Q.1 Describe the functionality of the describe() function and its variations.

Descriptive statistics provide a summary of the central tendency, dispersion, and shape of a dataset's distribution, excluding any missing values (NaN). These statistics can be calculated for both numeric and object series, as well as for columns in a DataFrame that contain mixed data types.

The `DataFrame.describe()` function is used to generate these descriptive statistics. It has several optional parameters that allow you to customize the output.

The `include` parameter can be set to 'all' (default), a list-like object of dtypes, or None. If set to 'all', all columns in the input DataFrame will be included in the output. If a list-like object of dtypes is provided, the result will be limited to the specified data types. For example, setting `include=['O']` will include only object columns, and setting `include=['category']` will include only pandas categorical columns. If set to None, the result will include all numeric columns.

The `exclude` parameter can be set to a list-like object of dtypes or None (default). If a list-like object of dtypes is provided, the specified data types will be excluded from the result. For example, setting `exclude=['O']` will exclude object columns, and setting `exclude=['category']` will exclude pandas categorical columns. If set to None, nothing will be excluded from the result.

By default, when describing a DataFrame, only numeric fields are returned in the output.

```
import pandas as pd
df = pd.DataFrame({'categorical': pd.Categorical(['d', 'e', 'f']),
'numeric': [1, 2, 3], 'object': ['a', 'b', 'c']
})
df.describe()
```

```
        numeric
count       3.0
```

```
mean        2.0
std         1.0
min         1.0
25%         1.5
```

50%	2.0
75%	2.5
max	3.0

Describing all columns of a DataFrame regardless of data type.

```
df.describe(include='all')
```

	categorical	numeric	object
count	3	3.0	3
unique	3	NaN	3
top	d	NaN	a
freq	1	NaN	1
mean	NaN	2.0	NaN
std	NaN	1.0	NaN
min	NaN	1.0	NaN
25%	NaN	1.5	NaN
50%	NaN	2.0	NaN
75%	NaN	2.5	NaN
max	NaN	3.0	NaN

Including only string columns in a DataFrame description.

```
df.describe(include=[object])
```

	object
count	3
unique	3
top	a
freq	1

Q.2 Specify the maximum character limit permissible for file names and file paths in the Windows operating system. Additionally, enumerate the special characters that are prohibited in file names.

Answer:

In Windows, the maximum length for a full file path, including the file name and extension, is 260 characters, and the maximum length for a file name is 255 characters

Q.3 Identify alternatives to the Itertools module in Python.

ANS:

1.functools.reduce() Function: The reduce() function applies this function to the first two elements of the iterable,then to the result and the third element, and so on, until it has processed the entire iterable.

```
import functools

def sum(a, b):
    return a + b

numbers = [1, 2, 3, 4]

result = functools.reduce(sum, numbers)
print(result)
```

```
10
```

2. List comprehensions are a powerful feature of Python that can make your code more concise and easier to read. They are often used to transform or filter data, and can be used with any iterable object, including lists, tuples, sets, and dictionaries.

```
# Creating a list of squares of the numbers from 1 to 5
squares = [x**2 for x in range(1, 6)]
print(squares)
```

```
[1, 4, 9, 16, 25]
```

3. The enumerate() function is a useful tool for iterating over a dictionary and keeping track of the index of each item. It can be used with any iterable object, including lists, tuples, sets, and dictionaries.

```
# Creating a dictionary of fruits and their prices
fruit_prices = {'apple': 0.5, 'banana': 0.25, 'cherry': 1.0, 'date':
0.75}

# Using enumerate() to iterate over the dictionary and printing the
index and value of each item
for index, (fruit, price) in enumerate(fruit_prices.items()):
    print(f'Index: {index}, Fruit: {fruit}, Price: {price}')
```

```
Index: 0, Fruit: apple, Price: 0.5
Index: 1, Fruit: banana, Price: 0.25
Index: 2, Fruit: cherry, Price: 1.0
Index: 3, Fruit: date, Price: 0.75
```

Q.4.The zip() function is a useful tool for iterating over two or more iterable objects in parallel.It can be used with any iterable object, including lists, tuples, sets, and dictionaries.

```
# Creating two lists of fruits and colors
fruits = ['apple', 'banana', 'cherry', 'date']
colors = ['red', 'yellow', 'red', 'brown']

# Using zip() to iterate over the two lists and printing the fruit and
color of each item
for fruit, color in zip(fruits, colors):
    print(f'Fruit: {fruit}, Color: {color}')
```

```
Fruit: apple, Color: red
Fruit: banana, Color: yellow
Fruit: cherry, Color: red
Fruit: date, Color: brown
```

Q.6 Develop a module and associated packages within a library, followed by installation using pip.

Ans:

step 1:PACKAGE Start by creating a directory structure for your library. For example: ├── my_package/ │ ├── init.py │ ├── mymodule.py │ ├── mymodule1.py └── setup.py Step2:CODE

init.py

print("my_package")

from .mymodule import hello from .mymodule1 import goodbye

mymodule.py

def hello(): print("Hello from module1!"

mymodule

def goodbye(): print("Goodbye from module2!") Step3:SetupFile

setup.py

from setuptools import setup, find_packages

setup(name='my_package', version='0.1', packages=find_packages

Step4:Run the following command pip install e .

Step 5.now use the library

import my_package

my_package.mymodule.hell

o()

my_package.mymodule1.go

odbye() Output:

my_package Hello from module1! Goodbye from module2!

Q.7 Instruct on the process of extracting date- time data from a DataFrame and exporting it to an Excel file using Pandas while preserving the original data type.

```
import pandas as pd
import xlsxwriter
```

```
# Createing a sample DataFrame with date-time data
data = {'date': ['2022-01-01 10:00:00', '2022-01-02 15:30:00', '2022-
01-03 08:15:00'],
        'value': [10, 20, 30]}
df = pd.DataFrame(data)
df['date'] = pd.to_datetime(df['date'])

# Exporting the DataFrame to an Excel file
writer = pd.ExcelWriter('output.xlsx', engine='xlsxwriter')
df.to_excel(writer, index=False)
workbook = writer.book
worksheet = writer.sheets['Sheet1']

# format for the date column
date_format = workbook.add_format({'num_format': 'yyyy-mm-dd
hh:mm:ss'})

# Setting the format for the date column in the Excel file
start_row = 0
start_col = df.columns.get_loc('date')
end_row = start_row + len(df)
end_col = start_col + 1
worksheet.set_column(start_col, end_col, None, date_format)

# Close the Excel writer
writer.close()

df1=pd.read_excel('output.xlsx')
```

df1

	date	value
0	2022-01-01 10:00:00	1900-01-10
1	2022-01-02 15:30:00	1900-01-20
2	2022-01-03 08:15:00	1900-01-30

Q.8 Propose alternative methods to replace the usage of the iloc function in Python.

```
import pandas as pd

nt=pd.read_csv("Netflix_Dataset.csv")

nt.columns

Index(['Title', 'Genre', 'Tags', 'Languages', 'Country Availability',
       'Runtime', 'Director', 'Writer', 'Actors', 'View Rating', 'IMDb
Score',
       'Awards Received', 'Awards Nominated For', 'Boxoffice',
'Release Date',
       'Netflix Release Date', 'Production House', 'Netflix Link',
'Summary',
       'Series or Movie', 'IMDb Votes', 'Image'],
      dtype='object')

# Using loc[]. Get cell value by name & index
print(nt.loc[8000]['Director'])
print(nt.loc[8000][10])

Jeremy Saulnier
7.1

C:\Users\apurva.pusatkar\AppData\Local\Temp\
ipykernel_14228\2940577545.py:3: FutureWarning: Series.  getitem
treating keys as positions is deprecated. In a future version, integer
keys will always be treated as labels (consistent with DataFrame
behavior). To access a value by position, use `ser.iloc[pos]`
  print(nt.loc[8000][10])

# Using iloc[]. Get cell value by index & name
print(nt.iloc[8000]['Languages'])
print(nt.iloc[8000,19])

English
Movie
```

```
# Using DataFrame.at[]
print(nt.at[8000,'Boxoffice'])
print(nt.at[nt.index[8000],'Summary'])
```

```
$2,58,384
Bad news from the past unhinges vagabond Dwight Evans, sending him on
a mission of bloody retribution that takes him to his childhood
hometown.
```

```
# Using DataFrame.iat[]
print(nt.iat[8000,20])

# Get a cell value
print(nt["Actors"].values[8000])
```

```
67790.0
Ydaiber Orozco, Dani Santiago, Macon Blair, Ronald Sarcos
```

Q.9 Illustrate the procedure for resetting the index in Python.

```
import pandas as pd

nt=pd.read_csv("Netflix_Dataset.csv") nt.set_index('Title', inplace=True) nt.head(5)
```

```
Genre \
Title

Lets Fight GhostCrime, Drama, Fantasy, Horror, Romance HOW TO BUILD A
GIRLComedy
The Con-HeartistComedy, Romance Gleboka wodaDrama
Only a MotherDrama
Tags
\ Title

Lets Fight Ghost  Comedy Programmes,Romantic TV Comedies,Horror ... HOW TO BUILD A GIRL

Dramas,Comedies,Films Based on Books,British The Con-Heartist Romantic Comedies,Comedies,Romantic

Films,Thai... Gleboka woda  TV Dramas,Polish TV Shows,Social Issue TV Dramas

Only a Mother  Social Issue Dramas,Dramas,Movies Based on Boo...
```

```
                              Languages  \
Title
Lets Fight Ghost     Swedish, Spanish
HOW TO BUILD A GIRL           English
The Con-Heartist                 Thai
Gleboka woda                   Polish
Only a Mother                  Swedish

                                                    Country Availability
\
Title

Lets Fight Ghost                                                  Thailand

HOW TO BUILD A GIRL                                                Canada

The Con-Heartist                                                  Thailand

Gleboka woda                                                       Poland

Only a Mother         Lithuania,Poland,France,Italy,Spain,Greece,Bel...


                            Runtime         Director   \
Title
Lets Fight Ghost     < 30 minutes  Tomas Alfredson
HOW TO BUILD A GIRL     1-2 hour    Coky Giedroyc
The Con-Heartist        > 2 hrs    Mez Tharatorn
Gleboka woda      < 30 minutes                NaN
Only a Mother             1-2 hour      Alf Sjöberg

                                                                   Writer
\
Title

Lets Fight Ghost                                    John Ajvide Lindqvist

HOW TO BUILD A GIRL                                          Caitlin Moran

The Con-Heartist     Pattaranad Bhiboonsawade, Mez Tharatorn, Thods...

Gleboka woda                                                         NaN

Only a Mother                                          Ivar Lo-Johansson


                                                                   Actors
\
Title
```

```
Lets Fight Ghost     Lina Leandersson, Kåre Hedebrant, Per Ragnar, ...
HOW TO BUILD A GIRL  Cleo, Paddy Considine, Beanie Feldstein, Dónal...
The Con-Heartist     Kathaleeya McIntosh, Nadech Kugimiya, Pimchano...
Gleboka woda         Katarzyna Maciag, Piotr Nowak, Marcin Dorocins...
Only a Mother        Hugo Björne, Eva Dahlbeck, Ulf Palme, Ragnar F...

                    View Rating  IMDb Score  ...  Awards  Nominated For
\
Title                                        ...
Lets Fight Ghost               R         7.9  ...                   57.0
HOW TO BUILD A GIRL            R         5.8  ...                    NaN
The Con-Heartist             NaN         7.4  ...                    NaN
Gleboka woda                 NaN         7.5  ...                    4.0
Only a Mother                NaN         6.7  ...                    1.0

                      Boxoffice Release Date Netflix Release Date  \
Title
Lets Fight Ghost     $21,22,065    12-Dec-08             04-03-21
HOW TO BUILD A GIRL    $70,632     08-May-20             04-03-21
The Con-Heartist           NaN    03-Dec-20             03-03-21
Gleboka woda               NaN    14-Jun-11             03-03-21
Only a Mother              NaN    31-Oct-49             03-03-21

                                          Production House  \
Title
Lets Fight Ghost                  Canal+, Sandrew Metronome
HOW TO BUILD A GIRL  Film 4, Monumental Pictures, Lionsgate
The Con-Heartist                                       NaN
Gleboka woda                                           NaN
Only a Mother                                          NaN

                                                Netflix Link  \
Title
Lets Fight Ghost    https://www.netflix.com/watch/81415947
HOW TO BUILD A GIRL https://www.netflix.com/watch/81041267
The Con-Heartist    https://www.netflix.com/watch/81306155
Gleboka woda        https://www.netflix.com/watch/81307527
Only a Mother      https://www.netflix.com/watch/81382068
```

```
                                                                     Summary  \
Title

Lets Fight Ghost     A med student with a supernatural gift tries t...

HOW TO BUILD A GIRL  When nerdy Johanna moves to London, things get...

The Con-Heartist    After her ex-boyfriend cons her out of a large...

Gleboka woda         A group of social welfare workers led by their...

Only a Mother        An unhappily married farm worker struggling to...


                   Series or Movie IMDb Votes  \
Title
Lets Fight Ghost            Series   205926.0
HOW TO BUILD A GIRL          Movie     2838.0
The Con-Heartist             Movie      131.0
Gleboka woda                Series       47.0
Only a Mother                Movie       88.0

                                                                       Image

Title

Lets Fight Ghost     https://occ-0-4708-64.1.nflxso.net/dnm/api/v6/...

HOW TO BUILD A GIRL  https://occ-0-1081-999.1.nflxso.net/dnm/api/v6...

The Con-Heartist     https://occ-0-2188-64.1.nflxso.net/dnm/api/v6/...

Gleboka woda         https://occ-0-2508-2706.1.nflxso.net/dnm/api/v...

Only a Mother        https://occ-0-2851-41.1.nflxso.net/dnm/api/v6/...


[5 rows x 21 columns]
```

```
# reset the index of the DataFrame
nt.reset_index(inplace=True)

# print the DataFrame with the reset index
print("\nDataFrame with reset index:")
nt.head(5)
```

```
DataFrame with reset index:

                 Title                                  Genre  \
0     Lets Fight Ghost  Crime, Drama, Fantasy, Horror, Romance
```

HOW TO BUILD A GIRL Comedy Comedy,
The Con-Heartist Romance
Gleboka woda Drama Drama
Only a Mother

	Tags	Languages
0	Comedy Programmes,Romantic TV Comedies,Horror ...	Swedish, Spanish
1	Dramas,Comedies,Films Based on Books,British	English
2	Romantic Comedies,Comedies,Romantic Films,Thai...	Thai
3	TV Dramas,Polish TV Shows,Social Issue TV Dramas	Polish
4	Social Issue Dramas,Dramas,Movies Based on Boo...	Swedish

	Country Availability	Runtime
0	Thailand Canada Thailand Poland	< 30 minutes
1	Lithuania,Poland,France,Italy,Spain,Greece,Bel...	1-2 hour
2		> 2 hrs
3		< 30 minutes
4		1-2 hour

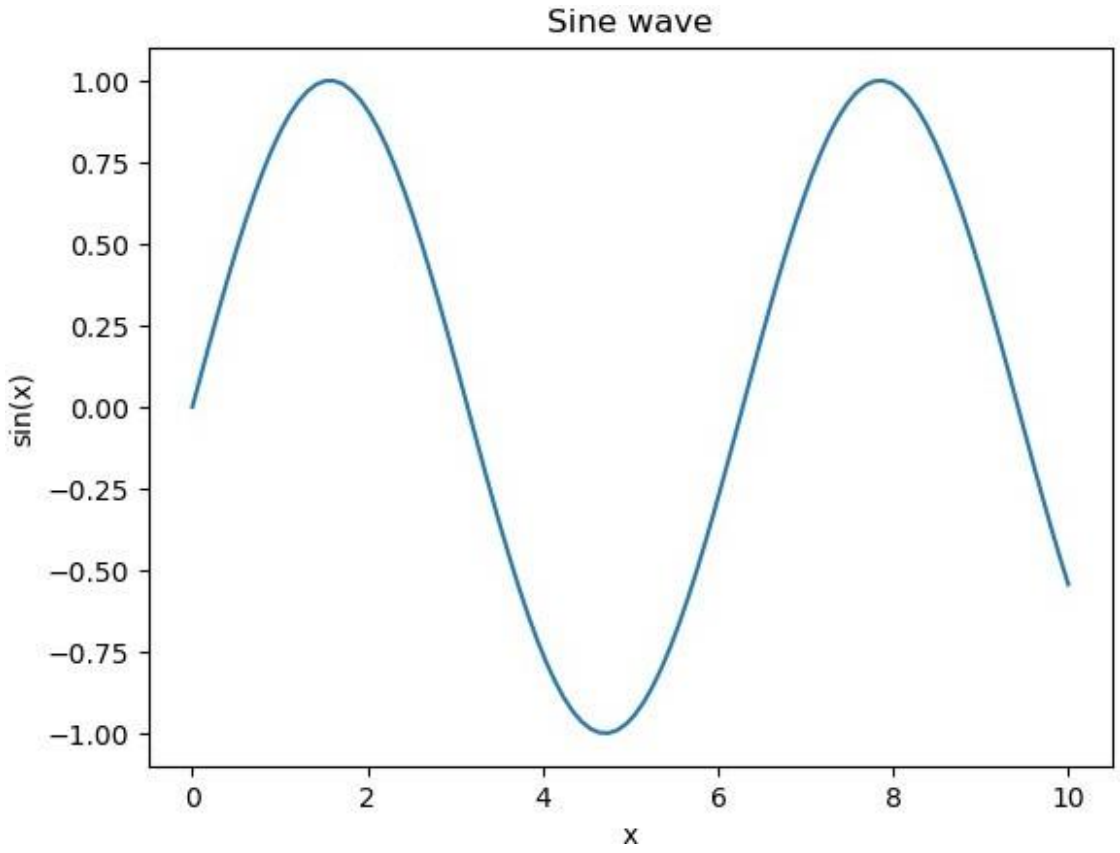
	Director	Writer
0	Tomas Alfredson	John Ajvide Lindqvist
1	Coky Giedroyc	Caitlin Moran
2	Mez Tharatorn	Pattaranad Bhiboonsawade, Mez Tharatorn, Thods...
3	NaN	NaN
4	Alf Sjöberg	Ivar Lo-Johansson

	Actors	View Rating	...
1	Lina Leandersson, Kåre Hedebrant, Per Ragnar, ...	R	...
2	Cleo, Paddy Considine, Beanie Feldstein, Dónal...	R	...
3	Kathaleeya McIntosh, Nadech Kugimiya, Pimchano...	NaN	...
4	Katarzyna Maciag, Piotr Nowak, Marcin Dorocins...	NaN	...
5	Hugo Björne, Eva Dahlbeck, Ulf Palme, Ragnar F...	NaN	...

```
   Awards  Nominated For   Boxoffice  Release Date Netflix  Release Date
\
0                   57.0  $21,22,065      12-Dec-08              04-03-21

1                    NaN    $70,632       08-May-20              04-03-21

2                    NaN         NaN      03-Dec-20              03-03-21

3                    4.0         NaN      14-Jun-11              03-03-21

4                    1.0         NaN      31-Oct-49              03-03-21


                          Production House  \
1                Canal+, Sandrew Metronome
2  Film 4, Monumental Pictures, Lionsgate
3                                      NaN
4                                      NaN
5                                      NaN

                               Netflix Link  \
1  https://www.netflix.com/watch/81415947
2  https://www.netflix.com/watch/81041267
3  https://www.netflix.com/watch/81306155
4  https://www.netflix.com/watch/81307527
5  https://www.netflix.com/watch/81382068

                                              Summary Series or
Movie  \
1  A med student with a supernatural gift tries t...          Series

2  When nerdy Johanna moves to London, things get...           Movie

3  After her ex-boyfriend cons her out of a large...           Movie

4  A group of social welfare workers led by their...          Series

5  An unhappily married farm worker struggling to...           Movie

                                                                    .
                                                                    .
                                                                    .

[5 rows x 22 columns]
```

Q.5. Demonstrate how to achieve a matplotlib operation using plotly.

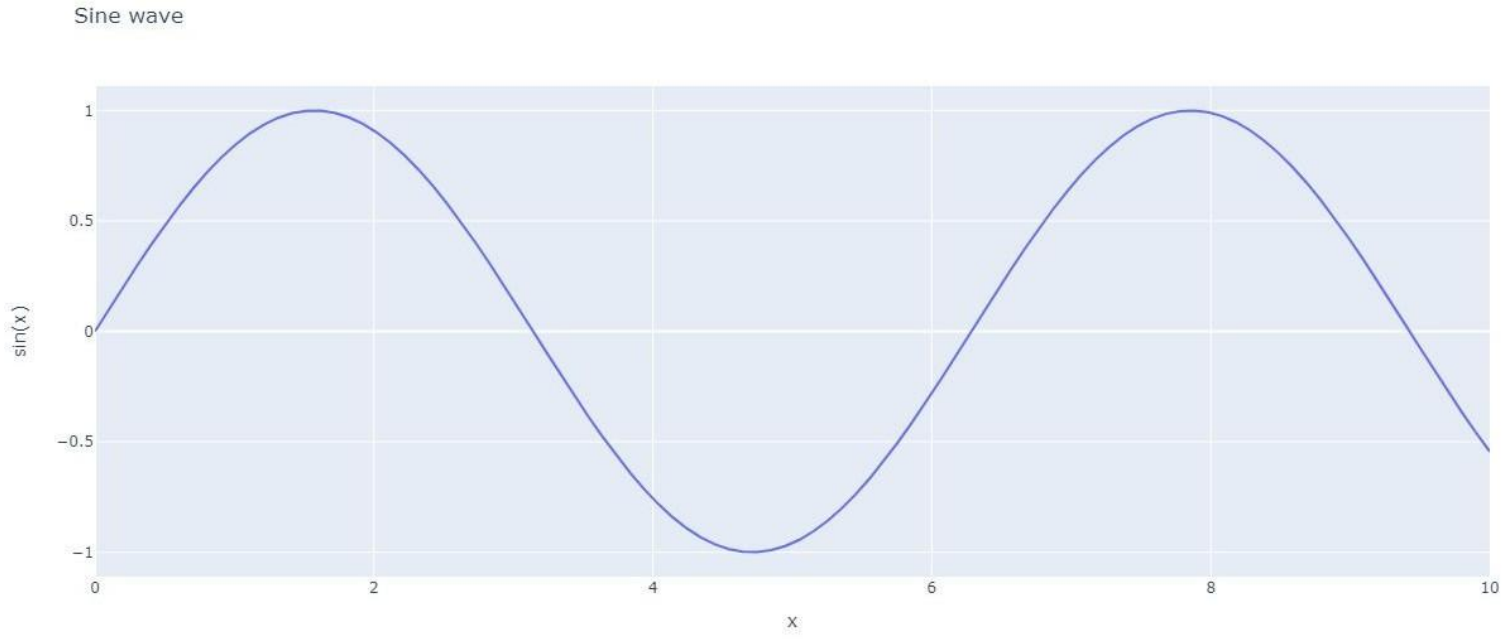
```
import matplotlib.pyplot as plt
import numpy as np

# Create some data
x = np.linspace(0, 10, 100)
y = np.sin(x)

# Create the plot
plt.plot(x, y)
plt.xlabel('x')
plt.ylabel('sin(x)')
plt.title('Sine wave')
plt.show()
```




```
import plotly.graph_objs as go
import plotly.offline as pyo

# Create the plot
```

```
trace = go.Scatter(x=x, y=y, mode='lines', name='sin(x)')
data = [trace]
layout = go.Layout(title='Sine wave', xaxis_title='x',
yaxis_title='sin(x)')
fig = go.Figure(data=data, layout=layout)

# Show the plot
pyo.plot(fig)
```

```
'temp-plot.html'
```


Sine wave
1
0.5
0
−0.5
−1
sin(x)
0
2
4
6
8
10
x