**3. Pandas DataSeries:**

**i)Write a Pandas program to create and display a one-dimensional array-like object containing an array of data using Pandas module**.

**import pandas as pd**

**series = pd.Series([2, 4, 6, 8, 10])**

**print(series)**

**output:**

**0 2**

**1 4**

**2 6**

**3 8**

**4 10**

**dtype: int64**

**ii)Write a Pandas program to convert a Panda module Series to Python list and it's type.**

**import pandas as pd**

**ds = pd.Series([2, 4, 6, 8, 10])**

**print("Pandas Series and type")**

**print(ds)**

**print(type(ds))**

**print("Convert Pandas Series to Python list")**

**print(ds.tolist())**

**print(type(ds.tolist()))**

**output:**

**Pandas Series and type**

**0 2**

**1 4**

**2 6**

**3 8**

**4 10**

**dtype: int64**

**<class 'pandas.core.series.Series'>**

**Convert Pandas Series to Python list**

**[2, 4, 6, 8, 10]**

**<class 'list'>**

**iii)Write a Pandas program to add, subtract, multiple and divide two Pandas Series.**

**import pandas as pd**

**ds1 = pd.Series([2, 4, 6, 8, 10])**

**ds2 = pd.Series([1, 3, 5, 7, 9])**

**ds = ds1 + ds2**

**print("Add two Series:")**

**print(ds)**

**print("Subtract two Series:")**

**ds = ds1 - ds2**

**print(ds)**

**print("Multiply two Series:")**

**ds = ds1 \* ds2**

**print(ds)**

**print("Divide Series1 by Series2:")**

**ds = ds1 / ds2**

**print(ds)**

**output:**

**Add two Series:**

**0 3**

**1 7**

**2 11**

**3 15**

**4 19**

**dtype: int64**

**Subtract two Series:**

**0 1**

**1 1**

**2 1**

**3 1**

**4 1**

**dtype: int64**

**Multiply two Series:**

**0 2**

**1 12**

**2 30**

**3 56**

**4 90**

**dtype: int64**

**Divide Series1 by Series2:**

**0 2.000000**

**1 1.333333**

**2 1.200000**

**3 1.142857**

**4 1.111111**

**dtype: float64**

**iv)Write a Pandas program to convert a NumPy array to a Pandas series**

**import numpy as np**

**import pandas as pd**

**np\_array = np.array([10, 20, 30, 40, 50])**

**print("NumPy array:")**

**print(np\_array)**

**new\_series = pd.Series(np\_array)**

**print("Converted Pandas series:")**

**print(new\_series)**

**output**

**NumPy array:**

**[10 20 30 40 50]**

**Converted Pandas series:**

**0 10**

**1 20**

**2 30**

**3 40**

**4 50**

**dtype: int64**

**4. Pandas DataFrames:**

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

**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**

**ii)Write a Pandas program to change the name 'James' to 'Suresh' in name column of the DataFrame**

**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("Original rows:")**

**print(df)**

**print("\nChange the name 'James' to ‘Suresh’:")**

**df['name'] = df['name'].replace('James', 'Suresh')**

**print(df)**

**output:**

**Original rows:**

**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**

**Change the name 'James' to ‘Suresh’:**

**name score attempts qualify**

**a Anastasia 12.5 1 yes**

**b Dima 9.0 3 no**

**c Katherine 16.5 2 yes**

**d Suresh 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**

**iii)Write a Pandas program to insert a new column in existing DataFrame**

**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("Original rows:")**

**print(df)**

**color = ['Red','Blue','Orange','Red','White','White','Blue','Green','Green','Red']**

**df['color'] = color**

**print("\nNew DataFrame after inserting the 'color' column")**

**print(df)**

**output:**

**Original rows:**

**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**

**New DataFrame after inserting the 'color' column**

**name score attempts qualify color**

**a Anastasia 12.5 1 yes Red**

**b Dima 9.0 3 no Blue**

**c Katherine 16.5 2 yes Orange**

**d James NaN 3 no Red**

**e Emily 9.0 2 no White**

**f Michael 20.0 3 yes White**

**g Matthew 14.5 1 yes Blue**

**h Laura NaN 1 no Green**

**i Kevin 8.0 2 no Green**

**j Jonas 19.0 1 yes Red**

**iv)Write a Pandas program to get list from DataFrame column headers.**

**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(list(df.columns.values))**

**output:**

**['name', 'score', 'attempts', 'qualify']**

**5. Pandas Index: i)Write a Pandas program to display the default index and set a column as an Index in a given dataframe.**

**import pandas as pd**

**df = pd.DataFrame({**

**'school\_code': ['s001','s002','s003','s001','s002','s004'],**

**'class': ['V', 'V', 'VI', 'VI', 'V', 'VI'],**

**'name': ['Alberto Franco','Gino Mcneill','Ryan Parkes', 'Eesha Hinton', 'Gino Mcneill', 'David Parkes'],**

**'date\_Of\_Birth': ['15/05/2002','17/05/2002','16/02/1999','25/09/1998','11/05/2002','15/09/1997'],**

**'weight': [35, 32, 33, 30, 31, 32],**

**'address': ['street1', 'street2', 'street3', 'street1', 'street2', 'street4'],**

**'t\_id':['t1', 't2', 't3', 't4', 't5', 't6']})**

**print("Default Index:")**

**print(df.head(10))**

**print("\nt\_id as new Index:")**

**df1 = df.set\_index('t\_id')**

**print(df1)**

**print("\nReset the index:")**

**df2 = df1.reset\_index(inplace=False)**

**print(df2)**

**output:**

**Default Index:**

**school\_code class name date\_Of\_Birth weight address t\_id**

**0 s001 V Alberto Franco 15/05/2002 35 street1 t1**

**1 s002 V Gino Mcneill 17/05/2002 32 street2 t2**

**2 s003 VI Ryan Parkes 16/02/1999 33 street3 t3**

**3 s001 VI Eesha Hinton 25/09/1998 30 street1 t4**

**4 s002 V Gino Mcneill 11/05/2002 31 street2 t5**

**5 s004 VI David Parkes 15/09/1997 32 street4 t6**

**t\_id as new Index:**

**school\_code class name date\_Of\_Birth weight address**

**t\_id**

**t1 s001 V Alberto Franco 15/05/2002 35 street1**

**t2 s002 V Gino Mcneill 17/05/2002 32 street2**

**t3 s003 VI Ryan Parkes 16/02/1999 33 street3**

**t4 s001 VI Eesha Hinton 25/09/1998 30 street1**

**t5 s002 V Gino Mcneill 11/05/2002 31 street2**

**t6 s004 VI David Parkes 15/09/1997 32 street4**

**Reset the index:**

**t\_id school\_code class name date\_Of\_Birth weight address**

**0 t1 s001 V Alberto Franco 15/05/2002 35 street1**

**1 t2 s002 V Gino Mcneill 17/05/2002 32 street2**

**2 t3 s003 VI Ryan Parkes 16/02/1999 33 street3**

**3 t4 s001 VI Eesha Hinton 25/09/1998 30 street1**

**4 t5 s002 V Gino Mcneill 11/05/2002 31 street2**

**5 t6 s004 VI David Parkes 15/09/1997 32 street4**

**ii)Write a Pandas program to create an index labels by using 64-bit integers, using floating-point numbers in a given dataframe**

**import pandas as pd**

**print("Create an Int64Index:")**

**df\_i64 = pd.DataFrame({**

**'school\_code': ['s001','s002','s003','s001','s002','s004'],**

**'class': ['V', 'V', 'VI', 'VI', 'V', 'VI'],**

**'name': ['Alberto Franco','Gino Mcneill','Ryan Parkes', 'Eesha Hinton', 'Gino Mcneill', 'David Parkes'],**

**'date\_Of\_Birth': ['15/05/2002','17/05/2002','16/02/1999','25/09/1998','11/05/2002','15/09/1997'],**

**'weight': [35, 32, 33, 30, 31, 32],**

**'address': ['street1', 'street2', 'street3', 'street1', 'street2', 'street4']},**

**index=[1, 2, 3, 4, 5, 6])**

**print(df\_i64)**

**print("\nView the Index:")**

**print(df\_i64.index)**

**print("\nFloating-point labels using Float64Index:")**

**df\_f64 = pd.DataFrame({**

**'school\_code': ['s001','s002','s003','s001','s002','s004'],**

**'class': ['V', 'V', 'VI', 'VI', 'V', 'VI'],**

**'name': ['Alberto Franco','Gino Mcneill','Ryan Parkes', 'Eesha Hinton', 'Gino Mcneill', 'David Parkes'],**

**'date\_Of\_Birth ': ['15/05/2002','17/05/2002','16/02/1999','25/09/1998','11/05/2002','15/09/1997'],**

**'weight': [35, 32, 33, 30, 31, 32],**

**'address': ['street1', 'street2', 'street3', 'street1', 'street2', 'street4']},**

**index=[.1, .2, .3, .4, .5, .6])**

**print(df\_f64)**

**print("\nView the Index:")**

**print(df\_f64.index)**

**output:**

**Create an Int64Index:**

**school\_code class name date\_Of\_Birth weight address**

**1 s001 V Alberto Franco 15/05/2002 35 street1**

**2 s002 V Gino Mcneill 17/05/2002 32 street2**

**3 s003 VI Ryan Parkes 16/02/1999 33 street3**

**4 s001 VI Eesha Hinton 25/09/1998 30 street1**

**5 s002 V Gino Mcneill 11/05/2002 31 street2**

**6 s004 VI David Parkes 15/09/1997 32 street4**

**View the Index:**

**Int64Index([1, 2, 3, 4, 5, 6], dtype='int64')**

**Floating-point labels using Float64Index:**

**school\_code class name date\_Of\_Birth weight address**

**0.1 s001 V Alberto Franco 15/05/2002 35 street1**

**0.2 s002 V Gino Mcneill 17/05/2002 32 street2**

**0.3 s003 VI Ryan Parkes 16/02/1999 33 street3**

**0.4 s001 VI Eesha Hinton 25/09/1998 30 street1**

**0.5 s002 V Gino Mcneill 11/05/2002 31 street2**

**0.6 s004 VI David Parkes 15/09/1997 32 street4**

**View the Index:**

**Float64Index([0.1, 0.2, 0.3, 0.4, 0.5, 0.6], dtype='float64'**)