Session5-6-Pandas (Groupby, Useful Operations, Pivot, Stack)

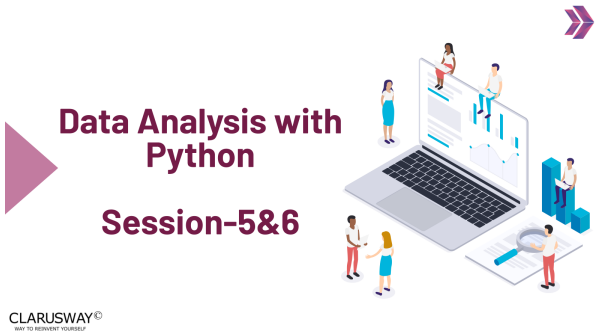
DS 12/22_EU_DAwP_S5&6_Groupby_UsefullOperations_6thAgu22
Training Clarusway
Pear Deck - August 6, 2022 at 0:51AM

Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1



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pandas

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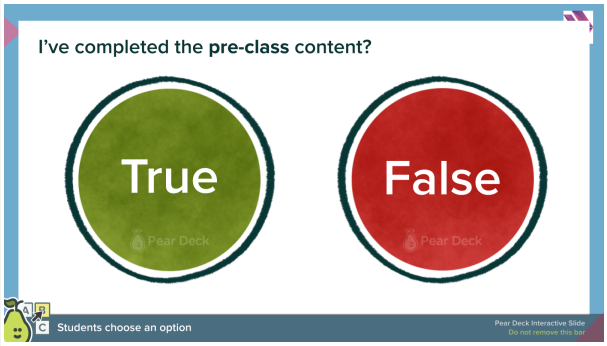
Slide 4	Your Response
	You Chose • **False** Other Choices • True

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Slide 5	Your Response
	

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Slide 6

Basic Aggregation Methods

- count()
- mean()
- median()
- idxmin()
- idxmax()
- corr()
- min()
- max()
- std()
- var()
- sum()
- describe()

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Grouping Data (DataFrame.groupby)

- DataFrame.groupby operation involves some combination of **splitting the object**, **applying a function**, and **combining the results**.
- This can be used to group large amounts of data and compute operations on these groups.

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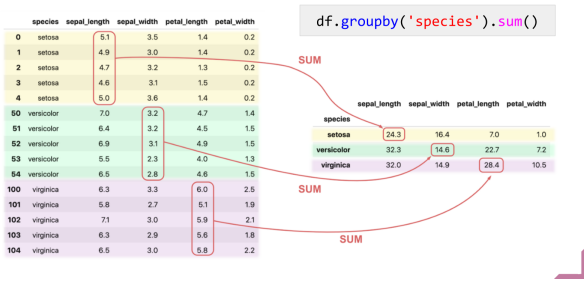
Grouping Data (DataFrame.groupby())



	species	sepal_length	sepal_width	petal_length	petal_width
0	setosa	5.1	3.5	1.4	0.2
1	setosa	4.9	3.0	1.4	0.2
2	setosa	4.7	3.2	1.3	0.2
3	setosa	4.6	3.1	1.5	0.2
4	setosa	5.0	3.6	1.4	0.2
50	versicolor	7.0	3.2	4.7	1.4
51	versicolor	6.4	3.2	4.5	1.5
52	versicolor	6.9	3.1	4.9	1.5
53	versicolor	5.5	2.3	4.0	1.3
54	versicolor	6.5	2.8	4.6	1.5
100	virginica	6.3	3.3	6.0	2.5
101	virginica	5.8	2.7	5.1	1.9
102	virginica	7.1	3.0	5.9	2.1
103	virginica	6.3	2.9	5.6	1.8
104	virginica	6.5	3.0	5.8	2.2

species	sepal_length	sepal_width	petal_length	petal_width
setosa	24.3	16.4	7.0	1.0
versicolor	32.3	14.6	22.7	7.2
virginica	32.0	14.9	28.4	10.5

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Useful Operations

DataFrame.aggregate/agg

```
>>> df = pd.DataFrame([[1, 2, 3],
...                    [4, 5, 6],
...                    [7, 8, 9],
...                    [np.nan, np.nan, np.nan]],
...                   columns=['A', 'B', 'C'])
```

Aggregate these functions over the rows.

```
>>> df.agg(['sum', 'min'])
        A     B     C
sum  12.0  15.0  18.0
min   1.0   2.0   3.0
```

Different aggregations per column.

```
>>> df.agg({'A' : ['sum', 'min'], 'B' : ['min', 'max']})
        A    B
sum  12.0  NaN
min   1.0  2.0
max   NaN  8.0
```

Aggregate different functions over the columns and rename the index

```
>>> df.agg(x=('A', max), y=('B', 'min'), z=('C', np.mean))
     A    B    C
x  7.0  NaN  NaN
y  NaN  2.0  NaN
z  NaN  NaN  6.0
```

Aggregate over the columns.

```
>>> df.agg("mean", axis="columns")
0    2.0
1    5.0
2    8.0
3    NaN
```

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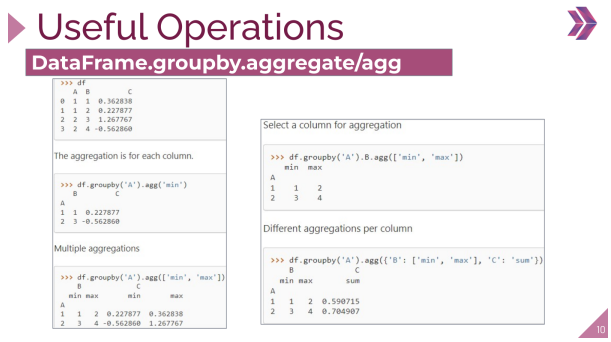

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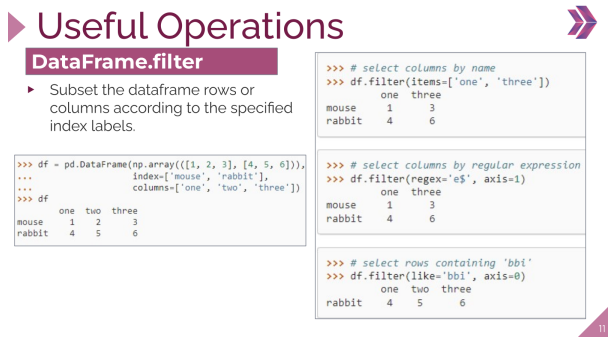

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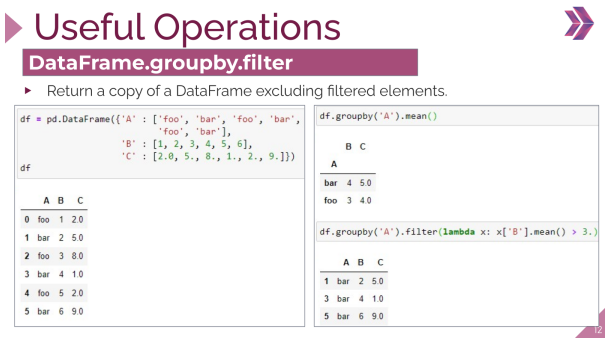

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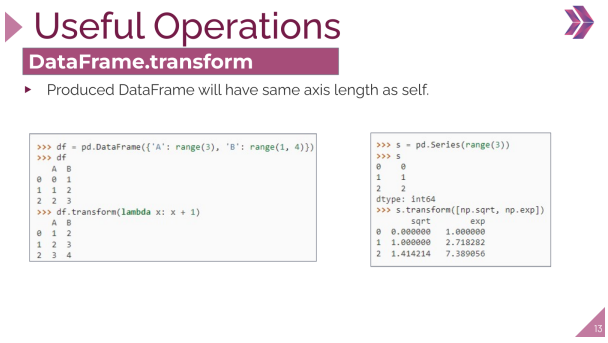

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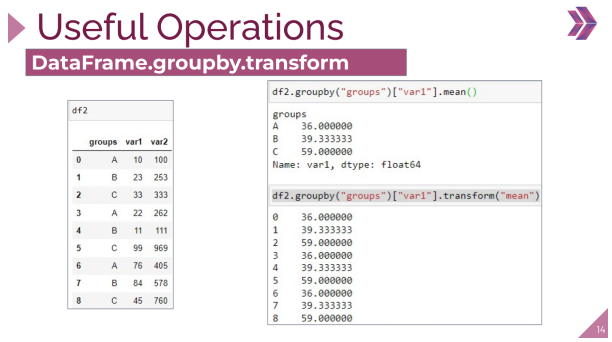

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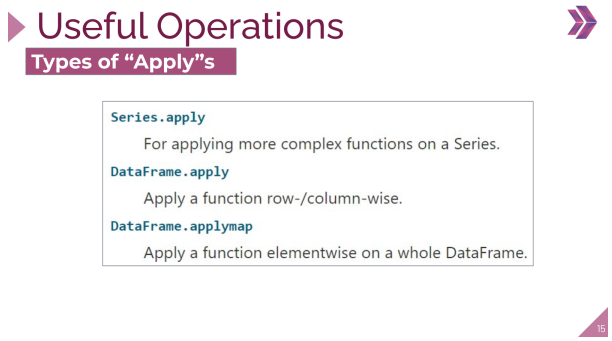

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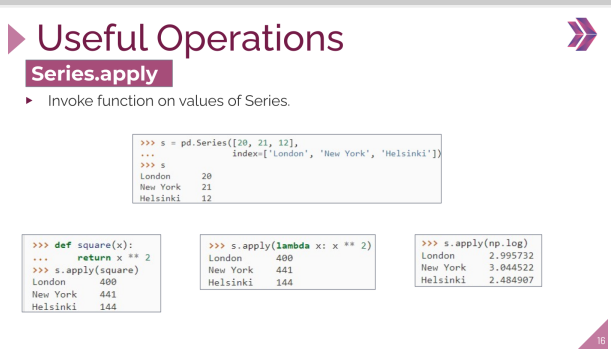

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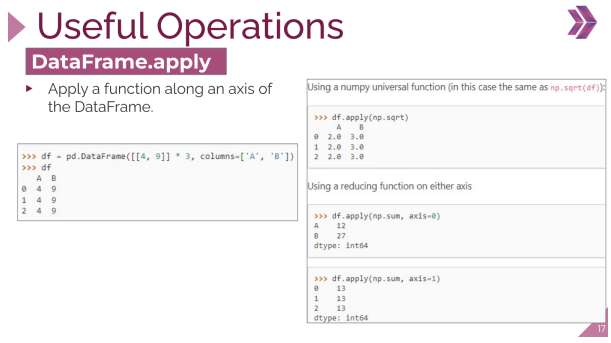

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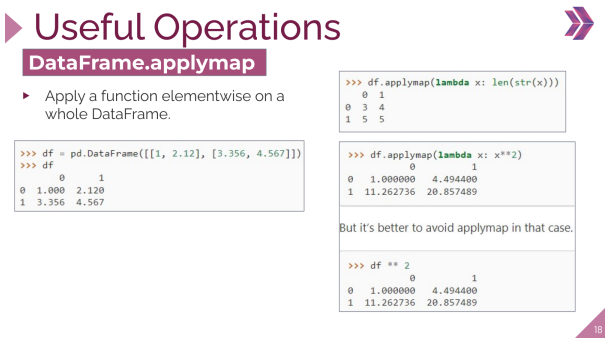

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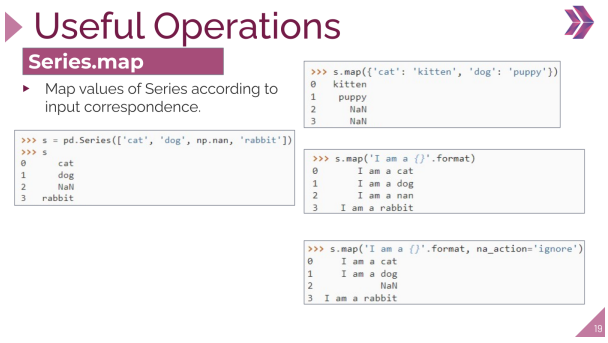

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Useful Operations

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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Useful 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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Useful Operations

apply() vs transform()

- **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()** 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
```


Use this space to take notes:

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Useful 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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Useful 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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Useful 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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Useful Operations

DataFrame.pivot

Row index in the new table | Columns in the new table | Cell values in the new table

ix	Item	CType	USD	EU
0	Item0	Gold	1$	1€
1	Item0	Bronze	2$	2€
2	Item1	Gold	3$	3€
3	Item1	Silver	4$	4€

ix=Item	Bronze	Gold	Silver
Item0	2$	1$	NaN
Item1	NaN	3$	4$

```
d.pivot(index='Item', columns='CType', values='USD')
```

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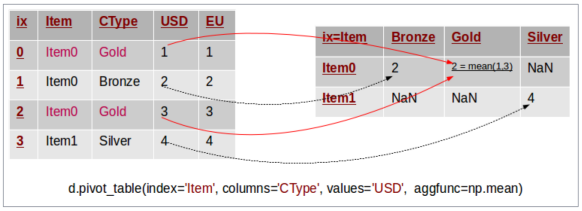
Useful Operations

DataFrame.pivot_table



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Useful Operations

.pivot() vs .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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Useful Operations

.pivot() vs .pivot_table()

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

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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Useful Operations

.pivot() vs .pivot_table()

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

If there are duplicate entries possible from the index(es) of interest you will need to aggregate the data in pivot_table, not pivot.

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

	age			height			weight		
sport	baseball	basketball	golf	baseball	basketball	golf	baseball	basketball	golf
gender									
female	NaN	21.5	22.0	NaN	70.0	73.0	NaN	150.0	150.0
male	21.0	20.0	NaN	72.0	75.0	NaN	200.0	175.0	NaN

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

	age			height			weight		
sport	baseball	basketball	golf	baseball	basketball	golf	baseball	basketball	golf
0	21.0	NaN	NaN	72.0	NaN	NaN	200.0	NaN	NaN
1	NaN	21.0	NaN	NaN	72.0	NaN	NaN	130.0	NaN
2	NaN	NaN	22.0	NaN	NaN	73.0	NaN	NaN	150.0
3	NaN	20.0	NaN	NaN	75.0	NaN	NaN	175.0	NaN
4	NaN	22.0	NaN	NaN	68.0	NaN	NaN	170.0	NaN

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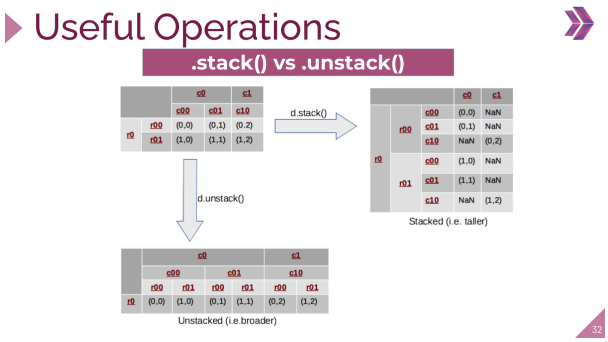

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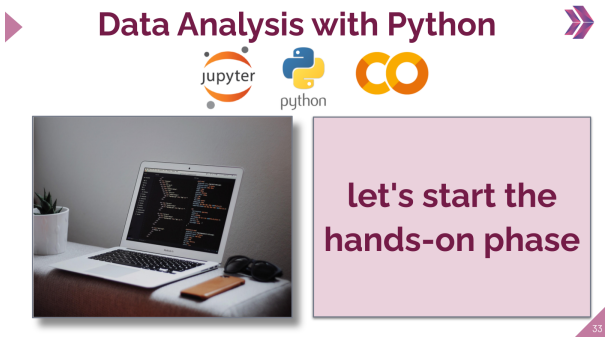

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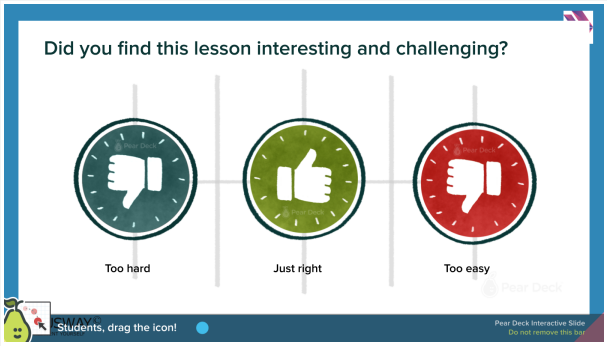
Slide 34	Your Response

Slide 34	Your Response
	

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