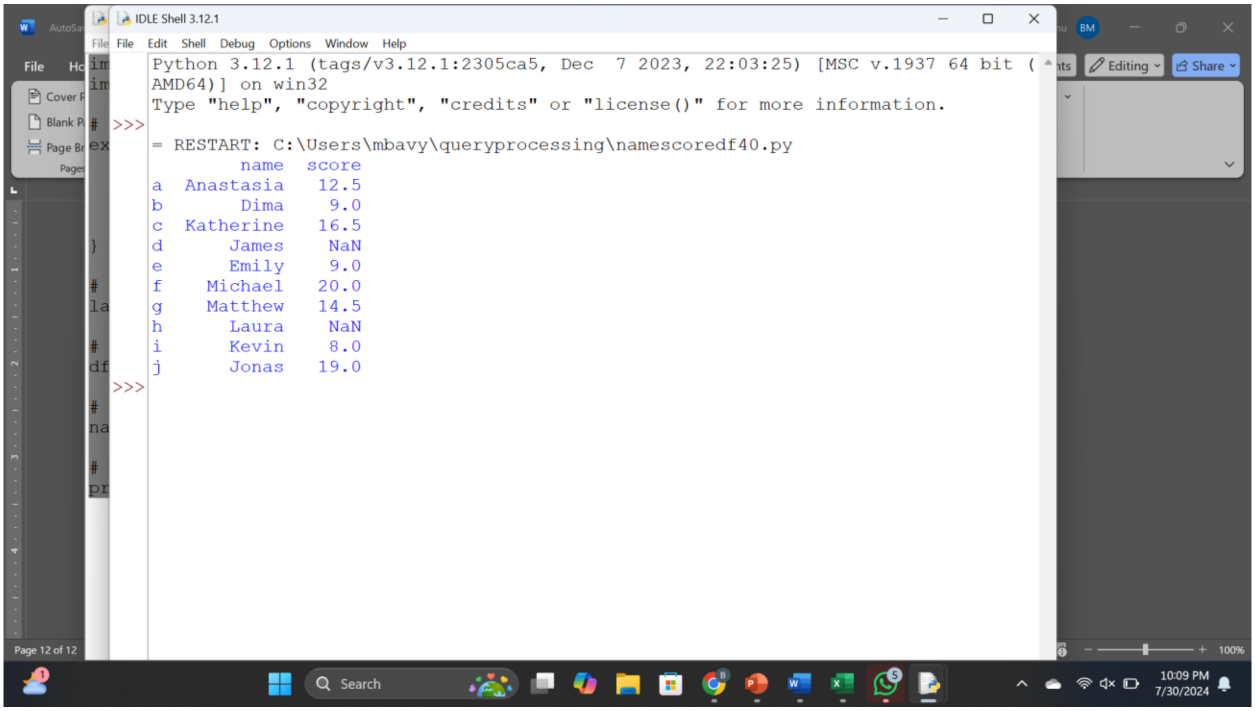
Aim:

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

Code:

```
import pandas as pd

import numpy as np


# Dictionary data

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']
}

# Index labels
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

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

# Select 'name' and 'score' columns
name_score = df[['name', 'score']]

# Display the result
print(name_score)
```

Output



```
Python 3.12.1 (tags/v3.12.1:2305ca5, Dec  7 2023, 22:03:25) [MSC v.1937 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
= RESTART: C:\Users\mbavy\queryprocessing\namescoredf40.py
        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
>>> 
```

Results:

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