

### 4.3-LoadData

December 20, 2022

```
<a href="https://cocl.us/PY0101EN_edx_add_top">
  
```

# Introduction to Pandas Python

Welcome! This notebook will teach you about using Pandas in the Python Programming Language. By the end of this lab, you'll know how to use Pandas package to view and access data.

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<p>
  Estimated time needed: <strong>15 min</strong>
</p>
```

## About the Dataset

The table has one row for each album and several columns

```
<li><b>artist</b>: Name of the artist</li>
<li><b>album</b>: Name of the album</li>
<li><b>released_year</b>: Year the album was released</li>
<li><b>length_min_sec</b>: Length of the album (hours,minutes,seconds)</li>
<li><b>genre</b>: Genre of the album</li>
<li><b>music_recording_sales_millions</b>: Music recording sales (millions in USD) on <a href=
<li><b>claimed_sales_millions</b>: Album's claimed sales (millions in USD) on <a href="http://v
<li><b>date_released</b>: Date on which the album was released</li>
<li><b>soundtrack</b>: Indicates if the album is the movie soundtrack (Y) or (N)</li>
<li><b>rating_of_friends</b>: Indicates the rating from your friends from 1 to 10</li>
```

You can see the dataset here:

 Artist | Album | Released | Length | Genre |

<th>Music recording sales (millions)</th>	<th>Claimed sales (millions)</th>	<th>Released</th>	<th>Soundtrack</th>	<th>Rating (friends)</th>
<td>Michael Jackson</td>	<td>Thriller</td>	<td>1982</td>	<td>00:42:19</td>	<td>Pop, rock, R&B</td>
<td>46</td>	<td>65</td>	<td>30-Nov-82</td>	<td></td>	<td>10.0</td>
<td>AC/DC</td>	<td>Back in Black</td>	<td>1980</td>	<td>00:42:11</td>	<td>Hard rock</td>
<td>26.1</td>	<td>50</td>	<td>25-Jul-80</td>	<td></td>	<td>8.5</td>
<td>Pink Floyd</td>	<td>The Dark Side of the Moon</td>	<td>1973</td>	<td>00:42:49</td>	<td>Progressive rock</td>
<td>24.2</td>	<td>45</td>	<td>01-Mar-73</td>	<td></td>	<td>9.5</td>
<td>Whitney Houston</td>	<td>The Bodyguard</td>	<td>1992</td>	<td>00:57:44</td>	<td>Soundtrack/R&B, soul, pop</td>
<td>26.1</td>	<td>50</td>	<td>25-Jul-80</td>	<td>Y</td>	

<td>7.0</td>
<tr>
<td>Meat Loaf</td>
<td>Bat Out of Hell</td>
<td>1977</td>
<td>00:46:33</td>
<td>Hard rock, progressive rock</td>
<td>20.6</td>
<td>43</td>
<td>21-Oct-77</td>
<td></td>
<td>7.0</td>
<tr>
<td>Eagles</td>
<td>Their Greatest Hits (1971-1975)</td>
<td>1976</td>
<td>00:43:08</td>
<td>Rock, soft rock, folk rock</td>
<td>32.2</td>
<td>42</td>
<td>17-Feb-76</td>
<td></td>
<td>9.5</td>
<tr>
<td>Bee Gees</td>
<td>Saturday Night Fever</td>
<td>1977</td>
<td>1:15:54</td>
<td>Disco</td>
<td>20.6</td>
<td>40</td>
<td>15-Nov-77</td>
<td>Y</td>
<td>9.0</td>
<tr>
<td>Fleetwood Mac</td>
<td>Rumours</td>
<td>1977</td>
<td>00:40:01</td>
<td>Soft rock</td>
<td>27.9</td>
<td>40</td>
<td>04-Feb-77</td>
<td></td>
<td>9.5</td>

## Introduction of Pandas

```
[1]: # Dependency needed to install file
```

```
!pip install xlrd
```

Defaulting to user installation because normal site-packages is not writeable  
Requirement already satisfied: xlrd in /usr/local/lib/python3.7/site-packages (1.2.0)

WARNING: You are using pip version 22.0.3; however, version 22.3.1 is available.

You should consider upgrading via the '/usr/local/bin/python3 -m pip install --upgrade pip' command.

```
[2]: # Import required library
```

```
import pandas as pd
```

After the import command, we now have access to a large number of pre-built classes and functions. This assumes the library is installed; in our lab environment all the necessary libraries are installed. One way pandas allows you to work with data is a dataframe. Let's go through the process to go from a comma separated values (.csv) file to a dataframe. This variable `csv_path` stores the path of the .csv, that is used as an argument to the `read_csv` function. The result is stored in the object `df`, this is a common short form used for a variable referring to a Pandas dataframe.

```
[3]: # Read data from CSV file
```

```
csv_path = 'https://s3-api.us-gEO.objectstorage.softlayer.net/cf-courses-data/  
→CognitiveClass/PY0101EN/Chapter%204/Datasets/TopSellingAlbums.csv'  
df = pd.read_csv(csv_path)
```

We can use the method `head()` to examine the first five rows of a dataframe:

```
[4]: # Print first five rows of the dataframe
```

```
df.head()
```

```
[4]:
```

	Artist	Album	Released	Length	\
0	Michael Jackson	Thriller	1982	0:42:19	
1	AC/DC	Back in Black	1980	0:42:11	
2	Pink Floyd	The Dark Side of the Moon	1973	0:42:49	
3	Whitney Houston	The Bodyguard	1992	0:57:44	
4	Meat Loaf	Bat Out of Hell	1977	0:46:33	

```
Genre Music Recording Sales (millions) \
```

0	pop, rock, R&B	46.0
1	hard rock	26.1
2	progressive rock	24.2
3	R&B, soul, pop	27.4
4	hard rock, progressive rock	20.6

	Claimed Sales (millions)	Released.1	Soundtrack	Rating
0	65	30-Nov-82	NaN	10.0
1	50	25-Jul-80	NaN	9.5
2	45	01-Mar-73	NaN	9.0
3	44	17-Nov-92	Y	8.5
4	43	21-Oct-77	NaN	8.0

We use the path of the excel file and the function `read_excel`. The result is a data frame as before:

```
[5]: # Read data from Excel File and print the first five rows

xlsx_path = 'https://s3-api.us-geo.objectstorage.softlayer.net/cf-courses-data/
→CognitiveClass/PY0101EN/Chapter%204/Datasets/TopSellingAlbums.xlsx'

df = pd.read_excel(xlsx_path)
df.head()
```

```
[5]:
```

	Artist	Album	Released	Length \
0	Michael Jackson	Thriller	1982	00:42:19
1	AC/DC	Back in Black	1980	00:42:11
2	Pink Floyd	The Dark Side of the Moon	1973	00:42:49
3	Whitney Houston	The Bodyguard	1992	00:57:44
4	Meat Loaf	Bat Out of Hell	1977	00:46:33

	Genre	Music Recording Sales (millions) \
0	pop, rock, R&B	46.0
1	hard rock	26.1
2	progressive rock	24.2
3	R&B, soul, pop	27.4
4	hard rock, progressive rock	20.6

  

	Claimed Sales (millions)	Released.1	Soundtrack	Rating
0	65	1982-11-30	NaN	10.0
1	50	1980-07-25	NaN	9.5
2	45	1973-03-01	NaN	9.0
3	44	1992-11-17	Y	8.5
4	43	1977-10-21	NaN	8.0

We can access the column `Length` and assign it a new dataframe `x`:

```
[6]: # Access to the column Length
```

```
x = df[['Length']]  
x
```

```
[6]:      Length  
0  00:42:19  
1  00:42:11  
2  00:42:49  
3  00:57:44  
4  00:46:33  
5  00:43:08  
6  01:15:54  
7  00:40:01
```

The process is shown in the figure:

Viewing Data and Accessing Data

You can also get a column as a series. You can think of a Pandas series as a 1-D dataframe. Just use one bracket:

```
[7]: # Get the column as a series
```

```
x = df['Length']  
x
```

```
[7]: 0    00:42:19  
     1    00:42:11  
     2    00:42:49  
     3    00:57:44  
     4    00:46:33  
     5    00:43:08  
     6    01:15:54  
     7    00:40:01  
     Name: Length, dtype: object
```

You can also get a column as a dataframe. For example, we can assign the column Artist:

```
[8]: # Get the column as a dataframe
```

```
x = type(df[['Artist']])  
x
```

```
[8]: pandas.core.frame.DataFrame
```

You can do the same thing for multiple columns; we just put the dataframe name, in this case, df, and the name of the multiple column headers enclosed in double brackets. The result is a new dataframe comprised of the specified columns:

```
[9]: # Access to multiple columns

y = df[['Artist', 'Length', 'Genre']]
y
```

```
[9]:
```

	Artist	Length	Genre
0	Michael Jackson	00:42:19	pop, rock, R&B
1	AC/DC	00:42:11	hard rock
2	Pink Floyd	00:42:49	progressive rock
3	Whitney Houston	00:57:44	R&B, soul, pop
4	Meat Loaf	00:46:33	hard rock, progressive rock
5	Eagles	00:43:08	rock, soft rock, folk rock
6	Bee Gees	01:15:54	disco
7	Fleetwood Mac	00:40:01	soft rock

The process is shown in the figure:

One way to access unique elements is the `iloc` method, where you can access the 1st row and the 1st column as follows:

```
[10]: # Access the value on the first row and the first column

df.iloc[0, 0]
```

```
[10]: 'Michael Jackson'
```

You can access the 2nd row and the 1st column as follows:

```
[11]: # Access the value on the second row and the first column

df.iloc[1,0]
```

```
[11]: 'AC/DC'
```

You can access the 1st row and the 3rd column as follows:

```
[12]: # Access the value on the first row and the third column

df.iloc[0,2]
```

```
[12]: 1982
```

You can access the column using the name as well, the following are the same as above:

```
[13]: # Access the column using the name

df.loc[0, 'Artist']
```

```
[13]: 'Michael Jackson'
```

```
[14]: # Access the column using the name
df.loc[1, 'Artist']
```

```
[14]: 'AC/DC'
```

```
[15]: # Access the column using the name
df.loc[0, 'Released']
```

```
[15]: 1982
```

```
[16]: # Access the column using the name
df.loc[1, 'Released']
```

```
[16]: 1980
```

You can perform slicing using both the index and the name of the column:

```
[17]: # Slicing the dataframe
df.iloc[0:2, 0:3]
```

```
[17]:
```

	Artist	Album	Released
0	Michael Jackson	Thriller	1982
1	AC/DC	Back in Black	1980

```
[18]: # Slicing the dataframe using name
df.loc[0:2, 'Artist':'Released']
```

```
[18]:
```

	Artist	Album	Released
0	Michael Jackson	Thriller	1982
1	AC/DC	Back in Black	1980
2	Pink Floyd	The Dark Side of the Moon	1973

Quiz on DataFrame

Use a variable q to store the column Rating as a dataframe

```
[19]: # Write your code below and press Shift+Enter to execute
q = df[['Rating']]
q
```

```
[19]:
```

	Rating
0	10.0
1	9.5



```
2    9.0
3    8.5
4    8.0
5    7.5
6    7.0
7    6.5
```

Double-click **here** for the solution.

Assign the variable `q` to the dataframe that is made up of the column `Released` and `Artist`:

```
[20]: # Write your code below and press Shift+Enter to execute
q = df[['Released', 'Artist']]
q
```

```
[20]:   Released      Artist
0    1982  Michael Jackson
1    1980         AC/DC
2    1973    Pink Floyd
3    1992  Whitney Houston
4    1977    Meat Loaf
5    1976        Eagles
6    1977    Bee Gees
7    1977  Fleetwood Mac
```

Double-click **here** for the solution.

Access the 2nd row and the 3rd column of `df`:

```
[23]: # Write your code below and press Shift+Enter to execute
df.iloc[1, 2]
```

```
[23]: 1980
```

Double-click **here** for the solution.

The last exercise!

Congratulations, you have completed your first lesson and hands-on lab in Python. However, there is one more thing you need to do. The Data Science community encourages sharing work. The best way to share and showcase your work is to share it on GitHub. By sharing your notebook on GitHub you are not only building your reputation with fellow data scientists, but you can also show it off when applying for a job. Even though this was your first piece of work, it is never too early to start building good habits. So, please read and follow this article to learn how to share your work.

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<p><a href="https://cocl.us/PY0101EN\_edx\_add\_bbottom"><img src="https://s3-api.us-geo.objectst

About the Authors:

Joseph Santarcangelo is a Data Scientist at IBM, and holds a PhD in Electrical Engineering. His research focused on using Machine Learning, Signal Processing, and Computer Vision to determine how videos impact human cognition. Joseph has been working for IBM since he completed his PhD.

Other contributors: Mavis Zhou

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