3

April 10, 2024

[2]:
```
import pandas as pd
import numpy as np
```

Write a Pandas program to join the two given dataframes along rows and assign all data.

[4]:
```
data1 = {
    'student_id': ['S1', 'S2', 'S3', 'S4', 'S5'],
    'name': ['Danniella Fenton', 'Ryder Storey', 'Bryce Jensen', 'Ed Bernal',␣
 ↪'Kwame Morin'],
    'marks': [200, 210, 190, 222, 199]
}

x1 = pd.DataFrame(data1)

data2 = {
    'student_id': ['S4', 'S5', 'S6', 'S7', 'S8'],
    'name': ['Scarlette Fisher', 'Carla Williamson', 'Dante Morse', 'Kaiser␣
 ↪William', 'Madeeha Preston'],
    'marks': [201, 200, 198, 219, 201]
}

x2 = pd.DataFrame(data2)

x3 = pd.concat([x1, x2], axis=0)

x3
```

[4]:

	student_id	name	marks
0	S1	Danniella Fenton	200
1	S2	Ryder Storey	210
2	S3	Bryce Jensen	190
3	S4	Ed Bernal	222
4	S5	Kwame Morin	199
0	S4	Scarlette Fisher	201
1	S5	Carla Williamson	200
2	S6	Dante Morse	198
3	S7	Kaiser William	219
4	S8	Madeeha Preston	201

Write a Pandas program to join the two given dataframes along columns and assign all data.

[24]:
```
x4 = pd.concat([x1, x2], axis=1)
x4
```

[24]:

	student_id	name	marks	student_id	name	marks
0	S1	Danniella Fenton	200	S4	Scarlette Fisher	201
1	S2	Ryder Storey	210	S5	Carla Williamson	200
2	S3	Bryce Jensen	190	S6	Dante Morse	198
3	S4	Ed Bernal	222	S7	Kaiser William	219
4	S5	Kwame Morin	199	S8	Madeeha Preston	201

Write a Pandas program to append rows to an existing DataFrame and display the combined data.

[12]:
```
x5 = {
    'student_id': ['S6'],
    'name': ['Scarlette Fisher'],
    'marks': [205]
}
x6 = pd.DataFrame(x5)

x7 = pd.concat([x1, x6])
x7
```

[12]:

	student_id	name	marks
0	S1	Danniella Fenton	200
1	S2	Ryder Storey	210
2	S3	Bryce Jensen	190
3	S4	Ed Bernal	222
4	S5	Kwame Morin	199
0	S6	Scarlette Fisher	205

Write a Pandas program to append a list of dictioneries or series to a existing DataFrame and display the combined data.

[45]:
```
datadata = {
    'student_id': ['S6'],
    'name': ['Scarlette Fisher'],
    'marks': [205]
}

x9 = pd.concat([x1, pd.DataFrame(datadata)], ignore_index=True)
x9
```

[45]:

	student_id	name	marks
0	S1	Danniella Fenton	200
1	S2	Ryder Storey	210
2	S3	Bryce Jensen	190
3	S4	Ed Bernal	222

```
4         S5       Kwame Morin    199
5         S6  Scarlette Fisher    205
```

Write a Pandas program to join the two given dataframes along rows and merge with another dataframe along the common column id.

[11]:
```
x10 = pd.concat([x1, x2], axis=0)

x10

exam_data = {
    'student_id': ['S1', 'S2', 'S3', 'S4', 'S5', 'S7', 'S8', 'S9', 'S10',␣
 ↪'S11', 'S12', 'S13'],
    'exam_id': [23, 45, 12, 67, 21, 55, 33, 14, 56, 83, 88, 12]
}

x11 = pd.DataFrame(exam_data)

x12 = pd.merge(x10, x11, on="student_id", how="inner")
x12
```

[11]:

	student_id	name	marks	exam_id
0	S1	Danniella Fenton	200	23
1	S2	Ryder Storey	210	45
2	S3	Bryce Jensen	190	12
3	S4	Ed Bernal	222	67
4	S4	Scarlette Fisher	201	67
5	S5	Kwame Morin	199	21
6	S5	Carla Williamson	200	21
7	S7	Kaiser William	219	55
8	S8	Madeeha Preston	201	33

Write a Pandas program to join the two dataframes using the common column of both dataframes.

[30]:
```
pd.merge(x1, x2, how="outer", on="student_id")
```

[30]:

	student_id	name_x	marks_x	name_y	marks_y
0	S1	Danniella Fenton	200.0	NaN	NaN
1	S2	Ryder Storey	210.0	NaN	NaN
2	S3	Bryce Jensen	190.0	NaN	NaN
3	S4	Ed Bernal	222.0	Scarlette Fisher	201.0
4	S5	Kwame Morin	199.0	Carla Williamson	200.0
5	S6	NaN	NaN	Dante Morse	198.0
6	S7	NaN	NaN	Kaiser William	219.0
7	S8	NaN	NaN	Madeeha Preston	201.0

Write a Pandas program to join the two dataframes with matching records from both sides where available.

[29]:
```
x15 = pd.merge(x1, x2, how="inner", on="student_id")
x15
```

[29]:

	student_id	name_x	marks_x	name_y	marks_y
0	S4	Ed Bernal	222	Scarlette Fisher	201
1	S5	Kwame Morin	199	Carla Williamson	200

Write a Pandas program to join (left join) the two dataframes using keys from left dataframe only.

[18]:
```
x17 = {
    'key1': ['K0', 'K0', 'K1', 'K2'],
    'key2': ['K0', 'K1', 'K0', 'K1'],
    'P': ['P0', 'P1', 'P2', 'P3'],
    'Q': ['Q0', 'Q1', 'Q2', 'Q3']
}

x17df = pd.DataFrame(x17)

x18 = {
    'key1': ['K0', 'K1', 'K1', 'K2'],
    'key2': ['K0', 'K0', 'K0', 'K0'],
    'R': ['R0', 'R1', 'R2', 'R3'],
    'S': ['S0', 'S1', 'S2', 'S3']
}

x18df = pd.DataFrame(x18)


pd.merge(x17df, x18df, how="left")
```

[18]:

	key1	key2	P	Q	R	S
0	K0	K0	P0	Q0	R0	S0
1	K0	K1	P1	Q1	NaN	NaN
2	K1	K0	P2	Q2	R1	S1
3	K1	K0	P2	Q2	R2	S2
4	K2	K1	P3	Q3	NaN	NaN

Write a Pandas program to join two dataframes using keys from right dataframe only.

[17]:
```
pd.merge(x17df, x18df, how="right")
```

[17]:

	key1	key2	P	Q	R	S
0	K0	K0	P0	Q0	R0	S0
1	K1	K0	P2	Q2	R1	S1
2	K1	K0	P2	Q2	R2	S2
3	K2	K0	NaN	NaN	R3	S3

Write a Pandas program to merge two given datasets using multiple join keys.

[26]:
```
pd.merge(x17df, x18df, how="outer", on=["key1", "key2"])
```

[26]:

	key1	key2	P	Q	R	S
0	K0	K0	P0	Q0	R0	S0
1	K0	K1	P1	Q1	NaN	NaN
2	K1	K0	P2	Q2	R1	S1
3	K1	K0	P2	Q2	R2	S2
4	K2	K1	P3	Q3	NaN	NaN
5	K2	K0	NaN	NaN	R3	S3

Write a Pandas program to create a new DataFrame based on existing series, using specified argument and override the existing columns names.

[27]:
```
x19 = pd.merge(x17df, x18df, how="outer", on=["key1", "key2"])
x19.columns = ["k1", "k2", "p", "q", "r", "s"]
x19
```

[27]:

	k1	k2	p	q	r	s
0	K0	K0	P0	Q0	R0	S0
1	K0	K1	P1	Q1	NaN	NaN
2	K1	K0	P2	Q2	R1	S1
3	K1	K0	P2	Q2	R2	S2
4	K2	K1	P3	Q3	NaN	NaN
5	K2	K0	NaN	NaN	R3	S3

Write a Pandas program to create a combination from two dataframes where a column id combination appears more than once in both dataframes.

[28]:
```
pd.merge(x17df, x18df, how="inner", on=["key1", "key2"])
```

[28]:

	key1	key2	P	Q	R	S
0	K0	K0	P0	Q0	R0	S0
1	K1	K0	P2	Q2	R1	S1
2	K1	K0	P2	Q2	R2	S2

Write a Pandas program to combine the columns of two potentially differently-indexed DataFrames into a single result DataFrame.

[33]:
```
x20 = {
    'A': ['A0', 'A1', 'A2'],
    'B': ['B0', 'B1', 'B2']
}

x20df = pd.DataFrame(x20, index=['K0', 'K1', 'K2'])

x21 = {
    'C': ['C0', 'C2', 'C3'],
    'D': ['D0', 'D2', 'D3']
}
```

```
x21df = pd.DataFrame(x21, index=['K0', 'K2', 'K3'])

pd.merge(x20df, x21df, how="inner", left_index=True, right_index=True)
```

[33]:

	A	B	C	D
K0	A0	B0	C0	D0
K2	A2	B2	C2	D2

Write a Pandas program to merge two given dataframes with different columns.

[34]:
```
pd.concat([x17df, x18df], axis=0)
```

[34]:

	key1	key2	P	Q	R	S
0	K0	K0	P0	Q0	NaN	NaN
1	K0	K1	P1	Q1	NaN	NaN
2	K1	K0	P2	Q2	NaN	NaN
3	K2	K1	P3	Q3	NaN	NaN
0	K0	K0	NaN	NaN	R0	S0
1	K1	K0	NaN	NaN	R1	S1
2	K1	K0	NaN	NaN	R2	S2
3	K2	K0	NaN	NaN	R3	S3

Write a Pandas program to Combine two DataFrame objects by filling null values in one DataFrame with non-null values from other DataFrame.

[35]:
```
x22 = {
    'A': [np.nan, 0.0, np.nan],
    'B': [3, 4, 5]
}

x22df = pd.DataFrame(x22)


x23 = {
    'A': [1, 1, 3],
    'B': [3.0, np.nan, 3.0]
}

x23df = pd.DataFrame(x23)

x22df.fillna(x23df)
```

[35]:

	A	B
0	1.0	3
1	0.0	4
2	3.0	5