



# FUNDAMENTOS E TÉCNICAS EM CIÊNCIAS DE DADOS

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<https://github.com/josenalde/datascience>

ANÁLISE E DESENVOLVIMENTO DE SISTEMAS - UFRN

# PANDAS #2 – EXPLORANDO DATAFRAMES

- SELECIONAR COLUNAS, LINHAS, ITENS INDIVIDUAIS COM LOCALIZAÇÃO DE ÍNDICES
- MÉTODOS PANDAS PARA PRODUIR ARRAYS BOOLEANOS
- OPERADORES BOOLEANOS COMBINADAS PARA REALIZAR OPERAÇÕES MAIS COMPLEXAS
- AGREGAÇÃO PARA ANÁLISE MAIS AVANÇADA COM LOOPS

```
d = np.random.randint(2,20, size=(30,5))
listIndex = []
for i in range(0,30):
    listIndex.append('i' + str(i))
df = pd.DataFrame(data=d, columns=list('ABCDE'), index=listIndex)
```

**Rótulos**

	A	B	C	D	E
i0	12	6	14	9	18
i1	16	13	3	4	13
i2	16	13	11	7	12
i3	18	3	5	11	17
i4	2	7	11	18	14
i5	17	2	17	18	15

df.loc['i2', 'D'] ?

df.loc['i5'] ?

df.loc[:, 'E'] ?

**O iloc permite selecionar por índice inteiro**

df.iloc[2, 3] ?

df.iloc[5] ?

df.iloc[:, 4] ?

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`df.iloc[1:3]`

	A	B	C	D	E
i0	12	6	14	9	18
i1	16	13	3	4	13
i2	16	13	11	7	12
i3	18	3	5	11	17
i4	2	7	11	18	14
i5	17	2	17	18	15

Diferença: loc inclui extremo (fim)

`df.loc['i1':'i3']`

	A	B	C	D	E
i0	12	6	14	9	18
i1	16	13	3	4	13
i2	16	13	11	7	12
i3	18	3	5	11	17
i4	2	7	11	18	14
i5	17	2	17	18	15

# PANDAS #2 – MÁSCARAS BOOLEANAS

Seja o dataset FORTUNE1000.csv

```
df2 = pd.read_csv('../datasets/fortune1000.csv')
```

	rank	title	Previous Rank	Revenues (\$M)	Revenue Change	Profits (\$M)	Profit Change	Assets (\$M)	Value as of 3/29/18 (\$M)	Employees	CEO	CEO Title	Sector	Industry	Years on Fortune 500 List	City	State	Latitude	Longitude
0	1	Walmart	1	\$500,343	3.00%	\$9,862.00	-27.70%	\$204,522	\$263,563	2,300,000	C. Douglas McMillon	President, Chief Executive Officer & Director	Retailing	General Merchandisers	24	Bentonville	AR	36.372854	-94.208817
1	2	Exxon Mobil	4	\$244,363	17.40%	\$19,710.00	151.40%	\$348,691	\$316,157	71,200	Darren W. Woods	Chairman & Chief Executive Officer	Energy	Petroleum Refining	24	Irving	TX	32.814018	-96.948894
2	3	Berkshire Hathaway	2	\$242,137	8.30%	\$44,940.00	86.70%	\$702,095	\$492,008	377,000	Warren E. Buffett	Chairman, President & Chief Executive Officer	Financials	Insurance: Property and Casualty (Stock)	24	Omaha	NE	41.256537	-95.934503
3	4	Apple	3	\$229,234	6.30%	\$48,351.00	5.80%	\$375,319	\$851,318	123,000	Timothy D. Cook	Chairman & Chief Executive Officer	Technology	Computers, Office Equipment	24	Cupertino	CA	37.322998	-122.032182
4	5	UnitedHealth Group	6	\$201,159	8.80%	\$10,558.00	50.50%	\$139,058	\$207,080	260,000	David S. Wichmann	Chairman & Chief Executive Officer	Health Care	Health Care: Insurance and Managed Care	24	Minnetonka	MN	44.921184	-93.468749

```
df2.columns
```

```
Index(['rank', 'title', 'Previous Rank', 'Revenues ($M)', 'Revenue Change', 'Profits ($M)', 'Profit Change', 'Assets ($M)', 'Mkt Value as of 3/29/18 ($M)', 'Employees', 'CEO', 'CEO Title', 'Sector', 'Industry', 'Years on Fortune 500 List', 'City', 'State', 'Latitude', 'Longitude'], dtype='object')
```

# PANDAS #2 – MÁSCARAS BOOLEANAS

```
Index(['rank', 'title', 'Previous Rank', 'Revenues ($M)',  
'Revenue Change', 'Profits ($M)', 'Profit Change', 'Assets ($M)', 'Mkt Value as of 3/29/18 ($M)',  
'Employees', 'CEO', 'CEO Title', 'Sector', 'Industry', 'Years on Fortune 500 List', 'City', 'State',  
'Latitude', 'Longitude'], dtype='object')
```

```
is_computer = df2['Industry'].str.startswith('Computers') #cria a mascara booleana  
is_computer
```

```
0    False  
1    False  
2    False  
3     True  
4    False  
...  
995  False  
996  False  
997  False  
998  False  
999  False
```

```
Name: Industry, Length: 1000
```



	rank	title	Previous Rank	Revenues (\$M)	Revenue Change	Profits (\$M)	Profit Change	Assets (\$M)	Value as of 3/29/18 (\$M)	Employees	CEO	CEO Title	Sector	Industry	Years on Fortune 500 List
0	1	Walmart	1	\$500,343	3.00%	\$9,862.00	-27.70%	\$204,522	\$263,563	2,300,000	C. Douglas McMillon	President, Chief Executive Officer & Director	Retailing	General Merchandisers	10
1	2	Exxon Mobil	4	\$244,363	17.40%	\$19,710.00	151.40%	\$348,691	\$316,157	71,200	Darren W. Woods	Chairman & Chief Executive Officer	Energy	Petroleum Refining	10
2	3	Berkshire Hathaway	2	\$242,137	8.30%	\$44,940.00	86.70%	\$702,095	\$492,008	377,000	Warren E. Buffett	Chairman, President & Chief Executive Officer	Financials	Insurance: Property and Casualty (Stock)	10
3	4	Apple	3	\$229,234	6.30%	\$48,351.00	5.80%	\$375,319	\$851,318	123,000	Timothy D. Cook	Chairman & Chief Executive Officer	Technology	Computers, Office Equipment	10
4	5	UnitedHealth Group	6	\$201,159	8.80%	\$10,558.00	50.50%	\$139,058	\$207,080	260,000	David S. Wichmann	Chairman & Chief Executive Officer	Health Care	Health Care: Insurance and Managed Care	10

```
cols = ['rank', 'title', 'Profits ($M)', 'Employees']  
df2.loc[is_computer, cols] #aplica a máscara nas colunas
```

# PANDAS #2 – MÁSCARAS BOOLEANAS

```
Index(['rank', 'title', 'Previous Rank', 'Revenues ($M)',  
'Revenue Change', 'Profits ($M)', 'Profit Change', 'Assets ($M)', 'Mkt Value as of 3/29/18 ($M)',  
'Employees', 'CEO', 'CEO Title', 'Sector', 'Industry', 'Years on Fortune 500 List', 'City', 'State',  
'Latitude', 'Longitude'], dtype='object')
```

```
is_computer = df2['Industry'].str.startswith('Computers') #cria a mascara booleana  
is_computer
```

```
cols = ['rank', 'title', 'Profits ($M)', 'Employees']  
df2.loc[is_computer, cols] #aplica a máscara nas colunas
```

rank		title	Profits (\$M)	Employees
3	4	Apple	\$48,351.00	123,000
34	35	Dell Technologies	(\$3,728.00)	145,000
57	58	HP	\$2,526.00	49,000
106	107	Hewlett Packard Enterprise	\$344.00	66,000
157	158	Western Digital	\$397.00	67,629
290	291	Xerox	\$195.00	36,100
431	432	NCR	\$232.00	34,000
494	495	NetApp	\$509.00	10,100
550	551	Diebold Nixdorf	(\$233.10)	23,000
656	657	Pitney Bowes	\$261.30	14,700
823	824	Super Micro Computer	\$69.30	2,699

Coluna Employees com strings com separadores vírgula  
Função de conversão str-float  
Defeituosa neste caso! Remover virgulas

```
print('----- antes -----')  
print(df2.dtypes)  
# Comparação incorreta, pois o campo Employees é object-string  
#c1 = df2['Employees'] > 300000  
df2['Employees'] = df2['Employees'].str.replace(',', '')  
print(df2)  
print('----- depois -----')  
df2['Employees'] = df2['Employees'].astype(float)  
print(df2.dtypes)  
c1 = df2['Employees'] > 70000  
c2 = df2['Sector'] == 'Energy'  
cond = c1 & c2 #máscara  
cols = ['rank', 'title', 'Sector', 'Employees']  
df2.loc[cond, cols]
```

rank		title	Sector	Employees
1	2	Exxon Mobil	Energy	71200.0

# PANDAS #2 – ALINHAMENTO DE ÍNDICES

Criar dataframes e comandos que reproduzam este exemplo:

	fruit_veg	qty		
tomato	fruit	4	corn	yellow
carrot	veg	2	carrot	orange
lime	fruit	4	tomato	red
corn	veg	1	lime	green
eggplant	veg	2	eggplant	purple

food                      colors

	fruit_veg	qty	color
tomato	fruit	4	red
carrot	veg	2	orange
lime	fruit	4	green
corn	veg	1	yellow
eggplant	veg	2	purple

food

```
food["color"] = colors
```

	fruit_veg	qty		
tomato	fruit	4	corn	yellow
carrot	veg	2	carrot	orange
lime	fruit	4	tomato	red
corn	veg	1	lime	green
eggplant	veg	2	eggplant	purple

food                      colors

<https://pandas.pydata.org/docs/reference/api/pandas.concat.html?highlight=concat>

# PANDAS #2 – ALINHAMENTO DE ÍNDICES

Operações aritméticas entre dataframes e series

O `r` é o método com argumento invertido.

Exemplo

`1/df`

`df.rdiv(1)`

Método	Descrição
<code>add, radd</code>	Métodos para adição (+)
<code>sub, rsub</code>	Métodos para subtração (-)
<code>div, rdiv</code>	Métodos para divisão (/)
<code>floordiv, rfloordiv</code>	Métodos para divisão pelo piso (//)
<code>mul, rmul</code>	Métodos para multiplicação (*)
<code>pow, rpow</code>	Métodos para exponencial (**)



# PANDAS #2 – PARA IR ALÉM

Estudar o notebook de exemplo com análise dos commits do Kernel Linux ao longo da história

[Exploring-the-evolution-of-Linux-Datacamp-Project/notebook.ipynb at master · vneogi199/Exploring-the-evolution-of-Linux-Datacamp-Project · GitHub](#)