



MANIPULATING DATAFRAMES WITH PANDAS

Pivoting DataFrames



Clinical trials data

```
In [1]: import pandas as pd
```

```
In [2]: trials = pd.read_csv('trials_01.csv')
```

```
In [3]: print(trials)
```

	id	treatment	gender	response
0	1	A	F	5
1	2	A	M	3
2	3	B	F	8
3	4	B	M	9



Reshaping by pivoting

```
In [4]: trials.pivot(index='treatment',  
...:                  columns='gender',  
...:                  values='response')
```

Out[4]:

gender	F	M
treatment		
A	5	3
B	8	9



Pivoting multiple columns

```
In [5]: trials.pivot(index='treatment', columns='gender')  
Out[5]:
```

	id		response	
	F	M	F	M
treatment				
A	1	2	5	3
B	3	4	8	9



MANIPULATING DATAFRAMES WITH PANDAS

Let's practice!



MANIPULATING DATAFRAMES WITH PANDAS

Stacking & unstacking DataFrames



Creating a multi-level index

```
In [1]: print(trials)
   id treatment gender  response
0    1          A     F         5
1    2          A     M         3
2    3          B     F         8
3    4          B     M         9
```

```
In [2]: trials = trials.set_index(['treatment', 'gender'])
```

```
In [3]: print(trials)
      treatment gender  id  response
A          F      1      5
          M      2      3
B          F      3      8
          M      4      9
```



Unstacking a multi-index (1)

```
In [4]: print(trials)
```

		id	response
A	gender		
	F	1	5
	M	2	3
B	F	3	8
	M	4	9

```
In [5]: trials.unstack(level='gender')
```

```
Out[5]:
```

	id		response	
gender	F	M	F	M
treatment				
A	1	2	5	3
B	3	4	8	9



Unstacking a multi-index (2)

```
In [6]: print(trials)
```

		id	response
A	gender		
	F	1	5
B	M	2	3
	F	3	8
	M	4	9

```
In [7]: trials.unstack(level=1)
```

```
Out[7]:
```

	id		response	
gender	F	M	F	M
treatment				
A	1	2	5	3
B	3	4	8	9



Stacking DataFrames

```
In [8]: trials_by_gender = trials.unstack(level='gender')
```

```
In [9]: trials_by_gender
```

```
Out[9]:
```

	id		response	
gender	F	M	F	M
treatment				
A	1	2	5	3
B	3	4	8	9

```
In [10]: trials_by_gender.stack(level='gender')
```

```
Out[10]:
```

		id	response
treatment	gender		
	A		
	F	1	5
	M	2	3
B	F	3	8
	M	4	9



Stacking DataFrames

```
In [11]: stacked = trials_by_gender.stack(level='gender')
```

```
In [12]: stacked
```

```
Out[12]:
```

		id	response
treatment	gender		
A	F	1	5
	M	2	3
B	F	3	8
	M	4	9



Swapping levels

```
In [13]: swapped = stacked.swaplevel(0, 1)
```

```
In [14]: print(swapped)
```

		id	response
gender	treatment		
F	A	1	5
M	A	2	3
F	B	3	8
M	B	4	9



Sorting rows

```
In [15]: sorted_trials = swapped.sort_index()
```

```
In [16]: print(sorted_trials)
```

		id	response
gender	treatment		
F	A	1	5
	B	3	8
M	A	2	3
	B	4	9



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MANIPULATING DATAFRAMES WITH PANDAS

Melting DataFrames



Clinical trials data

```
In [1]: import pandas as pd
```

```
In [2]: trials = pd.read_csv('trials_01.csv')
```

```
In [3]: print(trials)
```

	id	treatment	gender	response
0	1	A	F	5
1	2	A	M	3
2	3	B	F	8
3	4	B	M	9



Clinical trials after pivoting

```
In [4]: trials.pivot(index='treatment',  
...:                  columns='gender',  
...:                  values='response')
```

```
Out[4]:
```

gender	F	M
treatment		
A	5	3
B	8	9



Clinical trials data

```
In [5]: new_trials = pd.read_csv('trials_02.csv')
```

```
In [6]: print(new_trials)
```

	treatment	F	M
0	A	5	3
1	B	8	9

Melting DataFrame

```
In [7]: pd.melt(new_trials)
```

```
Out[7]:
```

	variable	value
0	treatment	A
1	treatment	B
2	F	5
3	F	8
4	M	3
5	M	9



Specifying id_vars

```
In [8]: pd.melt(new_trials, id_vars=['treatment'])
```

```
Out[8]:
```

	treatment	variable	value
0	A	F	5
1	B	F	8
2	A	M	3
3	B	M	9



Specifying value_vars

```
In [9]: pd.melt(new_trials, id_vars=['treatment'],  
....:          value_vars=['F', 'M'])
```

Out[9]:

	treatment	variable	value
0	A	F	5
1	B	F	8
2	A	M	3
3	B	M	9



Specifying value_name

```
In [10]: pd.melt(new_trials, id_vars=['treatment'],  
....:           var_name='gender', value_name='response')
```

Out[10]:

	treatment	gender	response
0	A	F	5
1	B	F	8
2	A	M	3
3	B	M	9



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Let's practice!



MANIPULATING DATAFRAMES WITH PANDAS

Pivot tables



More clinical trials data

```
In [1]: import pandas as pd
```

```
In [2]: more_trials = pd.read_csv('trials_03.csv')
```

```
In [3]: print(more_trials)
```

	id	treatment	gender	response
0	1	A	F	5
1	2	A	M	3
2	3	A	M	8
3	4	A	F	9
4	5	B	F	1
5	6	B	M	8
6	7	B	F	4
7	8	B	F	6



Rearranging by pivoting

```
In [4]: more_trials.pivot(index='treatment',  
    ...:                   columns='gender',  
    ...:                   values='response')
```

```
-----  
ValueError: Index contains duplicate entries, cannot reshape
```



Pivot table

```
In [5]: more_trials.pivot_table(index='treatment',  
    ....:                        columns='gender',  
    ....:                        values='response')
```

```
Out[5]:
```

gender	F	M
treatment		
A	7.000000	5.5
B	3.666667	8.0



Other aggregations

```
In [6]: more_trials.pivot_table(index='treatment',  
    ....:                        columns='gender',  
    ....:                        values='response',  
    ....:                        aggfunc='count')
```

Out[6]:

gender	F	M
treatment		
A	2	2
B	3	1



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Let's practice!