Introduction to Jupiter Notebooks: Problem Solving

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Let's practice the skills we learned during the last lesson on Jupyter Notebooks.

Create a Spreadsheet of Data

Create an Excel spreadsheet as follows.

- Sign into https://www.office.com/launch/excel using your `memphis.edu` email.
- Name the spreadsheet file *scores*.
- The first row must be headings only.
- The first three columns must have the following headings: *Name*, *Exam1*, and *Exam2*.
- Below the headings row, there must be 15 rows of data. Fill the rows in with a variety of made-up names and exam scores (assuming that each exam score is between 0 and 100 points).

Upload the spreadsheet into your JupyterLab workspace.

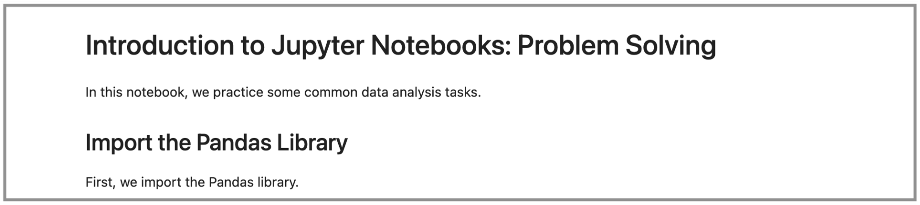
Create a New Notebook

Create a new xpython notebook named `Jupyter-notebooks-intro-PS.ipynb` in your JupyterLab workspace.

- Be sure that the notebook is using the *xpython* kernel (NOT the *Python 3* kernel).

Add a Markdown Cell

Make the first cell in the notebook a Markdown cell that looks like the following figure.



Introduction to Jupyter Notebooks: Problem Solving

In this notebook, we practice some common data analysis tasks.

Import the Pandas Library

First, we import the Pandas library.

- Don’t forget to set the cell type to *Markdown*.
- Hint: The cell includes a level-1 heading and a level-2 heading.
- Hint: See the GitHub Markdown Cheatsheet for Markdown examples.

Run the cell to make it render the Markdown as pretty headings and text.

Import the Pandas Library

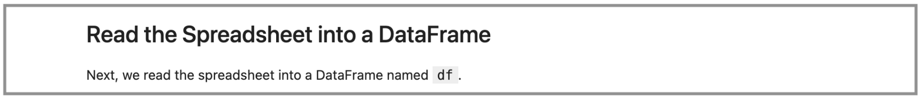
Add a code cell that imports the Pandas library.

- Import the Pandas library as `pd`.

Run the code cell. (No output should be displayed.)

Read the Spreadsheet into a DataFrame

Add a Markdown cell that looks like this:



Read the Spreadsheet into a DataFrame

Next, we read the spreadsheet into a DataFrame named `df`.

- Hint: The heading in this cell (and all future Markdown cells) is a level-2 heading.
- Hint: To format the `df` variable, we surround the df in backticks (i.e., “s).

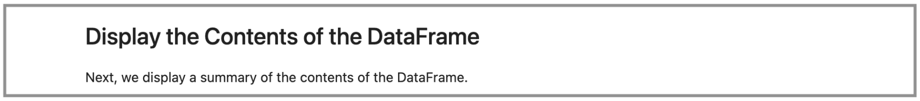
Add a code cell that reads the spreadsheet you uploaded into a DataFrame.

- Name the DataFrame variable `df`.

Run the code cell. (No output should be displayed.)

Display the Contents of the DataFrame

Add a Markdown cell that looks like this:



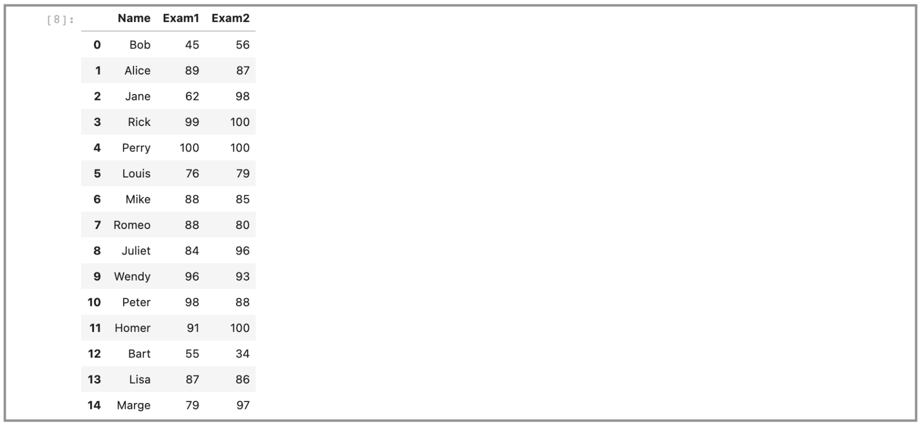
Display the Contents of the DataFrame

Next, we display a summary of the contents of the DataFrame.

Add a code cell that displays the contents of the DataFrame.

- Hint: This involves only adding a variable block.

Run the code cell and note the output, which should resemble the following:

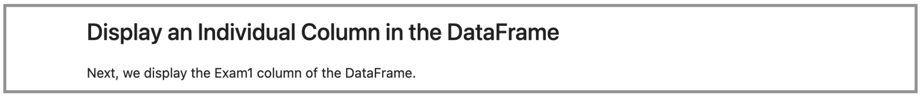


[8]:

	Name	Exam1	Exam2
0	Bob	45	56
1	Alice	89	87
2	Jane	62	98
3	Rick	99	100
4	Perry	100	100
5	Louis	76	79
6	Mike	88	85
7	Romeo	88	80
8	Juliet	84	96
9	Wendy	96	93
10	Peter	98	88
11	Homer	91	100
12	Bart	55	34
13	Lisa	87	86
14	Marge	79	97

Display an Individual Column in the DataFrame

Add a Markdown cell that looks like this:



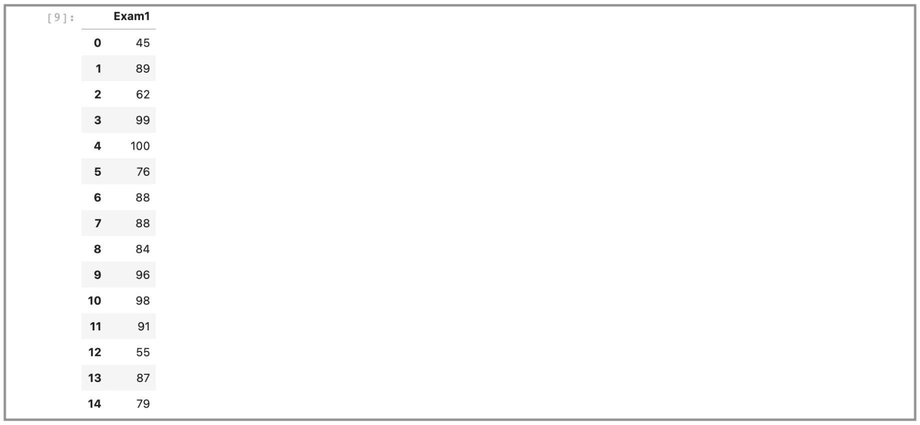
Display an Individual Column in the DataFrame

Next, we display the Exam1 column of the DataFrame.

Add a code cell that displays a summary of only the data in the Exam1 column.

- Hint: This involves one of the *Lists* blocks.

Run the code cell and note the output, which should resemble the following:

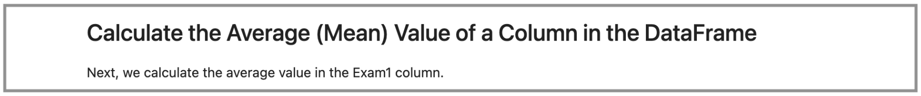


[9]:

	Exam1
0	45
1	89
2	62
3	99
4	100
5	76
6	88
7	88
8	84
9	96
10	98
11	91
12	55
13	87
14	79

Calculate the Average (Mean) Value of a Column in the DataFrame

Add a Markdown cell that looks like this:



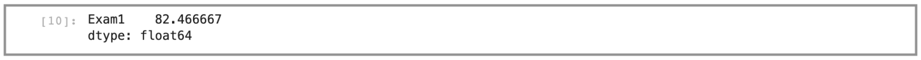
Calculate the Average (Mean) Value of a Column in the DataFrame

Next, we calculate the average value in the Exam1 column.

Add a code cell that calculate the average value in only the data in the Exam1 column.

- Hint: First, store the Exam1 column as a list in a new variable (call it `exam1`). Then, run the `mean` operation on the `exam1` variable.

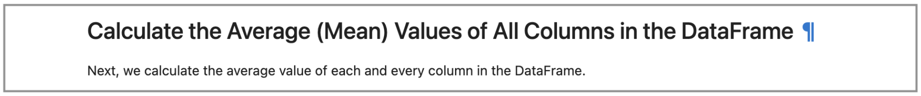
Run the code cell and note the output, which should resemble the following:



```
[10]: Exam1    82.466667
      dtype: float64
```

Calculate the Average (Mean) Values of All Columns in the DataFrame

Add a Markdown cell that looks like this:



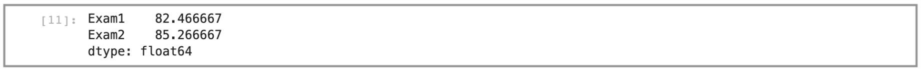
Calculate the Average (Mean) Values of All Columns in the DataFrame ¶

Next, we calculate the average value of each and every column in the DataFrame.

Add a code cell that calculates the average value for each column in the DataFrame.

- Hint: This can be done by calling the `mean` operation on the entire DataFrame.

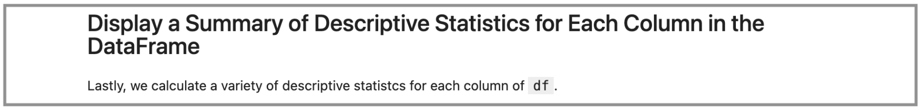
Run the code cell and note the output, which should resemble the following:



```
[11]: Exam1    82.466667
      Exam2    85.266667
      dtype: float64
```

Display a Summary of Descriptive Statistics for Each Column in the DataFrame

Add a Markdown cell that looks like this:



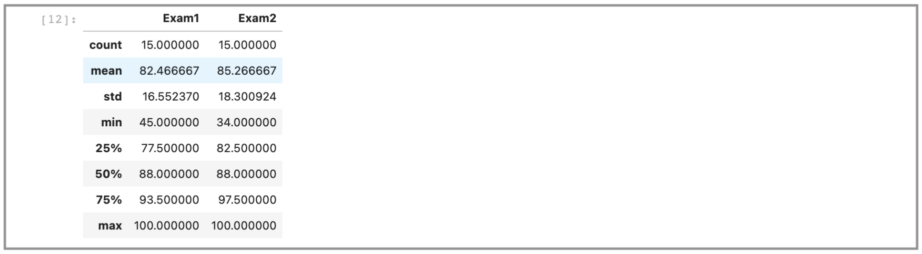
Display a Summary of Descriptive Statistics for Each Column in the DataFrame

Lastly, we calculate a variety of descriptive statistcs for each column of `df`.

Add a code cell that displays a summary of descriptive statistics for each column in the DataFrame.

- Hint: This can be done by calling the `describe` operation on the entire DataFrame.

Run the code cell and note the output, which should resemble the following:



[12]:

	Exam1	Exam2
count	15.000000	15.000000
mean	82.466667	85.266667
std	16.552370	18.300924
min	45.000000	34.000000
25%	77.500000	82.500000
50%	88.000000	88.000000
75%	93.500000	97.500000
max	100.000000	100.000000

Congratulations! You've completed the first problem-solving notebook!