

Integrating LTI Hands-On Labs with Open edX at IBM Skills Network

Leons Petrazickis @leonsp

IBM Skills Network

- Network of education portals for companies and universities.
- Largest is the public <https://CognitiveClass.ai> with over a million learners.
- Content focuses on Data Science, AI, and Machine Learning.
- We deploy an easy to customize Open edX portal for you on demand.

Courses

- Some of the most popular courses:
 - Python for Data Science
 - Machine Learning with Python
 - Deep Learning Fundamentals
- All require a hands-on lab environment
- Our courses are on multiple platforms: Coursera, edX, Cognitive Class

Learning Tools Interoperability (LTI)

- Standard for integrating external tools with a learning management system (LMS) like Open edX.
- Based on the Open Authorization (OAuth) standard.
- Tools are are LTI providers.
- LMS like Open edX are LTI consumers.
- Providers have to authorize consumers.

Labs

- <https://labs.cognitiveclass.ai/> is our Labs environment.
- Hands-on tools:
 - JupyterLab for Python, R, and Scala
 - RStudio for R
 - Zeppelin for Python and Scala
- Labs are mostly Jupyter notebooks.
- It is an LTI provider, so that it can be consumed by any authorized Open edX instance.

User Experience 1/4



Python Basics for Data Science

IBM - PY0101EN

Started - Any time, Self-paced



[Resume Course](#)

User Experience 2/4

Lab- Loading Data and Viewing Data

[Bookmark this page](#)

Practice your skills on Skills Network Labs

IBM Skills Network Labs is a virtual lab environment used in this course. Your Username and email will be passed to Labs and will only be used for communicating important information to enhance your learning experience.

[View resource in a new window](#)

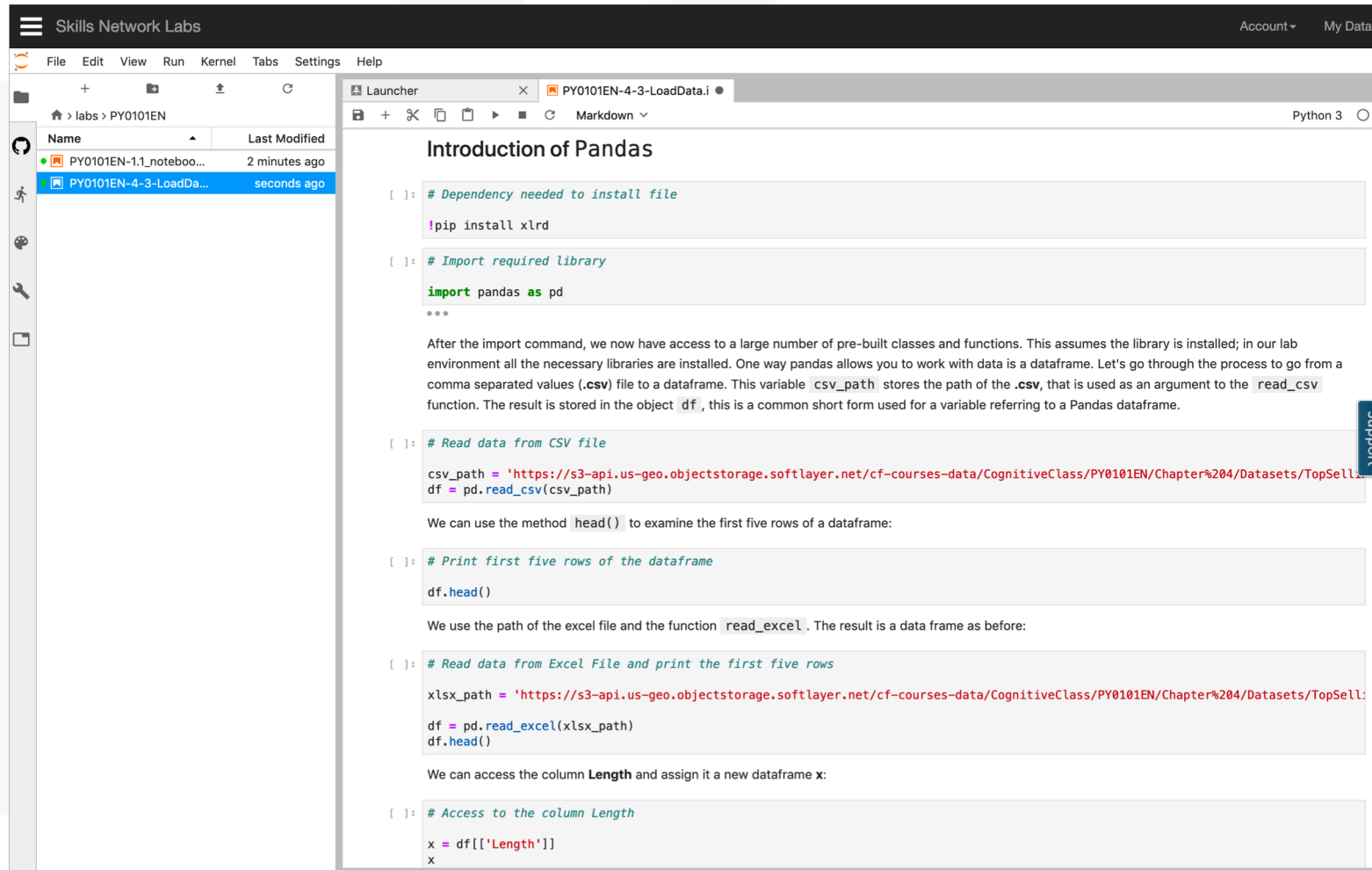
User Experience 3/4

Click OK to have your username and e-mail address sent to a 3rd party application.
Click Cancel to return to this page without sending your information.

Cancel

OK

User Experience 4/4



The screenshot displays the IBM Skills Network Labs interface. The top navigation bar includes 'Skills Network Labs', 'Account', and 'My Data'. Below this is a menu bar with 'File', 'Edit', 'View', 'Run', 'Kernel', 'Tabs', 'Settings', and 'Help'. The main workspace is divided into three panes:

- Left Pane:** A file explorer showing a directory structure under 'labs > PY0101EN'. It lists two notebooks: 'PY0101EN-1.1_noteboo...' (modified 2 minutes ago) and 'PY0101EN-4-3-LoadDa...' (modified seconds ago).
- Top Center Pane:** A 'Launcher' window for the notebook 'PY0101EN-4-3-LoadData.i', showing a 'Markdown' editor and 'Python 3' kernel.
- Main Content Pane:** The notebook content, titled 'Introduction of Pandas'. It contains several code cells and explanatory text:

```
[ ]: # Dependency needed to install file
!pip install xlrd

[ ]: # 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.

```
[ ]: # Read data from CSV file
csv_path = 'https://s3-api.us-geo.objectstorage.softlayer.net/cf-courses-data/CognitiveClass/PY0101EN/Chapter%204/Datasets/TopSell...'
df = pd.read_csv(csv_path)
```

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

```
[ ]: # Print first five rows of the dataframe
df.head()
```

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

```
[ ]: # 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/TopSell...'
df = pd.read_excel(xlsx_path)
df.head()
```

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

```
[ ]: # Access to the column Length
x = df[['Length']]
x
```

A vertical 'Support' button is visible on the right side of the notebook content area.

Automated Marking

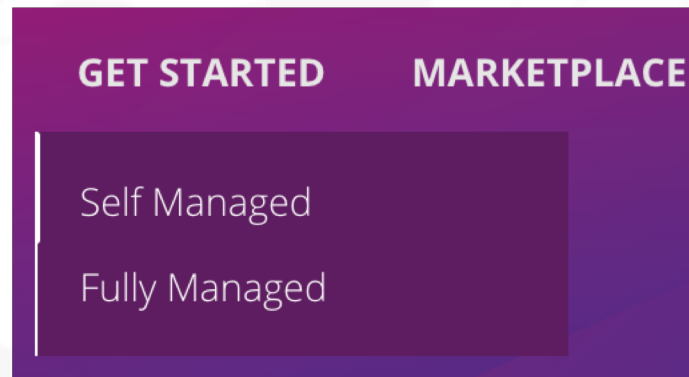
- LTI standard includes ability for a learner to submit their work for automated marking.
- A mark is a number between 0.0 and 1.0.
- e.g. 0.75 is a 75% or a B grade, depending on your scale.

Other Uses of LTI

- We also used LTI to let learners claim personalized reward codes.
- LTI lets you do very simple single sign-on.
- Riff uses LTI to integrate video chat.

Get Your Own Open edX Trial

- We've built a way for everyone to get their own instance of vanilla open source Open edX
- Try it here: <https://open.edx.org/>



- Direct link: <https://cocl.us/open-edx-trial>

Thanks!

Leons Petrazickis
@leonsp