Session6-Pandas (Operations, Pivot, Stack)_temp

DAwithPython S-6
Training Clarusway
Pear Deck - January 26, 2022 at 7:39PM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

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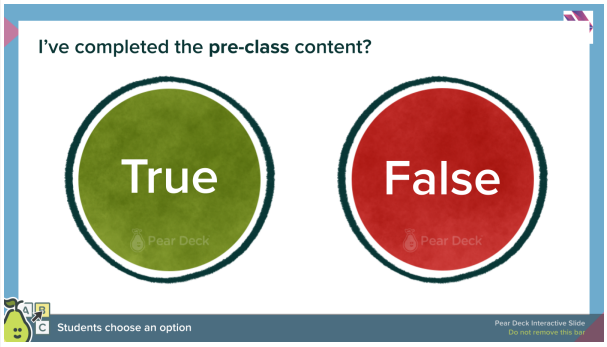
Slide 4	Your Response



You Chose
- **True**

Other Choices
- False

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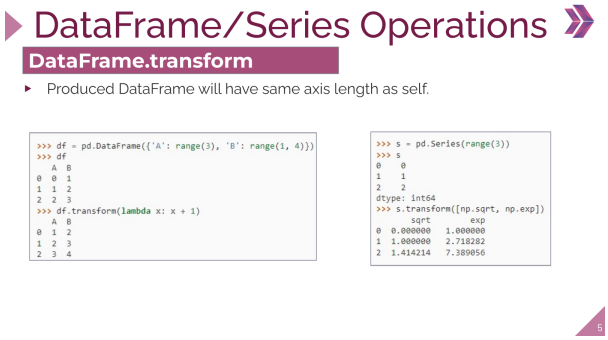

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DataFrame/Series Operations

DataFrame.groupby.transform

df2

	groups	var1	var2
0	A	10	100
1	B	23	253
2	C	33	333
3	A	22	262
4	B	11	111
5	C	99	969
6	A	76	405
7	B	84	578
8	C	45	760

```
df2.groupby("groups")["var1"].mean()
```

```
groups
A    36.000000
B    39.333333
C    59.000000
Name: var1, dtype: float64
```

```
df2.groupby("groups")["var1"].transform("mean")
```

```
0    36.000000
1    39.333333
2    59.000000
3    36.000000
4    39.333333
5    59.000000
6    36.000000
7    39.333333
8    59.000000
```

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DataFrame/Series Operations

Types of “Apply”s

`Series.apply`
For applying more complex functions on a Series.

`DataFrame.apply`
Apply a function row-/column-wise.

`DataFrame.applymap`
Apply a function elementwise on a whole DataFrame.

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DataFrame/Series Operations

Series.apply

- Invoke function on values of Series.

```
>>> s = pd.Series([20, 21, 12],
...               index=['London', 'New York', 'Helsinki'])
>>> s
London      20
New York    21
Helsinki    12
```

```
>>> def square(x):
...     return x ** 2
>>> s.apply(square)
London      400
New York    441
Helsinki    144
```

```
>>> s.apply(lambda x: x ** 2)
London      400
New York    441
Helsinki    144
```

```
>>> s.apply(np.log)
London      2.995732
New York    3.044522
Helsinki    2.484907
```


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DataFrame/Series Operations

DataFrame.apply

- Apply a function along an axis of the DataFrame.

```
>>> df = pd.DataFrame([[4, 9]] * 3, columns=['A', 'B'])
>>> df
   A  B
0  4  9
1  4  9
2  4  9
```

Using a numpy universal function (in this case the same as `np.sqrt(df)`):

```
>>> df.apply(np.sqrt)
     A    B
0  2.0  3.0
1  2.0  3.0
2  2.0  3.0
```

Using a reducing function on either axis

```
>>> df.apply(np.sum, axis=0)
A    12
B    27
dtype: int64
```

```
>>> df.apply(np.sum, axis=1)
0    13
1    13
2    13
dtype: int64
```


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DataFrame/Series Operations

DataFrame.applymap

- Apply a function elementwise on a whole DataFrame.

```
>>> df = pd.DataFrame([[1, 2.12], [3.356, 4.567]])
>>> df
       0      1
0  1.000  2.120
1  3.356  4.567
```

```
>>> df.applymap(lambda x: len(str(x)))
   0  1
0  3  4
1  5  5
```

```
>>> df.applymap(lambda x: x**2)
          0          1
0  1.000000   4.494400
1  11.262736  20.857489
```

But it's better to avoid applymap in that case.

```
>>> df ** 2
          0          1
0  1.000000   4.494400
1  11.262736  20.857489
```

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DataFrame/Series Operations

Series.map

- Map values of Series according to input correspondence.

```
>>> s = pd.Series(['cat', 'dog', np.nan, 'rabbit'])
>>> s
0      cat
1      dog
2      NaN
3   rabbit
```

```
>>> s.map({'cat': 'kitten', 'dog': 'puppy'})
0   kitten
1    puppy
2      NaN
3      NaN
```

```
>>> s.map('I am a {}'.format)
0       I am a cat
1       I am a dog
2       I am a nan
3    I am a rabbit
```

```
>>> s.map('I am a {}'.format, na_action='ignore')
0     I am a cat
1     I am a dog
2            NaN
3  I am a rabbit
```

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DataFrame/Series Operations

apply() vs applymap() vs map()

	DataFrame	Series
`apply`	✅	✅
`map`		✅
`applymap`	✅	

- **apply()** is used to apply a function **along an axis of the DataFrame or on values of Series**.
- **applymap()** is used to apply a function to a **DataFrame elementwise**.
- **map()** is used to **substitute each value in a Series with another value**.

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DataFrame/Series Operations

apply() vs transform()

```
df5.apply(lambda x: x+10)
```

	A	B
0	11	20
1	12	30
2	13	40

	A	B
0	1	10
1	2	20
2	3	30

```
df5.transform(lambda x: x+10)
```

	A	B
0	11	20
1	12	30
2	13	40

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DataFrame/Series Operations

apply() vs transform()

- **transform()** works with function, a string function, a list of functions, and a dict. However, **apply()** is only allowed with function.
- **transform()** cannot produce aggregated results.
- **apply()** works with multiple Series at a time. But, **transform()** is only allowed to work with a single Series at a time.
- **transform()** returns a DataFrame that has the same length as the input

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DataFrame/Series Operations

apply() vs transform()

- **transform()** works with function, a string function, a list of functions, and a dict. However, **apply()** is only allowed with function.

	A	B
0	1	10
1	2	20
2	3	30

```
df5.transform('sqrt')
#df5.apply('sqrt') gives an error
```

	A	B
0	1.000000	3.162278
1	1.414214	4.472136
2	1.732051	5.477226

```
df5.transform(np.sqrt)
#df5.apply(np.sqrt)
```

	A	B
0	1.000000	3.162278
1	1.414214	4.472136
2	1.732051	5.477226

```
df5.transform([np.sqrt, np.exp])
#df5.apply([np.sqrt, np.exp])
```

	A		B	
	sqrt	exp	sqrt	exp
0	1.000000	2.718282	3.162278	2.202647e+04
1	1.414214	7.389056	4.472136	4.851652e+08
2	1.732051	20.085537	5.477226	1.068647e+13

```
df5.transform({'A': np.sqrt, 'B': np.exp})
#df5.apply({'A': np.sqrt, 'B': np.exp})
```

	A	B
0	1.000000	2.202647e+04
1	1.414214	4.851652e+08
2	1.732051	1.068647e+13

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DataFrame/Series Operations

apply() vs transform()

- **transform()** cannot produce aggregated results.

	A	B
0	1	10
1	2	20
2	3	30

```
df5.apply(lambda x: x.sum())
# df5.transform(lambda x:x.sum()) gives an error
```

```
A     6
B    60
dtype: int64
```


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DataFrame/Series Operations

apply() vs transform()

- **apply()** works with multiple Series at a time. But, **transform()** is only allowed to work with a single Series at a time.

	A	B
0	1	10
1	2	20
2	3	30

```
df5.apply(lambda x: x["B"]-x["A"], axis=1)
# df5.transform(lambda x: x["B"]-x["A"], axis=1) gives an error
```

```
0     9
1    18
2    27
dtype: int64
```


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DataFrame/Series Operations

apply() vs transform()

- **apply()** works with multiple Series at a time. But, **transform()** is only allowed to work with a single Series at a time.

	key	A	B
0	a	0	1
1	b	1	2
2	c	2	3
3	a	3	1
4	b	4	2
5	c	5	3
6	a	6	1
7	b	7	2
8	c	8	3

```
df6.groupby('key').apply(lambda x: x["B"]-x["A"])
# df6.groupby('key').transform(lambda x: x["B"]-x["A"]) gives an error
```

```
key
a    0    1
     3   -2
     6   -5
b    1    1
     4   -2
     7   -5
c    2    1
     5   -2
     8   -5
```

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DataFrame/Series Operations

apply() vs transform()

- **transform()** returns a DataFrame that has the same length as the input

	key	A	B
0	a	0	1
1	b	1	2
2	c	2	3
3	a	3	1
4	b	4	2
5	c	5	3
6	a	6	1
7	b	7	2
8	c	8	3

```
df6.groupby('key')['A'].sum()
```

```
key
a     9
b    12
c    15
```

```
df6.groupby('key')['A'].apply(lambda x: x.sum())
```

```
key
a     9
b    12
c    15
```

```
df6.groupby('key')['A'].transform(lambda x: x.sum())
```

```
0     9
1    12
2    15
3     9
4    12
5    15
6     9
7    12
8    15
```

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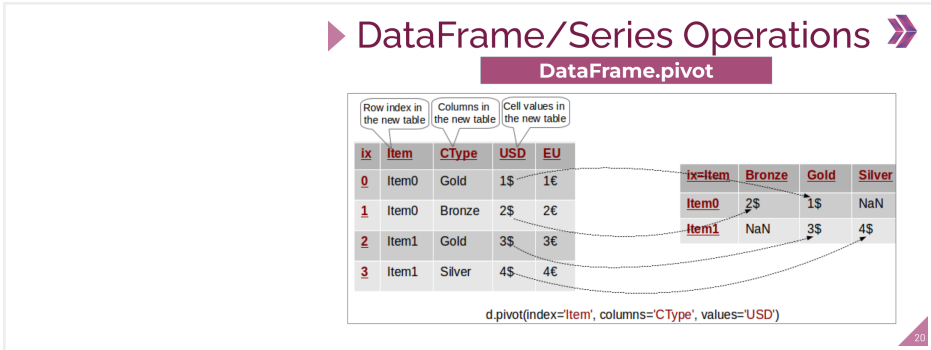

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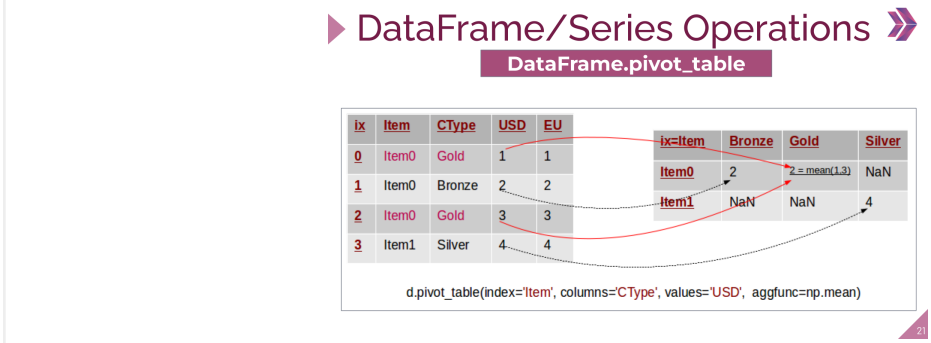

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DataFrame/Series Operations

DataFrame.pivot vs DataFrame.pivot_table

- **Pivot_table** is a generalization of **pivot** that can handle duplicate values for **one pivoted index/column pair**.
- **Pivot_table** will only allow **numeric types** as "values=", whereas **pivot** will take **string types** as "values=".

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DataFrame/Series Operations

DataFrame.pivot vs DataFrame.pivot_table

	gender	sport	age	height	weight
0	male	baseball	21	72	200
1	female	basketball	21	72	130
2	female	golf	22	73	150
3	male	basketball	20	75	175
4	female	archery	22	68	170

Pivot and pivot_table may only exhibit the same functionality if the data allows.

```
df.pivot_table(index='gender', columns='sport',
               values=['age','height','weight'],
               aggfunc='mean')
```

	age				height				weight			
sport	archery	baseball	basketball	golf	archery	baseball	basketball	golf	archery	baseball	basketball	golf
gender												
female	22.0	NaN	21.0	22.0	68.0	NaN	72.0	73.0	170.0	NaN	130.0	150.0
male	NaN	21.0	20.0	NaN	NaN	72.0	75.0	NaN	NaN	200.0	175.0	NaN

=

```
df.pivot(index='gender', columns='sport',
         values=['age','height','weight'])
```

	age				height				weight			
sport	archery	baseball	basketball	golf	archery	baseball	basketball	golf	archery	baseball	basketball	golf
gender												
female	22.0	NaN	21.0	22.0	68.0	NaN	72.0	73.0	170.0	NaN	130.0	150.0
male	NaN	21.0	20.0	NaN	NaN	72.0	75.0	NaN	NaN	200.0	175.0	NaN

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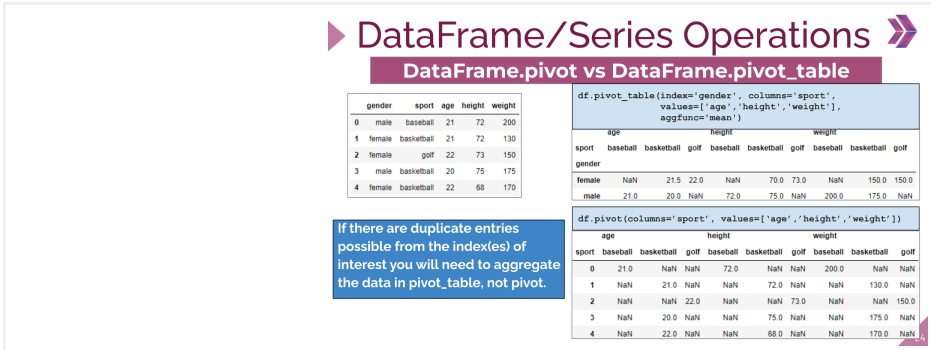

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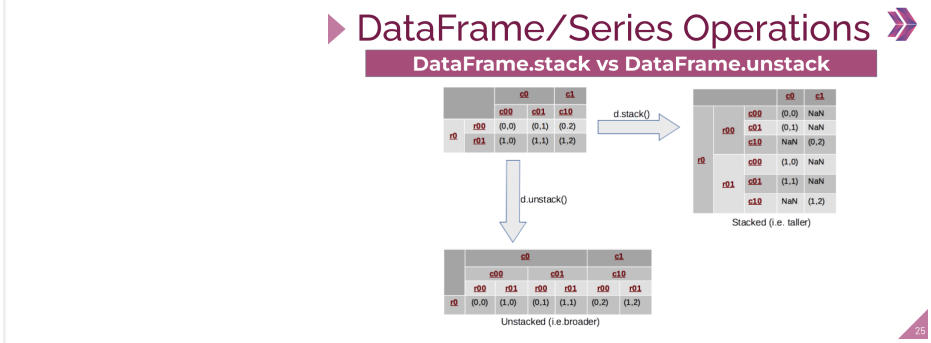

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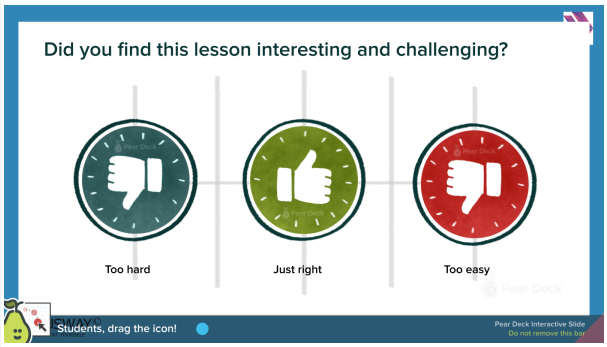
Slide 27	Your Response
	

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THANKS!

Any questions?

You can find us at:

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