

EXERCISE 0: PYTHON VERSION

Visit <https://www.anaconda.com/>.
What is the current version of Python in Anaconda available on the website?

Answer: **python 3.8**

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EXERCISE 2: CHECK THE ANACONDA NAVIGATOR

Now, you have to check whether Anaconda is installed in your machine.
Click “start” and look for the Anaconda folder, and click “Anaconda Navigator”. At the Anaconda Navigator, click at the “Home” tab. How many applications available in Anaconda? List all of them here.

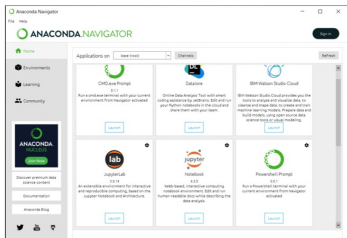


Figure 6: Anaconda Navigator

Answer: **13 applications**

On left hand side of Navigator Click the “Environments” tab, how many packages are installed in the Anaconda package installed in your machine?

Answer: **362 packages**

How many packages are available in the Anaconda ? Those are ready for you to install.

Answer: **6918 packages**

EXERCISE 3: PLAY WITH ANACONDA CONSOLE

Basically, using command line is the best way to interact with Python and Anaconda.

Click “start” and select “Anaconda Prompt” in the Anaconda folder. You will see the Anaconda command prompt ready for your command.

Now you have to check the version of Anaconda installed in your machine by using command line mode.

Type `conda list anaconda`

What is the output? and what is the current version of Anaconda that is installed in your machine?

```
Answer:
Select Anaconda Prompt (anaconda)
(base) C:\Users\HP>conda list anaconda$
# packages in environment at D:\anaconda:
#
# Name            Version      Build      Channel
#-----
# anaconda        2021.05      py38_0
(base) C:\Users\HP>
```

Next, you need to check the installed packages by using the following command

```
conda list
```

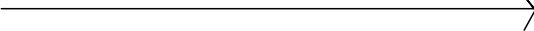
Is the list that appear in the command line mode same with the list of installed packages that you saw in the Anaconda navigation?

Answer: *same as the anaconda navigation*

Now, you need to learn how to update Anaconda. First, it is better to update the package manager (conda).

Type `conda update conda`

Are there any packages need to be updated? What are they?

Answer: 

```

Anaconda Prompt (anaconda) - conda update conda
(base) C:\Users\HP>conda update conda
Collecting package metadata (current repodata.json): done
Solving environment: done

## Package Plan ##
  environment location: D:\anaconda
  added / updated specs:
    - conda

The following packages will be downloaded:

package | build | size
-----|-----|-----
conda-4.10.3 | py38ha95532_0 | 2.9 MB
Total: 2.9 MB

The following packages will be UPDATED:
conda 4.10.1-py38ha95532_1 --> 4.10.3-py38ha95532_0

Proceed ([y]/n)?
```

EXERCISE 4: INSTALL A NEW PACKAGE USING ANACONDA PROMPT

You need to know how to install new packages using Anaconda prompt in cases that the installed packages are not enough to solve your problem. We use Git package as an example. Git is one of the popular version control package that we will try it later.

Type `conda update git`

What is the output?

Answer:

```

(base) C:\Users\HP>conda update git
PackageNotFoundError: Package is not installed in prefix.
prefix: D:\anaconda
package name: git
```

Type `conda install git`

What is the output?

Answer:

```

(base) C:\Users\HP>conda install git
Collecting package metadata (current repodata.json): done
Solving environment: done

## Package Plan ##
  environment location: D:\anaconda
  added / updated specs:
    - git

The following packages will be downloaded:

package | build | size
-----|-----|-----
conda-4.10.3 | py38ha95532_0 | 2.9 MB
git-2.32.0 | hba00322_1 | 10.9 MB
Total: 13.8 MB

The following NEW packages will be INSTALLED:
git | pkg/macos/win-64::git-2.32.0-hba00322_1

The following packages will be UPDATED:
conda 4.10.1-py38ha95532_1 --> 4.10.3-py38ha95532_0

Proceed ([y]/n)?
```

Check the version of the Git package by using `git -version` command

What is the output?

Answer:

```

Anaconda Prompt (anaconda)
(base) C:\Users\HP>git --version
git version 2.31.1.windows.1
(base) C:\Users\HP>
```

EXERCISE 5: PLAY WITH THE JUPYTER NOTEBOOK

Jupyter notebook is a set of tools for interactively developing and presenting Python programming. It makes a working with Python and data easier for scientists. It is a web-based application suitable for the process of solving a computational problem and presenting the results along with code, explanatory text and background. The Jupyter notebook combines two components:

1. The web application: a browser-based which combine text, mathematics, computations and their rich media output.
2. Notebook documents: a representation of all content visible in the web application. The Jupyter notebook file extension is .ipynb

Let's start, at the Anaconda navigator, click "Jupyter Notebook" (not Jupyterlab). You will see the Jupyter notebook on your browser with the list of files.

What is the URL of the Jupyter notebook that shows on your browser?

Answer: http://localhost:8888/notebooks/Untitled1.ipynb?kernel_name=python3

Then, click “New”, and select “Python3”. You will see the file called “Untitled”. The gray rectangle box with `in[]` is called “cell” where we can input both Python code and text using Mark Down tag.

Let’s start with the coding, in the “code” cell type, you can start typing in Python code directly. Executing code in this cell can be done by either clicking on the run cell button or hitting Shift + Return keys.

Type `print(‘Hello World’)` in the first cell and run. The output becomes visible right underneath the cell.

What is the output?

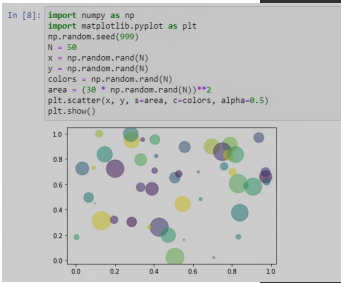
Answer:

```
In [1]: print("Hello World")

Hello World
```

Next, we will test how to create a figure on the Jupyter notebook. Type the following code in the second cell and run.

```
import numpy as np
import matplotlib.pyplot as plt
np.random.seed(999)
N = 50
x = np.random.rand(N)
y = np.random.rand(N)
colors = np.random.rand(N)
area = (30 * np.random.rand(N))**2
plt.scatter(x, y, s=area, c=colors, alpha=0.5)
plt.show()
```



What is the output?

Answer:

You have to modify the figure by adding 50 more circles. Please, try to edit the code above. What is your new code that add 50 more circles?

```
In [10]: import numpy as np
import matplotlib.pyplot as plt
np.random.seed(999)
N = 100
x = np.random.rand(N)
y = np.random.rand(N)
colors = np.random.rand(N)
area = (30 * np.random.rand(N))**2
plt.scatter(x, y, s=area, c=colors, alpha=0.5)
plt.show()
```

In the next cell, type `print(df)` and run. What is the difference between `df` from the previous command and `print(df)`, and why it is different?
This is the result when type `print(df)` and run. The different is when type `df`, Answer: it shows the table of data. On the other hand, when type `print(df)`, it shows text.

```
In [13]: import pandas as pd
df = pd.read_csv("https://raw.githubusercontent.com/plotly/datasets/master/school_earnings.csv")
print(df)
```

	School	Women	Men	Gap
0	MIT	94	152	58
1	Stanford	96	151	55
2	Harvard	112	165	53
3	U.Penn	92	141	49
4	Princeton	90	137	47
5	Chicago	78	118	40
6	Georgetown	94	131	37
7	Tufts	76	112	36
8	Yale	79	114	35
9	Columbia	86	119	33
10	Duke	93	124	31
11	Dartmouth	84	114	30
12	NYU	67	94	27
13	Notre Dame	73	100	27
14	Cornell	88	107	27
15	Michigan	62	84	22
16	Brown	72	92	20
17	Berkeley	71	88	17
18	Emory	68	82	14
19	UCLA	64	78	14
20	SoCal	72	81	9

```
import pandas as pd
df = pd.read_csv("https://raw.githubusercontent.com/plotly/datasets/master/school_earnings.csv")
```

df

How many data items contain in this dataset?

Answer: 21

```
In [12]: import pandas as pd
df = pd.read_csv("https://raw.githubusercontent.com/plotly/datasets/master/school_earnings.csv")

Out[12]:
```

	School	Women	Men	Gap
0	MIT	94	152	58
1	Stanford	96	151	55
2	Harvard	112	165	53
3	U.Penn	92	141	49
4	Princeton	90	137	47
5	Chicago	78	118	40
6	Georgetown	94	131	37
7	Tufts	76	112	36
8	Yale	79	114	35
9	Columbia	86	119	33
10	Duke	93	124	31
11	Dartmouth	84	114	30
12	NYU	67	94	27
13	Notre Dame	73	100	27
14	Cornell	88	107	27
15	Michigan	62	84	22
16	Brown	72	92	20
17	Berkeley	71	88	17
18	Emory	68	82	14
19	UCLA	64	78	14
20	SoCal	72	81	9

EXERCISE 6: MARKDOWN AND CODE IN JUPYTER NOTE-BOOK

You can change the cell type from “Code” to “Markdown” to include explanatory text in your notebook. To change the type, you can use the dropdown input control.

Change the next cell to “Markdown” and search the Internet for the Markdown tag, [Markdown in Jupyter Notebook](#)

Use Markdown to generate the following output on the current notebook.

Mahidol University

Faculty of Information and Communication Technology

We are studying ITCS159

Software Lab for Basic Scientific Problem Solving

Markdown can create lists, for example

- first
- second
- third

Markdown can also create inline code, for example

```
Sayyy, Say!!!, Say Ouu, Say Ahh, Say ICT
```

Mahidol University

Faculty of information and Communication Technology

We are studying ITCS159

Software Lab for Basic Scientific Problem solving

Markdown can create lists, for example

- first
- second
- third

Markdown can also create inline code, for example

```
Sayy, Say!!!, Say Ouu,Say Ahh, Say ICT
```

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****Software Lab for Basic Scientific Problem solving****

Markdown can create lists, for example

- first
- second
- third

Markdown can also create inline code, for example

```
`Sayy, Say!!!, Say Ouu,Say Ahh, Say ICT`
```

The Jupyter notebook also supports latex's mathematical formula. Type the following code in the next cell, and run.

```
%%latex
\begin{align}
B' &= -\nabla \times E, \\
E' &= \nabla \times B - 4\pi j, \\
x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\end{align}
```

What is the output?

Answer:

$$\begin{aligned} B' &= -\nabla \times E, \\ E' &= \nabla \times B - 4\pi j, \\ x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \end{aligned}$$

Given the limit of following function

$$\lim_{x \rightarrow \infty} \frac{\sin((x))}{x} = 0$$

Learn some Latex code in Jupyter Notebook [follow the guide of Latex](#)

Create derivative of equation in Jupyter Notebook.

Answer Code:

```
In [5]: %%latex
\begin{align}
& \lim_{x \rightarrow \infty} \frac{\sin((x))}{x} = 0
\end{align}
```

$$\lim_{x \rightarrow \infty} \frac{\sin((x))}{x} = 0$$