PANDAS

HARDEST Functions

https://towardsdatascience.com/meet-the-hardest-functions-of-pandas-part-i-7d1f74597e92

https://towardsdatascience.com/meet-the-hardest-functions-of-pandas-part-ii-f8029a2b0c9b

https://towardsdatascience.com/shape-tables-like-jelly-with-pandas-melt-and-pivot-f2e13e666d6

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

%matplotlib inline
```

In [2]:

```
data = ((1,'raja','ram'),
        (2,'ramu','jaimu'),
        (3,'deepu','mastana'))
```

In [3]:

```
data
```

Out[3]:

```
((1, 'raja', 'ram'), (2, 'ramu', 'jaimu'), (3, 'deepu', 'mastana'))
```

In [4]:

```
data = pd.DataFrame(data,columns=['num','f_name','l_name'])
```

In [5]:

```
data.to_excel('excel1.xlsx',sheet_name='data',encoding='unicode',index=False)
```

In [6]:

```
tips_df = sns.load_dataset('tips')
```

In [7]:

```
tips_df.shape
```

Out[7]:

```
(244, 7)
```

In [8]:

```
tips_df.describe()
```

Out[8]:

	total_bill	tip	size
count	244.000000	244.000000	244.000000
mean	19.785943	2.998279	2.569672
std	8.902412	1.383638	0.951100
min	3.070000	1.000000	1.000000
25%	13.347500	2.000000	2.000000
50%	17.795000	2.900000	2.000000
75%	24.127500	3.562500	3.000000
max	50.810000	10.000000	6.000000

In [9]:

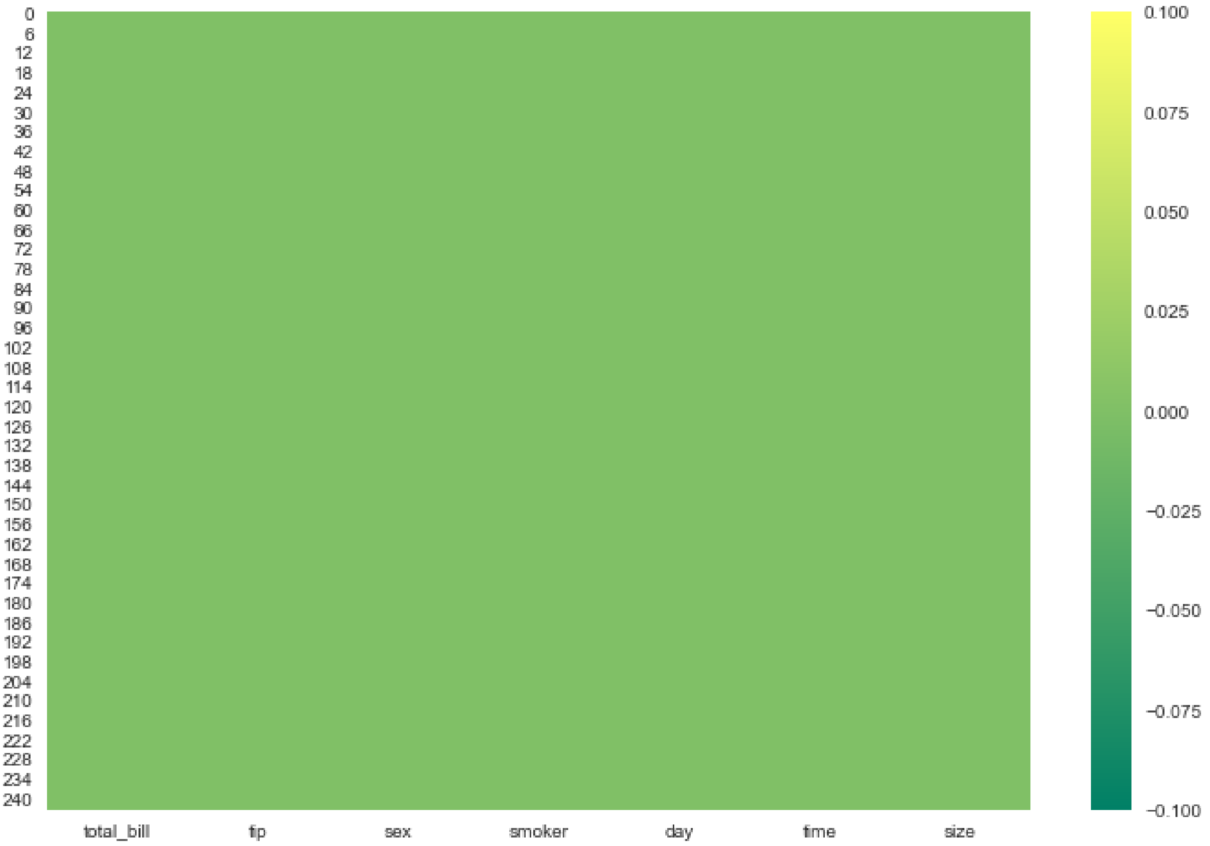
```
tips_df.head()
```

Out[9]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

In [10]:

```
with plt.style.context('seaborn'):
    plt.figure(figsize=(12,8))
    sns.heatmap(tips_df.isnull(),annot=False,cmap='summer',cbar=True)
    plt.show()
```



In [11]:

```
tips_df.head(10)
```

Out[11]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
5	25.29	4.71	Male	No	Sun	Dinner	4
6	8.77	2.00	Male	No	Sun	Dinner	2
7	26.88	3.12	Male	No	Sun	Dinner	4

	total_bill	tip	sex	smoker	day	time	size
8	15.04	1.96	Male	No	Sun	Dinner	2
9	14.78	3.23	Male	No	Sun	Dinner	2

In [12]:

```
%%timeit
tips_df.groupby(['sex']).count()[['total_bill']]
```

```
10.6 ms ± 2.76 ms per loop (mean ± std. dev. of 7 runs, 100 loops each)
```

In [13]:

```
%%timeit
tips_df.groupby(['sex'])[['total_bill']].count()
```

```
4.94 ms ± 951 µs per loop (mean ± std. dev. of 7 runs, 100 loops each)
```

In [14]:

```
tips_df.groupby(['sex'])[['total_bill']].sum()
```

Out[14]:

	total_bill
sex	
Male	3256.82
Female	1570.95

In [15]:

```
tips_df.groupby(['sex','smoker']).count()
```

Out[15]:

		total_bill	tip	day	time	size
sex	**smoker**					
Male	**Yes**	60	60	60	60	60
	No	97	97	97	97	97
Female	**Yes**	33	33	33	33	33
	No	54	54	54	54	54

In [16]:

```
%%timeit
tips_df.pivot_table(values='total_bill',index='sex',aggfunc=np.count_nonzero)
```

```
25.3 ms ± 1.36 ms per loop (mean ± std. dev. of 7 runs, 10 loops each)
```

In [17]:

```
tips_df.pivot_table(values='total_bill',index='sex',aggfunc=np.count_nonzero)
```

Out[17]:

	total_bill
sex	
Male	157.0
Female	87.0

In [18]:

```
tips_df.head(10)
```

Out[18]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3

	total_bill	tip	sex	smoker	day	time	size
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4
5	25.29	4.71	Male	No	Sun	Dinner	4
6	8.77	2.00	Male	No	Sun	Dinner	2
7	26.88	3.12	Male	No	Sun	Dinner	4
8	15.04	1.96	Male	No	Sun	Dinner	2
9	14.78	3.23	Male	No	Sun	Dinner	2

```
In [19]: tips_df.groupby(['sex','smoker'])[['total_bill']].agg([np.mean,np.median,np.sum])
```

Out[19]:

		total_bill		
		mean	median	sum
sex	smoker			
Male	**Yes**	22.284500	20.39	1337.07
	No	19.791237	18.24	1919.75
Female	**Yes**	17.977879	16.27	593.27
	No	18.105185	16.69	977.68

```
In [20]: tips_df.pivot_table(values=['total_bill','tip'],index=['sex','smoker'],aggfunc=[np.m
```

Out[20]:

		mean		median		sum	
		tip	total_bill	tip	total_bill	tip	total_bill
sex	smoker						
Male	**Yes**	3.051167	22.284500	3.00	20.39	183.07	1337.07
	No	3.113402	19.791237	2.74	18.24	302.00	1919.75
Female	**Yes**	2.931515	17.977879	2.88	16.27	96.74	593.27
	No	2.773519	18.105185	2.68	16.69	149.77	977.68

```
In [21]: tips_df.pivot_table(values=['tip'],columns=['size'],index=['sex','smoker'],aggfunc=[
```

Out[21]:

		mean										s
		tip										
	size	1	2	3	4	5	6	1	2	3	4	5
sex	smoker											
Male	**Yes**	1.920	2.692927	4.272857	3.981111	2.50	0.00	1.92	110.41	29.91	35.83	5.00
	No	0.000	2.557544	3.148824	4.262632	5.00	5.85	0.00	145.78	53.53	80.99	10.00
Female	**Yes**	1.000	2.736800	3.846000	4.045000	0.00	0.00	1.00	68.42	19.23	8.09	0.00
	No	1.415	2.370606	2.918889	4.014286	5.14	4.60	2.83	78.23	26.27	28.10	5.14

In [22]:
```
arithmetic_results = tips_df.pivot_table(values=['total_bill','tip'],index=['sex'],a
                                                                  'tip':[np.mea
arithmetic_results
```

Out[22]:
```
                                   tip   total_bill
          amax   amin      mean  median       sum
   sex
  Male    10.0    1.0  3.089618    3.00   3256.82
Female     6.5    1.0  2.833448    2.75   1570.95
```

In [23]:
```
arithmetic_results.stack()
```

Out[23]:
```
                         tip   total_bill
   sex
  Male     amax  10.000000        NaN
           amin   1.000000        NaN
           mean   3.089618        NaN
         median   3.000000        NaN
            sum        NaN    3256.82
Female     amax   6.500000        NaN
           amin   1.000000        NaN
           mean   2.833448        NaN
         median   2.750000        NaN
            sum        NaN    1570.95
```

In [24]:
```
arithmetic_results.stack(level=0)
```

Out[24]:
```
                    amax   amin      mean  median       sum
   sex
  Male         tip  10.0    1.0  3.089618    3.00       NaN
        total_bill   NaN    NaN       NaN     NaN   3256.82
Female         tip   6.5    1.0  2.833448    2.75       NaN
        total_bill   NaN    NaN       NaN     NaN   1570.95
```

In [25]:
```
arithmetic_results
```

Out[25]:
```
                                   tip   total_bill
          amax   amin      mean  median       sum
   sex
  Male    10.0    1.0  3.089618    3.00   3256.82
Female     6.5    1.0  2.833448    2.75   1570.95
```

```
In [26]: pd.DataFrame(arithmetic_results.unstack())
```

```
Out[26]:
                                    0
                        sex
tip         amax        Male        10.000000
                        Female       6.500000
            amin        Male         1.000000
                        Female       1.000000
            mean        Male         3.089618
                        Female       2.833448
            median      Male         3.000000
                        Female       2.750000
total_bill  sum         Male      3256.820000
                        Female    1570.950000
```

```
In [27]: tips_df.head()
```

```
Out[27]:
   total_bill   tip     sex  smoker  day    time  size
0       16.99  1.01  Female      No  Sun  Dinner     2
1       10.34  1.66    Male      No  Sun  Dinner     3
2       21.01  3.50    Male      No  Sun  Dinner     3
3       23.68  3.31    Male      No  Sun  Dinner     2
4       24.59  3.61  Female      No  Sun  Dinner     4
```

```
In [28]: pd.crosstab(index=tips_df['sex'],columns=tips_df['smoker'],values=tips_df['tip'],agg
```

```
Out[28]:
smoker       Yes        No
   sex
  Male  3.051167  3.113402
Female  2.931515  2.773519
```

```
In [29]: tips_df.pivot_table(values='tip',index='sex',columns='smoker',aggfunc=np.mean)
```

```
Out[29]:
smoker       Yes        No
   sex
  Male  3.051167  3.113402
Female  2.931515  2.773519
```

```
In [30]: tips_df.head()
```

```
Out[30]:
   total_bill   tip     sex  smoker  day    time  size
```

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

```
In [31]: pd.melt(frame=tips_df,id_vars='time',value_vars=['size','tip'])
```

Out[31]:

	time	variable	value
0	Dinner	size	2.00
1	Dinner	size	3.00
2	Dinner	size	3.00
3	Dinner	size	2.00
4	Dinner	size	4.00
...	...	...	...
483	Dinner	tip	5.92
484	Dinner	tip	2.00
485	Dinner	tip	2.00
486	Dinner	tip	1.75
487	Dinner	tip	3.00

488 rows × 3 columns

```
In [ ]: 
```

```
In [13]: df = pd.DataFrame({'Id':[1,2,3,4],'val':[2,5,np.nan,6]})
```

```
In [14]: df
```

Out[14]:

	Id	val
0	1	2.0
1	2	5.0
2	3	NaN
3	4	6.0

```
In [17]: df[df['val'] != np.nan]
```

Out[17]:

	Id	val
0	1	2.0
1	2	5.0
2	3	NaN

	Id	val
3	4	6.0

In [19]:

```
df['val'].isna()
```

Out[19]:

```
0    False
1    False
2     True
3    False
Name: val, dtype: bool
```

In [21]:

```
np.nan != np.nan
```

Out[21]:

```
True
```

In [33]:

```
df['Id'].index=['A1','A2','A3','A4']
```

In [34]:

```
df['Id']
```

Out[34]:

```
A1    1
A2    2
A3    3
A4    4
Name: Id, dtype: int64
```

In [35]:

```
df['val']
```

Out[35]:

```
0    2.0
1    5.0
2    NaN
3    6.0
Name: val, dtype: float64
```

In [38]:

```
pd.concat([df['Id'],df['val']],axis=1,ignore_index=False)
```

Out[38]:

	Id	val
A1	1.0	NaN
A2	2.0	NaN
A3	3.0	NaN
A4	4.0	NaN
0	NaN	2.0
1	NaN	5.0
2	NaN	NaN
3	NaN	6.0