Pandas Dataframe - Advanced

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The Almighty Pandas

Indexing Dataframe

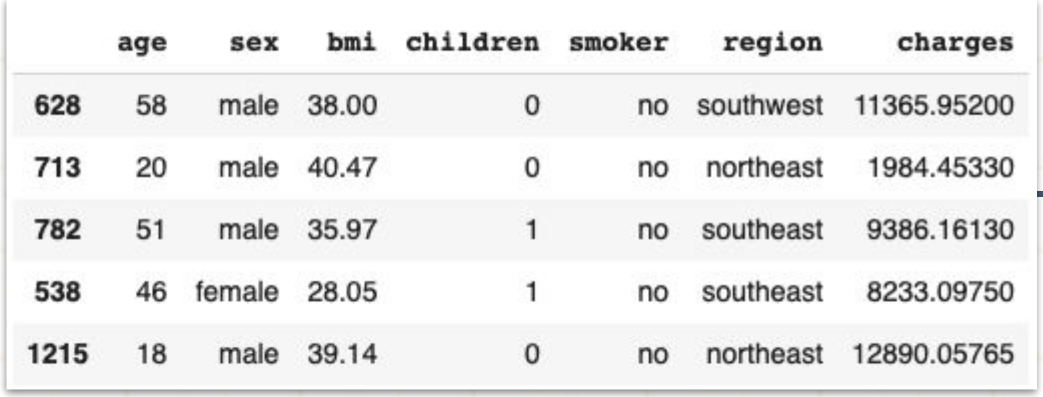
Indexing pada dataframe menggunakan Pandas memiliki beberapa pengaplikasian di dalam dataset.

Contoh:

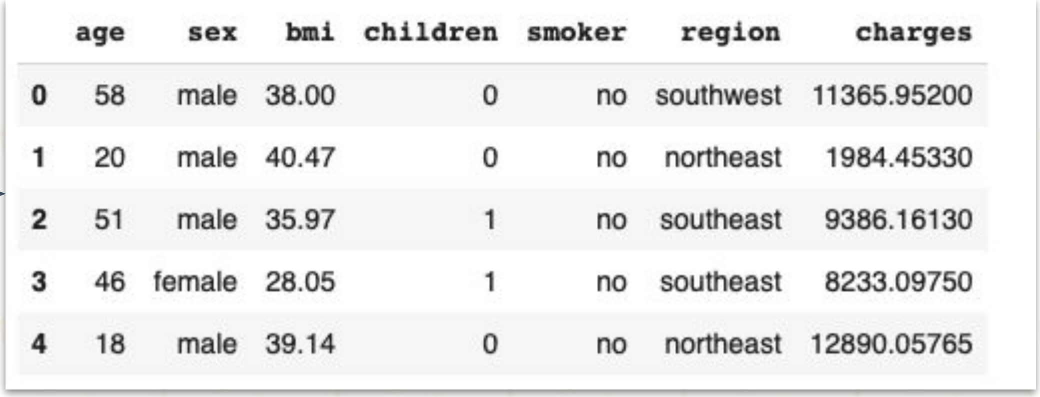
- *Mengurutkan index*
- *Membuat data pada variable tertentu menjadi index*

Indexing Dataframe *(Reset Index)*

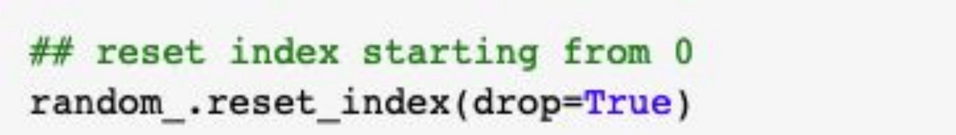
Index sangat membantu dalam mencari data ketika ingin melakukan kalkulasi terdapat data di dalam dataset.



	age	sex	bmi	children	smoker	region	charges
628	58	male	38.00	0	no	southwest	11365.95200
713	20	male	40.47	0	no	northeast	1984.45330
782	51	male	35.97	1	no	southeast	9386.16130
538	46	female	28.05	1	no	southeast	8233.09750
1215	18	male	39.14	0	no	northeast	12890.05765



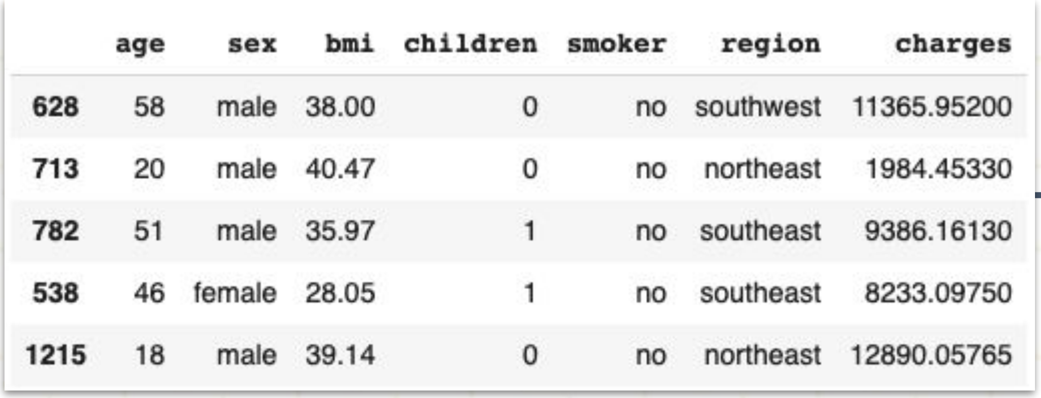
	age	sex	bmi	children	smoker	region	charges
0	58	male	38.00	0	no	southwest	11365.95200
1	20	male	40.47	0	no	northeast	1984.45330
2	51	male	35.97	1	no	southeast	9386.16130
3	46	female	28.05	1	no	southeast	8233.09750
4	18	male	39.14	0	no	northeast	12890.05765



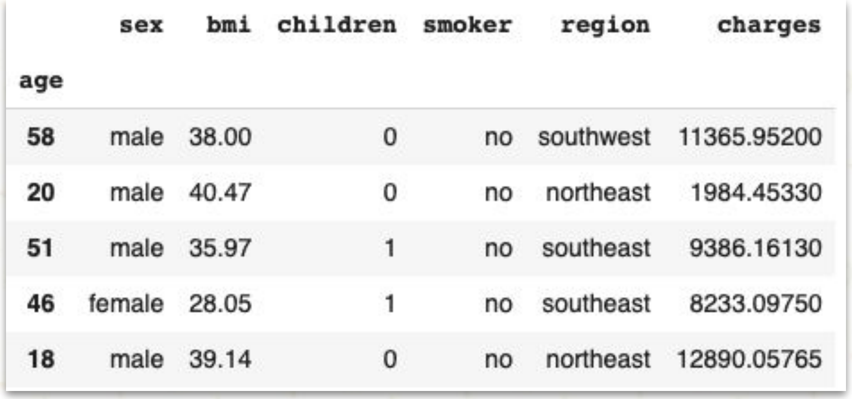
```
## reset index starting from 0
random_.reset_index(drop=True)
```

Indexing Dataframe *(Set Column as Index)*

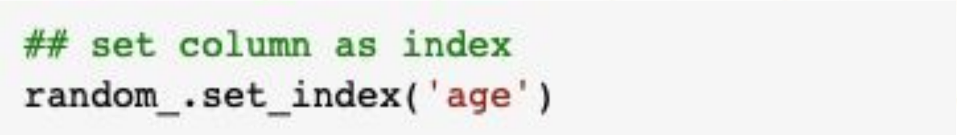
Index juga dapat membuat index sendiri berdasarkan dari kolom yang ada di dalam dataset



	age	sex	bmi	children	smoker	region	charges
628	58	male	38.00	0	no	southwest	11365.95200
713	20	male	40.47	0	no	northeast	1984.45330
782	51	male	35.97	1	no	southeast	9386.16130
538	46	female	28.05	1	no	southeast	8233.09750
1215	18	male	39.14	0	no	northeast	12890.05765



	sex	bmi	children	smoker	region	charges
age						
58	male	38.00	0	no	southwest	11365.95200
20	male	40.47	0	no	northeast	1984.45330
51	male	35.97	1	no	southeast	9386.16130
46	female	28.05	1	no	southeast	8233.09750
18	male	39.14	0	no	northeast	12890.05765



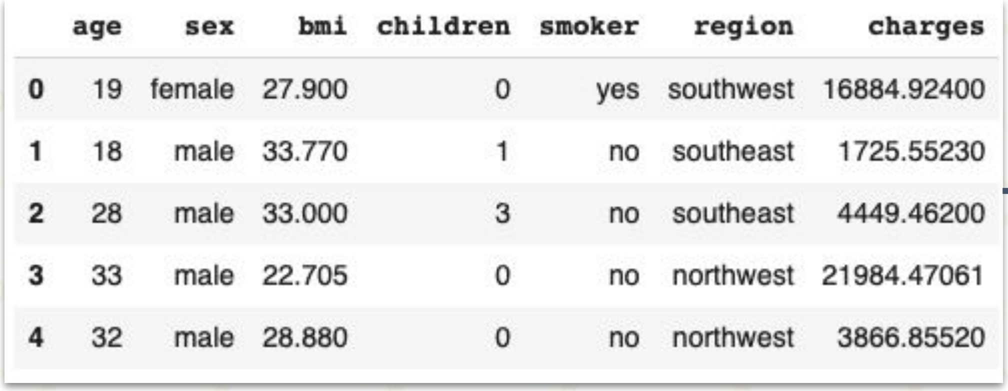
```
## set column as index
random_.set_index('age')
```

Menghapus Variable/Kolom

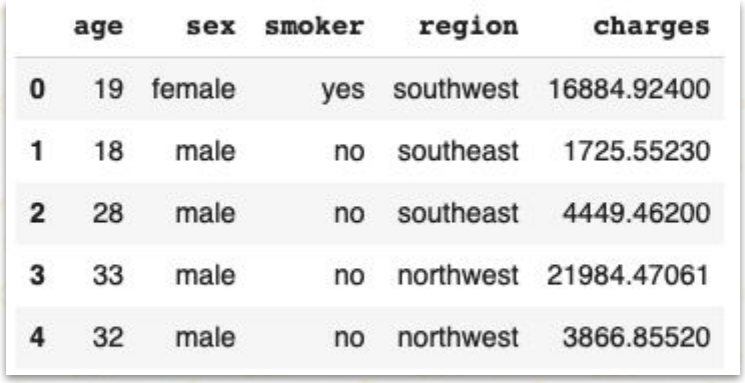
Pandas dapat menghapus kolom-kolom yang tidak diinginkan. Adapun tujuan menghapus kolom adalah:

- *Untuk memilih kolom yang akan dianalisa*
- *Untuk memilih kolom yang digunakan dalam machine learning model*

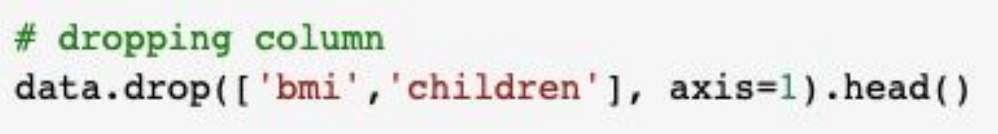
Dropping Column *(beberapa kolom)*



	age	sex	bmi	children	smoker	region	charges
0	19	female	27.900	0	yes	southwest	16884.92400
1	18	male	33.770	1	no	southeast	1725.55230
2	28	male	33.000	3	no	southeast	4449.46200
3	33	male	22.705	0	no	northwest	21984.47061
4	32	male	28.880	0	no	northwest	3866.85520



	age	sex	smoker	region	charges
0	19	female	yes	southwest	16884.92400
1	18	male	no	southeast	1725.55230
2	28	male	no	southeast	4449.46200
3	33	male	no	northwest	21984.47061
4	32	male	no	northwest	3866.85520



```
# dropping column
data.drop(['bmi','children'], axis=1).head()
```

Menggabungkan Dataframe

*Dataset juga dapat digabungkan selain menggunakan metode merge, yaitu metode **JOIN**.*

Join Dataframe

Selain menggunakan merge, pandas juga dapat menggabungkan dua dataset menjadi satu menggunakan **join**. Terdapat perbedaan antara merge dan join yaitu:

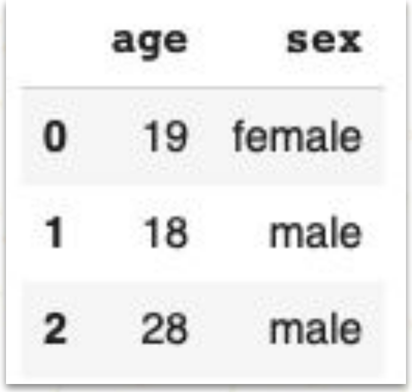
→ Join

- Menggabungkan data berdasarkan index

→ Merge

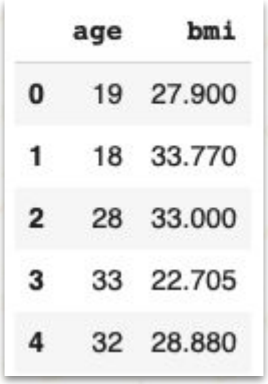
- Menggabungkan data lebih fleksibel dan memungkinkan untuk menentukan kolom selain index untuk kedua dataframe

Join Dataframe



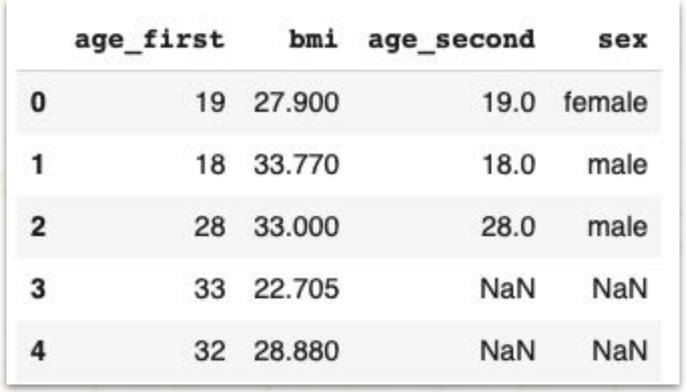
	age	sex
0	19	female
1	18	male
2	28	male

+

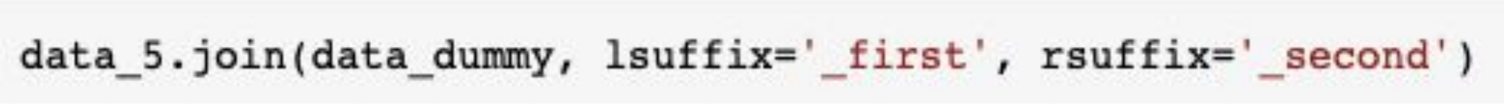


	age	bmi
0	19	27.900
1	18	33.770
2	28	33.000
3	33	22.705
4	32	28.880

→



	age_first	bmi	age_second	sex
0	19	27.900	19.0	female
1	18	33.770	18.0	male
2	28	33.000	28.0	male
3	33	22.705	NaN	NaN
4	32	28.880	NaN	NaN

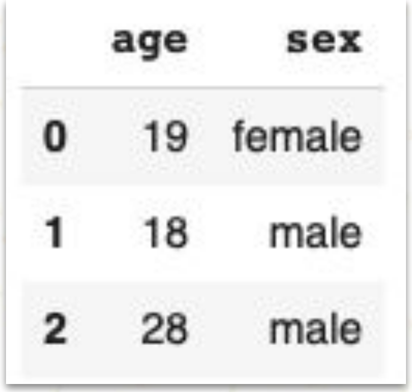


```
data_5.join(data_dummy, lsuffix='_first', rsuffix='_second')
```

Concatenate & Append Dataframe

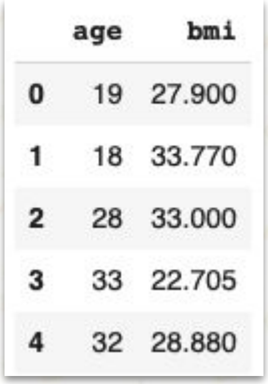
Menggabungkan objek dengan Pandas pada spesifik axis baik itu x-axis (horizontal) ataupun y-axis (vertikal)

Concatenate *(Horizontal)*



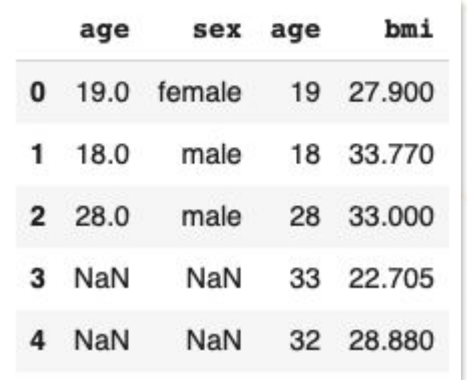
	age	sex
0	19	female
1	18	male
2	28	male

+

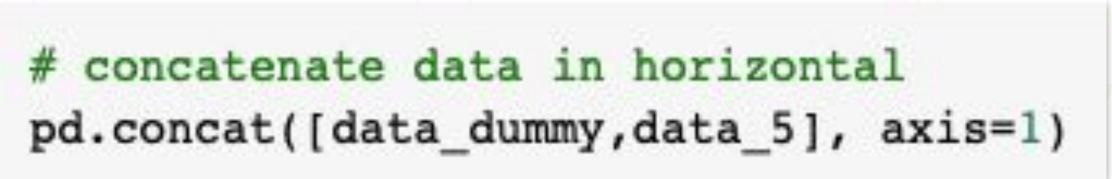


	age	bmi
0	19	27.900
1	18	33.770
2	28	33.000
3	33	22.705
4	32	28.880

→

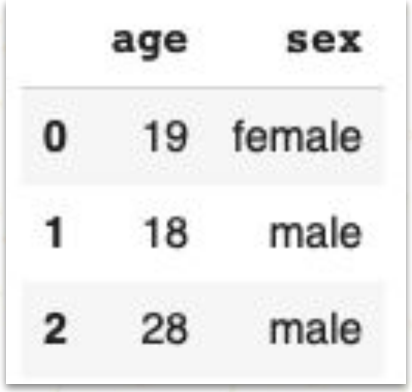


	age	sex	age	bmi
0	19.0	female	19	27.900
1	18.0	male	18	33.770
2	28.0	male	28	33.000
3	NaN	NaN	33	22.705
4	NaN	NaN	32	28.880



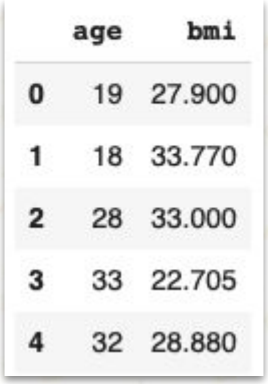
```
# concatenate data in horizontal
pd.concat([data_dummy,data_5], axis=1)
```

Concatenate *(Vertical)*

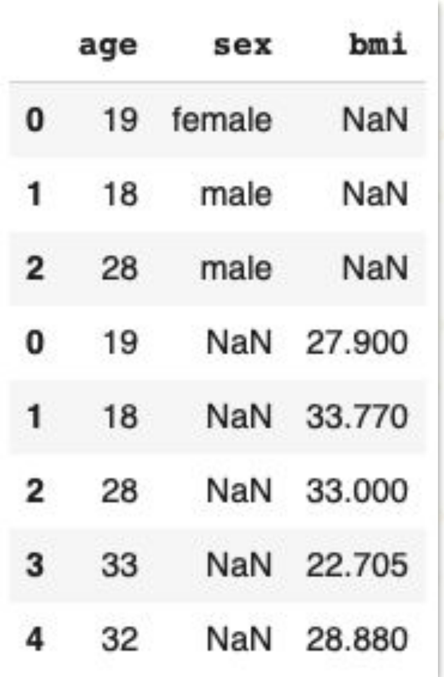


	age	sex
0	19	female
1	18	male
2	28	male

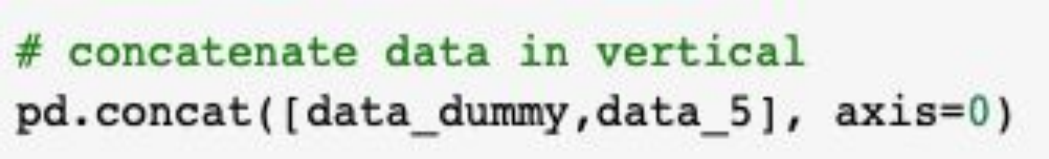
+



	age	bmi
0	19	27.900
1	18	33.770
2	28	33.000
3	33	22.705
4	32	28.880



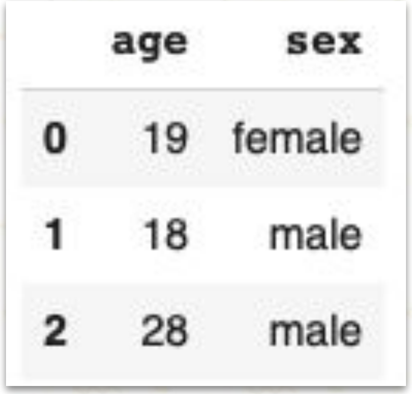
	age	sex	bmi
0	19	female	NaN
1	18	male	NaN
2	28	male	NaN
0	19	NaN	27.900
1	18	NaN	33.770
2	28	NaN	33.000
3	33	NaN	22.705
4	32	NaN	28.880



```
# concatenate data in vertical
pd.concat([data_dummy,data_5], axis=0)
```

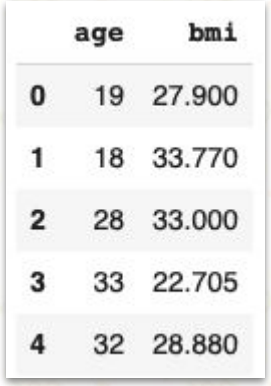
Append

Dalam dataframe, append dapat dilakukan jika terdapat nama kolom pada kedua dataset yang sama

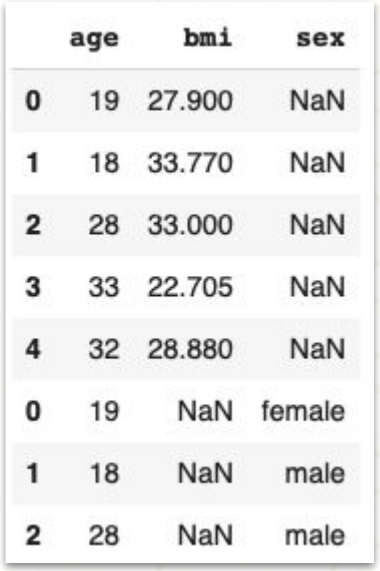


	age	sex
0	19	female
1	18	male
2	28	male

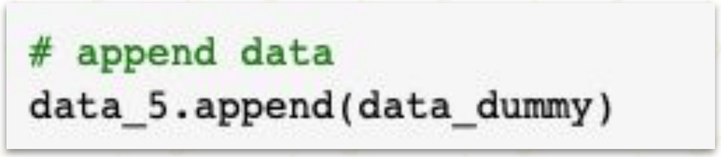
+



	age	bmi
0	19	27.900
1	18	33.770
2	28	33.000
3	33	22.705
4	32	28.880



	age	bmi	sex
0	19	27.900	NaN
1	18	33.770	NaN
2	28	33.000	NaN
3	33	22.705	NaN
4	32	28.880	NaN
0	19	NaN	female
1	18	NaN	male
2	28	NaN	male



```
# append data
data_5.append(data_dummy)
```

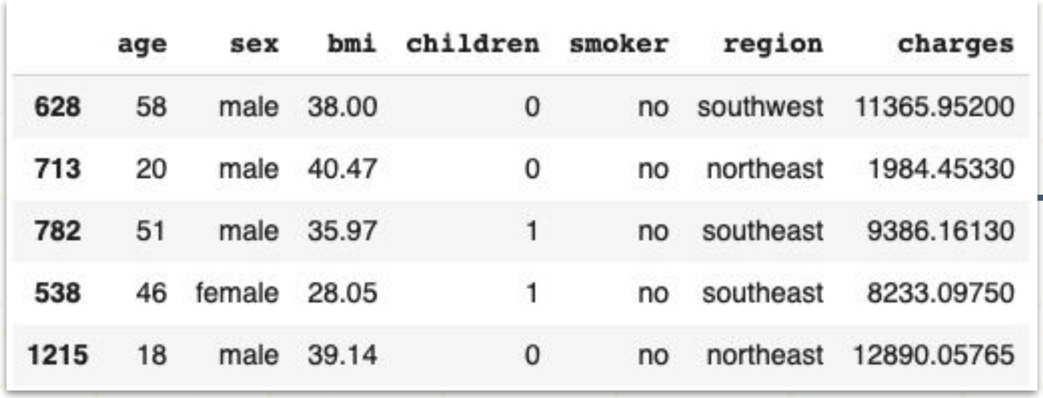
Pivot Table Dataframe

Pivot table memberikan informasi berupa agregasi suatu data dengan melampirkan isi data pada nama kolom tertentu

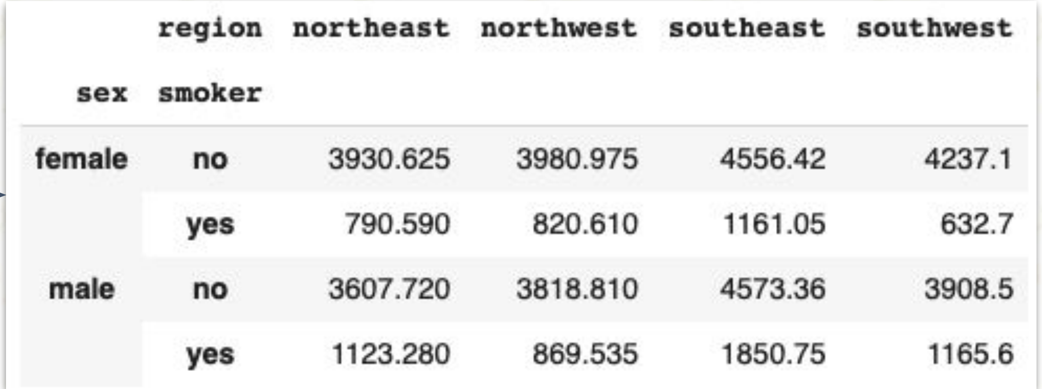
Pivot Table

Beberapa karakteristik pivot table menggunakan pandas:

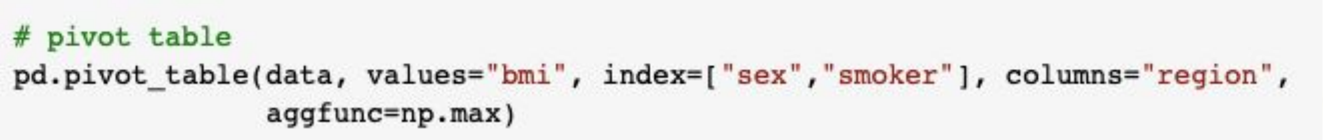
- Tampilan seperti pivot table yang ada di spreadsheet
- Nama kolom sebagai level data disimpan dalam bentuk MultiIndex



	age	sex	bmi	children	smoker	region	charges
628	58	male	38.00	0	no	southwest	11365.95200
713	20	male	40.47	0	no	northeast	1984.45330
782	51	male	35.97	1	no	southeast	9386.16130
538	46	female	28.05	1	no	southeast	8233.09750
1215	18	male	39.14	0	no	northeast	12890.05765



	region	northeast	northwest	southeast	southwest
sex	smoker				
female	**no**	3930.625	3980.975	4556.42	4237.1
	yes	790.590	820.610	1161.05	632.7
male	**no**	3607.720	3818.810	4573.36	3908.5
	yes	1123.280	869.535	1850.75	1165.6

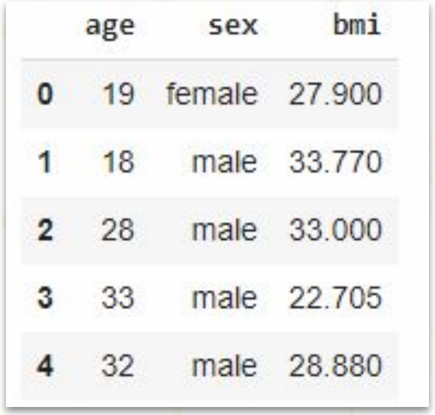


```
# pivot table
pd.pivot_table(data, values="bmi", index=["sex","smoker"], columns="region",
               aggfunc=np.max)
```

Melting Dataframe

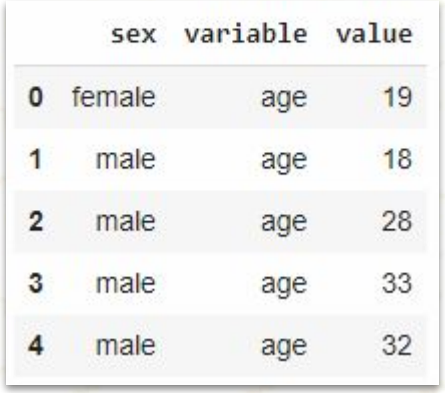
*Melting dataframe digunakan untuk memberikan informasi data dimana **nama kolom/variable akan menjadi datapoint** dan tetap memberikan informasi nilai dari kolom/variable namun di kolom yang berbeda*

Pivot Table

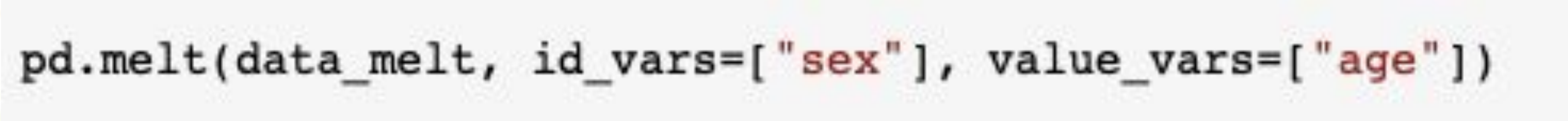


	age	sex	bmi
0	19	female	27.900
1	18	male	33.770
2	28	male	33.000
3	33	male	22.705
4	32	male	28.880

→



	sex	variable	value
0	female	age	19
1	male	age	18
2	male	age	28
3	male	age	33
4	male	age	32



```
pd.melt(data_melt, id_vars=["sex"], value_vars=["age"])
```

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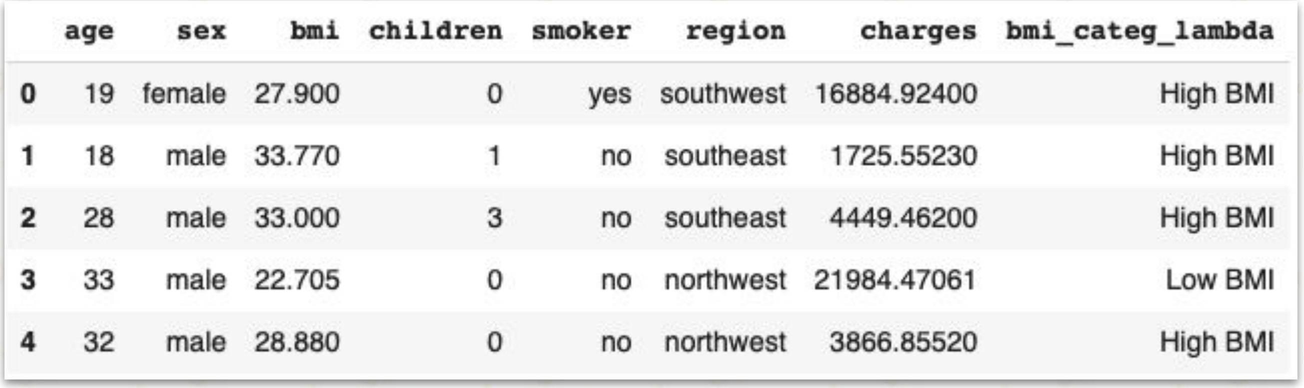
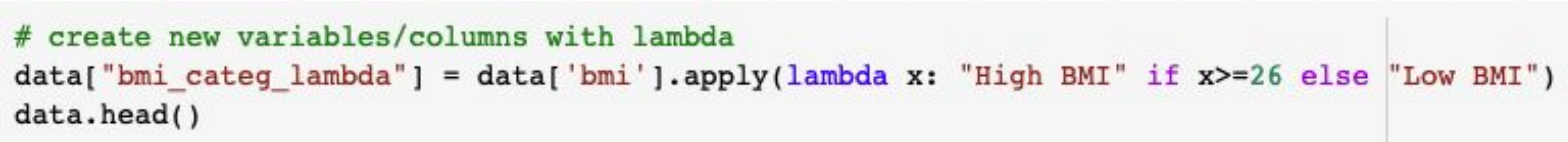
Lambda Function

Lambda function mempersingkat syntax python

Lambda Function

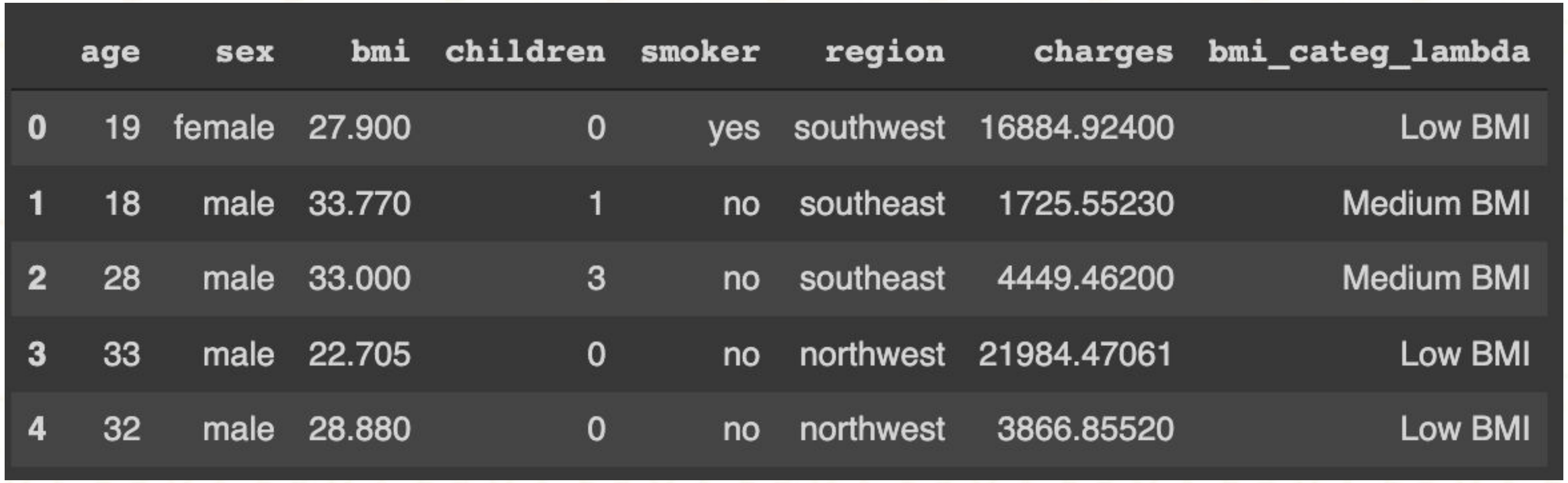


	age	sex	bmi	children	smoker	region	charges	bmi_categ_lambda
0	19	female	27.900	0	yes	southwest	16884.92400	High BMI
1	18	male	33.770	1	no	southeast	1725.55230	High BMI
2	28	male	33.000	3	no	southeast	4449.46200	High BMI
3	33	male	22.705	0	no	northwest	21984.47061	Low BMI
4	32	male	28.880	0	no	northwest	3866.85520	High BMI



```
# create new variables/columns with lambda
data["bmi_categ_lambda"] = data['bmi'].apply(lambda x: "High BMI" if x>=26 else "Low BMI")
data.head()
```

Homework



	age	sex	bmi	children	smoker	region	charges	bmi_categ_lambda
0	19	female	27.900	0	yes	southwest	16884.92400	Low BMI
1	18	male	33.770	1	no	southeast	1725.55230	Medium BMI
2	28	male	33.000	3	no	southeast	4449.46200	Medium BMI
3	33	male	22.705	0	no	northwest	21984.47061	Low BMI
4	32	male	28.880	0	no	northwest	3866.85520	Low BMI

Hitung:

- min, max, dan mean dari kolom bmi_categ_lambda menggunakan pivot table
- Ubah data point di kolom sex, region dan bmi_categ_lambda menjadi huruf besar semua menggunakan lambda function

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Thank YOU