How to retrieve data with the iloc[] method

SHARP SIGHT

What you'll learn

- How to use `iloc[]` to retrieve data in DataFrames
  - Selecting specific cells of data
  - Selecting single rows
  - Selecting single columns

- How to select "slices" of data
  - select multiple rows or columns at the same time

Quick review of dataframe structure

Here's the data we'll be using

- We'll use the following data for the examples in this presentation

- This is actually a subset of a more complete dataset you'll work with elsewhere

country_code	country	continent	population	gdp
USA	United States	North America	323,405,935	18,624,475,000,000
CHN	China	Asia	1,378,665,000	11,190,992,550,230
JPN	Japan	Asia	126,994,511	4,949,273,341,994
DEU	Germany	Europe	82,348,669	3,477,796,274,497
GBR	United Kingdom	Europe	65,595,565	2,650,850,178,102
FRA	France	Europe	66,859,768	2,465,134,297,439

Each row and each column have an implicit integer index

You can use these numeric indexes to reference particular rows or columns

column index

row index		0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
3	**DEU**	Germany	Europe	82,348,669	3,477,796,274,497
4	**GBR**	United Kingdom	Europe	65,595,565	2,650,850,178,102
5	**FRA**	France	Europe	66,859,768	2,465,134,297,439

Rows and columns can also be referenced by "label"

You'll learn more about column names and labels in the lesson on `loc[]`

column label

country_code	country	continent	population	gdp
USA	United States	North America	323,405,935	18,624,475,000,000
CHN	China	Asia	1,378,665,000	11,190,992,550,230
JPN	Japan	Asia	126,994,511	4,949,273,341,994
DEU	Germany	Europe	82,348,669	3,477,796,274,497
GBR	United Kingdom	Europe	65,595,565	2,650,850,178,102
FRA	France	Europe	66,859,768	2,465,134,297,439

Methods for selecting data

There are two Pandas methods for selecting rows and columns

- The `loc[]` method selects by label

- The `iloc[]` method selects by integer index

- We can use both of these to select:
  - single rows of data
  - slices of data

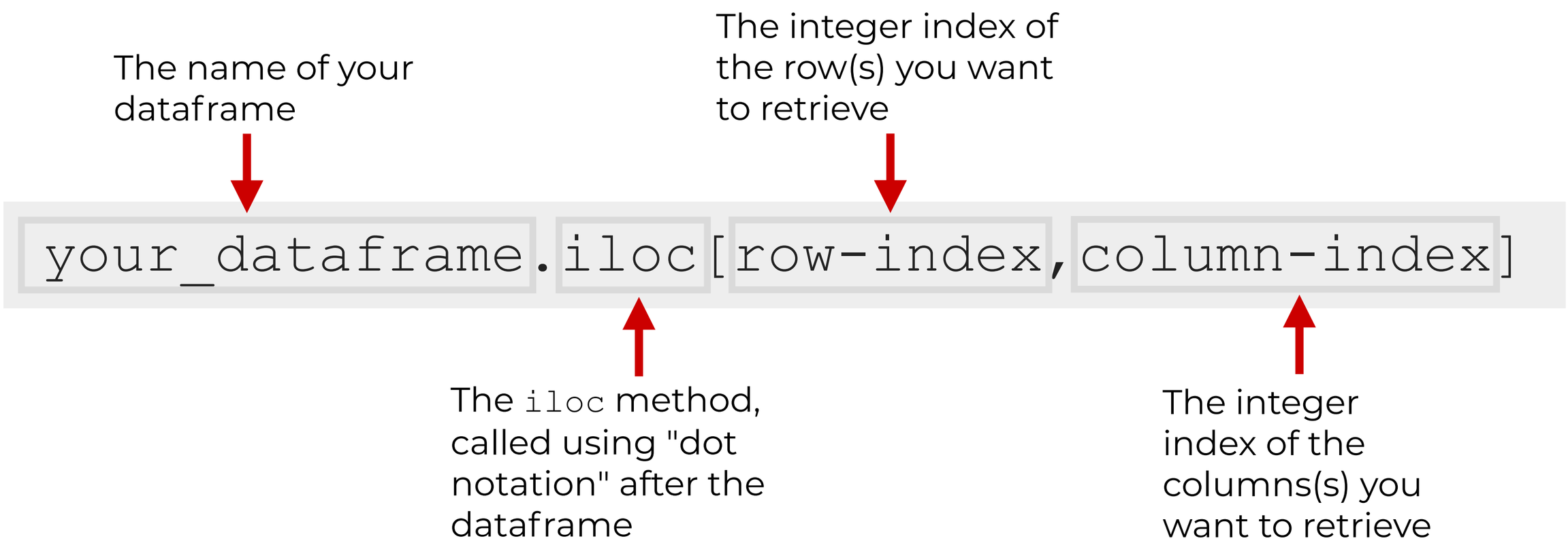
Introduction to iloc

The iloc method allows you to locate data by integer index

Here, we're selecting a column by numeric index

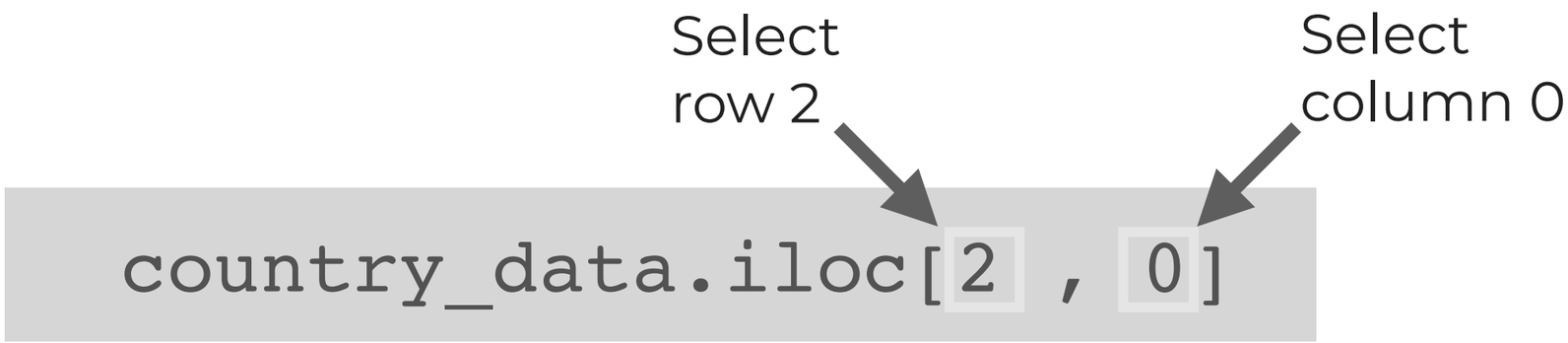
		0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
3	**DEU**	Germany	Europe	82,348,669	3,477,796,274,497
4	**GBR**	United Kingdom	Europe	65,595,565	2,650,850,178,102
5	**FRA**	France	Europe	66,859,768	2,465,134,297,439

Syntax of the iloc[] method

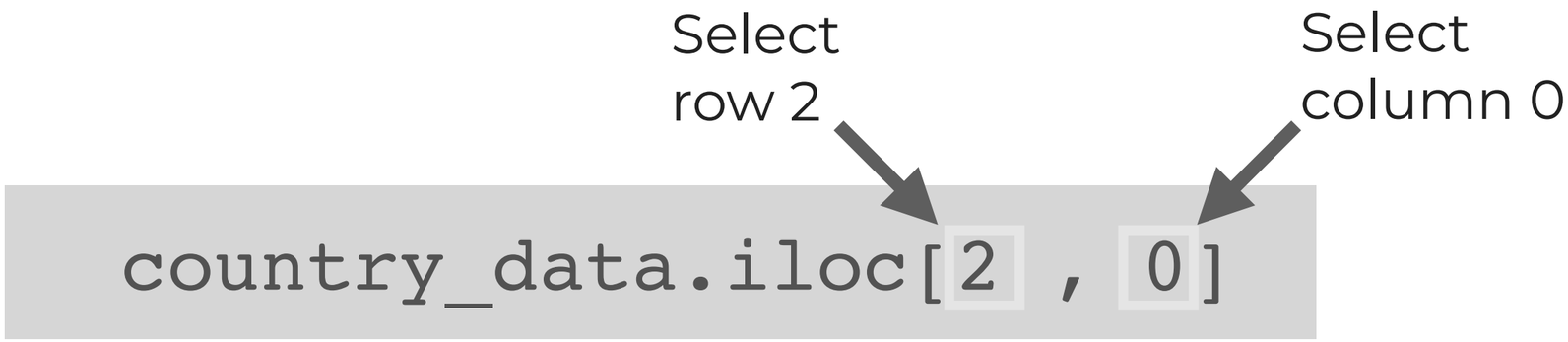


Example: how to select a single cell with iloc

To select a cell of data, we need to specify the row and column with iloc



SELECT A CELL WITH ILOC



	0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
3	**DEU**	Germany	Europe	82,348,669	3,477,796,274,497
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How to select a single row with iloc

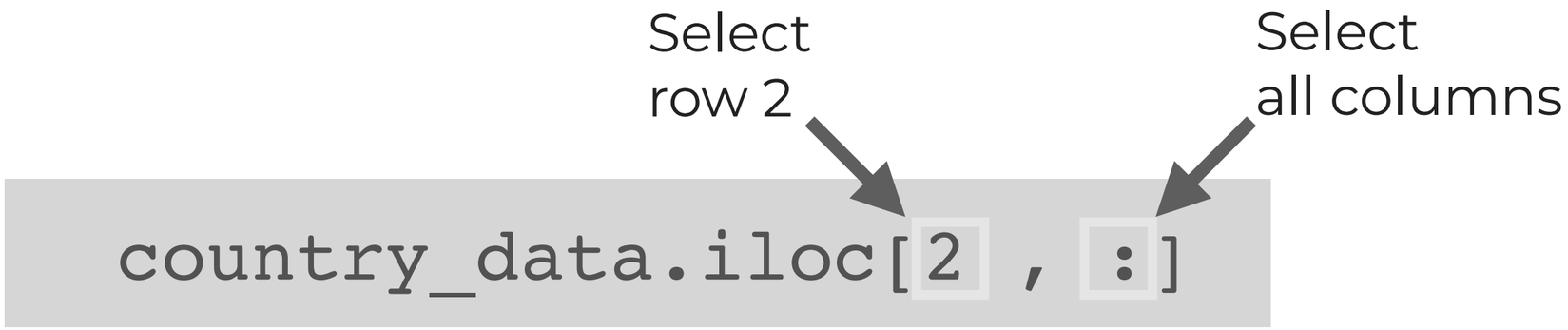
Syntax to select a row of data with iloc[]

An integer index indicates that we want to retrieve the data for a particular row

```
your_dataframe.iloc[row-index, : ]
```

The ':' indicates that we want to retrieve all columns

SELECT A ROW WITH ILOC



	0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
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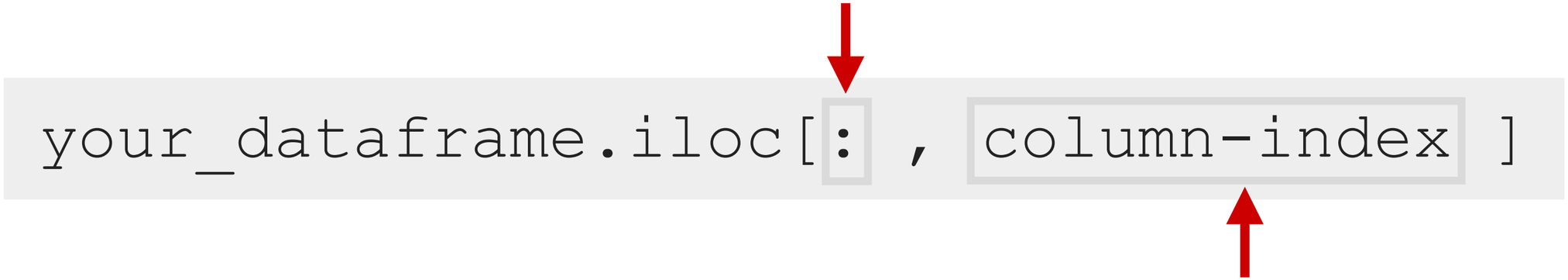
5	**FRA**	France	Europe	66,859,768	2,465,134,297,439

How to select a single column with iloc

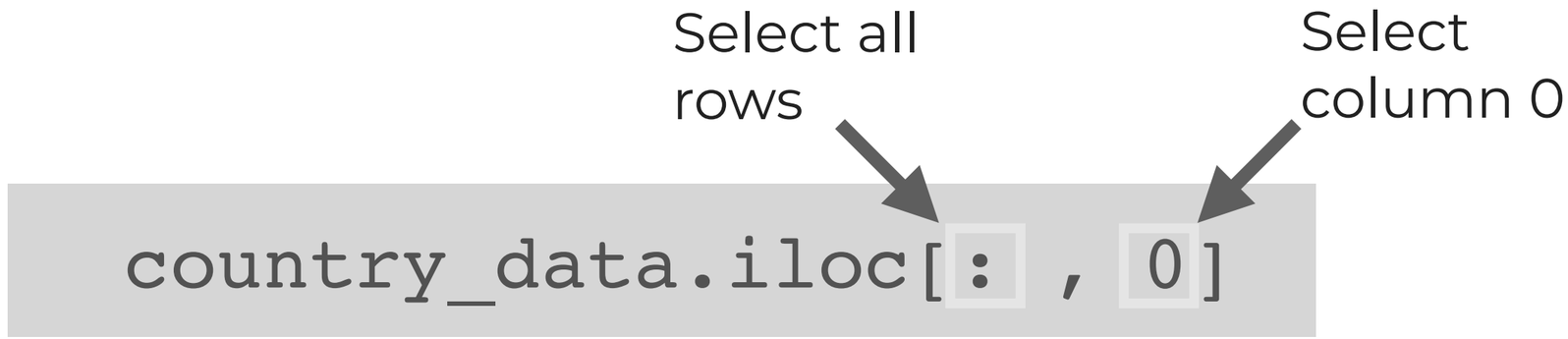
Syntax to select a column of data with iloc[]

The ':' indicates that we want to retrieve all rows



An integer index indicates that we want to retrieve the data for a particular column

SELECT A COLUMN WITH ILOC



	0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
3	**DEU**	Germany	Europe	82,348,669	3,477,796,274,497
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Slicing rows *and* columns

Syntax to select multiple rows and columns with iloc[]

The index of the first row you want to retrieve

```
your_dataframe.iloc[ start:stop, start:stop]
```

The index of the row that we want to "stop" at (this row will *not* be retrieved)

SELECT MULTIPLE ROWS

Select from row 2 up to and excluding row 4

Select all columns

```
country_data.iloc[2:4 , :]
```

	0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
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SELECT MULTIPLE COLUMNS

Select
all rows

Select from col 0 up to
and excluding col 3

```
country_data.iloc[: , 0:3]
```

		0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
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SELECT A SPECIFIC SLICE OF CELLS

Select from row 1 up to and excluding row 4

Select from col 0 up to and excluding col 3

```
country_data.iloc[1:4 , 0:3]
```

	0	1	2	3
	country_code	**country**	**continent**	**population**	**gdp**
0	**USA**	United States	North America	323,405,935	18,624,475,000,000
1	**CHN**	China	Asia	1,378,665,000	11,190,992,550,230
2	**JPN**	Japan	Asia	126,994,511	4,949,273,341,994
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5	**FRA**	France	Europe	66,859,768	2,465,134,297,439

Recap

Recap of what we learned

- How to retrieve data using `iloc[]`
  - select single rows
  - select single columns

- How to select *slices* of data
  - multiple rows
  - multiple columns