

# Lab 1 – Install & Setup your Environment

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TU 257 – Data Analytics

# Follow along – Don't rush ahead

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Follow along with the steps I get for each Lab

Don't rush ahead

Don't ask Question about something we are covering later

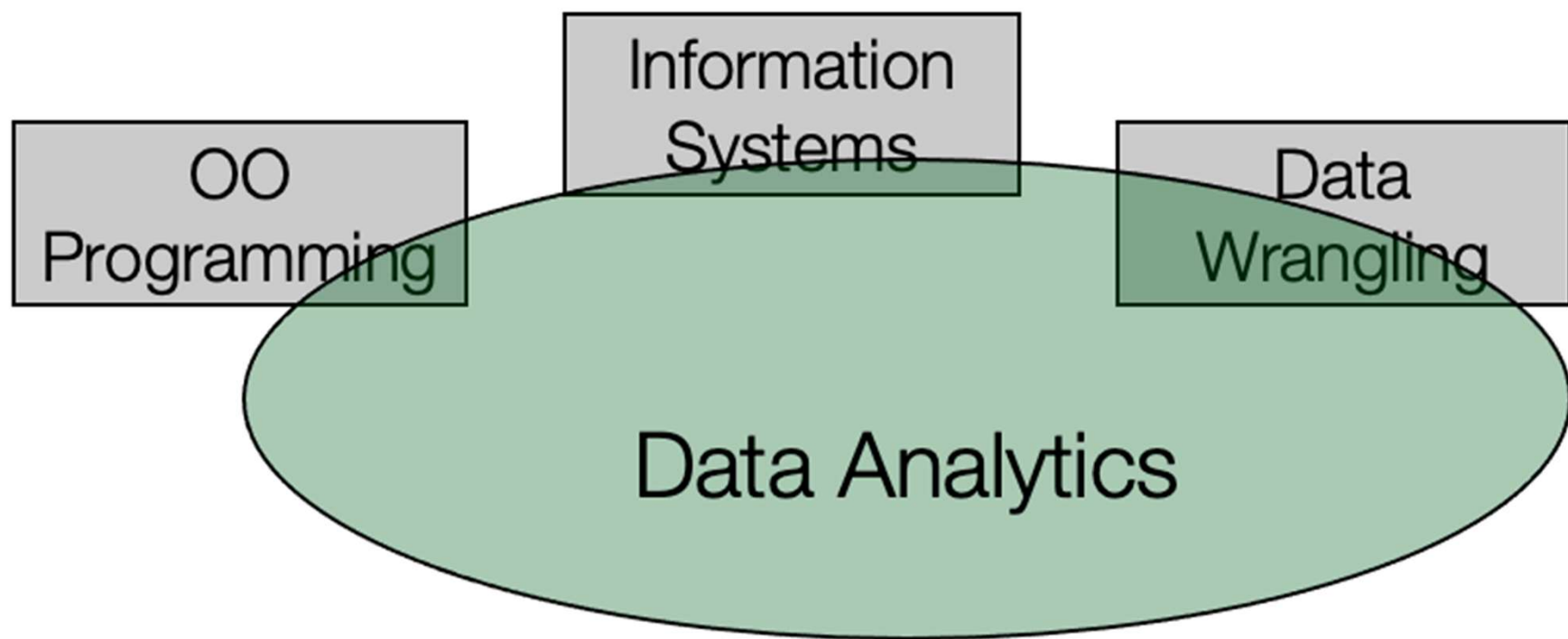
Wait

Labs are designed to be followed in a certain order

Follow that order

Don't skip steps - if you do, things will go wrong

If something doesn't work, look back on what you did and see if you missed a step(s)



# Agenda

---

Install Python

Install IDE

- Jupyter Notebook
- Jupyter Lab
- Google Colabs
  
- Explore these and Pick One
- If you are unsure, install Jupyter Notebook

Run some simple code



+



You might have Python  
already installed – Great  
you have nothing to do!

Installed it last Semester.  
Great, but can you  
remember how to use it?



I need to install it, How  
do that?

Install Python yourself,  
and all the libraries  
yourself

Or use Anaconda, which  
it installs lots of related  
libraries

Or use a website with  
everything done for you

---

You will need to do the following for

Data Wangling module



**STOP**

**LOOK**

**LISTEN**



# Anaconda

Anaconda provides a prebuilt environment

Download

- <https://www.anaconda.com/>

Free to use

Will include Python and lots of libraries for doing Data Science, Machine Learning, etc work

Will have correct version of libraries to run correctly with each other and version of Python

Can create multiple Anaconda environments on your Computer, with each one for a different project

- Allows separation of work which might need different version of libraries etc



[Products](#)

Solutions

Press Windows I

## Anaconda Hub

### Distribution

Trusted public and private repositories

### Cloud Suite

Notebooks, storage, and AI Assistant

### Package Security Manager

Trusted asset repository

### Navigator

Trusted public and private repositories

### Notebooks

Cloud coding, storage, and sharing

### On-Premises LLM

Build custom generative AI models

### AI Navigator

Desktop app for generative AI

### Anaconda Toolbox

Unlock Python capabilities in E



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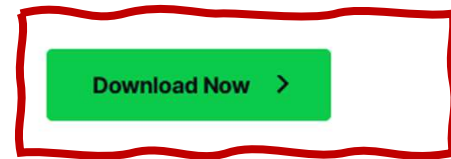
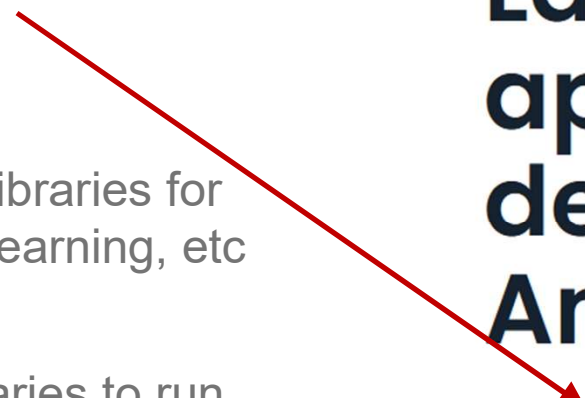
[Company](#)

Products / [Anaconda Navigator](#)

# Launch data science applications from your desktop with Anaconda Navigator

The Desktop Portal to Data Science.

[Download Now >](#)



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## Distribution

### Free Download\*

Register to get everything you need to get started on your workstation including Cloud Notebooks, Navigator, AI Assistant, Learning and more.

- ✓ Easily search and install thousands of data science, machine learning, and AI packages
- ✓ Manage packages and environments from a desktop application or work from the command line
- ✓ Deploy across hardware and software platforms
- ✓ Distribution installation on Windows, MacOS, or Linux

\*Use of Anaconda's Offerings at an organization of more than 200 employees requires a Business or Enterprise license. [See Pricing](#)



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By continuing, I agree to Anaconda's [Privacy Policy](#) and [Terms of Use](#).

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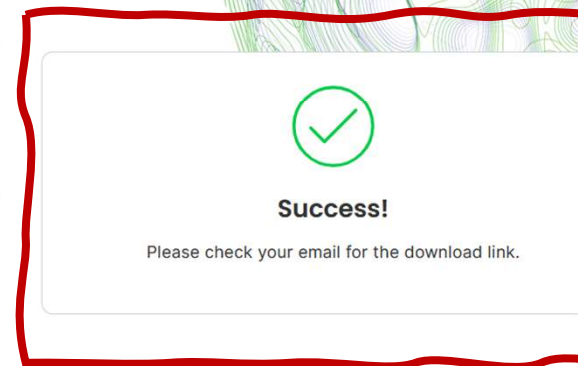
## Distribution

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- ✓ Deploy across hardware and software platforms
- ✓ Distribution installation on Windows, MacOS, or Linux

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# Download Now

For installation assistance, refer to [Troubleshooting](#).

Download Anaconda Distribution or [Miniconda](#) by choosing the proper installer for your machine. Learn the difference from our [Documentation](#).



## Anaconda Installers

 [Download](#)



**Windows**

**Python 3.12**



**Mac**

**Python 3.12**



**Linux**

**Python 3.12**





# Anaconda – Watch the video

This video shows you how to install Anaconda

Video on Module webpage week 1

Can take from 4-10 minutes to install

- Sometimes it can take 40+ minutes to install !!!

**Install Anaconda**

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Start coding i

Introducing Anaconda Notebooks +

Master the foundations of data science anytime, anywhere! Expert-led tutorials the cloud today.

Subscribe on Anaconda Nucleus

Installing Anaconda3

Running package scripts...

Watch later Share

Just getting started? Learn Python basics in 3 hours

After a few hours with Anaconda's experts, you will.

Watch on YouTube

# Anaconda



Check out the Installation Instructions for Step-by-Step guide

<https://docs.anaconda.com/anaconda/install/index.html>

## ANACONDA DOCUMENTATION

The screenshot shows the Anaconda documentation website. The left sidebar contains a navigation menu with the following items: Distribution, on Windows, on macOS, on Linux, on AWS Graviton2, on Linux-s390x (IBM), on Linux POWER, in silent mode, for multiple users, your installation, installer file hashes, from older versions, anaconda on older systems, and Installing Anaconda on. The main content area is titled 'Installation' and includes a tip: 'Looking for Python 3.5 or 3.6? See our [FAQ](#).' Below the tip, there is a section for 'System requirements' with a list of bullet points: License: Free use and redistribution under the terms of the [EULA for Anaconda Distribution](#); Operating system: Windows 8 or newer, 64-bit macOS 10.13+, or Linux, including Ubuntu, RedHat, CentO; If your operating system is older than what is currently supported, you can find older versions of the Anaconda on older operating systems for version recommendations; System architecture: Windows- 64-bit x86; MacOS- 64-bit x86 & M1; Linux- 64-bit x86, 64-bit aarch64 (AV LinuxONE); Minimum 5 GB disk space to download and install. Below the requirements, there is a note: 'On Windows, macOS, and Linux, it is best to install Anaconda for the local user, which does not require administrator permissions. However, with administrator permissions, you can install Anaconda system wide.' At the bottom, there are three links: 'Installing on Windows', 'Installing on macOS', and 'Installing on Linux'.

- Windows Installation Instructions

<https://docs.anaconda.com/anaconda/install/windows/>

- Mac Installation Instructions

<https://docs.anaconda.com/anaconda/install/mac-os/>

- Linux Installation Instructions

<https://docs.anaconda.com/anaconda/install/linux/>

# Anaconda

## Anaconda Starter Guide

<https://docs.anaconda.com/downloads/3613d324acc0a4b3c203fd79c71a2b45/Anaconda-Starter-Guide.pdf>



## ANACONDA DISTRIBUTION STARTER GUIDE

See full documentation for Anaconda Distribution: [docs.anaconda.com](https://docs.anaconda.com)

### BEFORE STARTING

#### Why do I need Anaconda Distribution?

Many scientific packages require a specific version of Python to run. It's difficult to manage multiple Python installations on one computer from interacting and breaking, and hard to keep them up-to-date. Anaconda Distribution makes management of multiple Python versions on one computer easier, and provides a large collection of highly-optimized, commonly-used scientific libraries to get you started faster.

#### What is Anaconda Distribution?

An easy-to-install collection of high performance Python libraries, along with a command-line tool for managing packages and environments. Beyond the collection of open source packages in the Anaconda installer, you can use conda to install over 1.5k packages (including the R language) from the Anaconda public repository and more than 10k packages from community channels, such as conda-forge and bioconda.

#### What is Miniconda?

Miniconda is conda and its dependencies. With Miniconda, you can build your environment from scratch by installing only the packages needed to run the conda command. It's a lightweight installer, typically used with an active internet connection.

```
conda install PACKAGENAME
```

**Example:** `conda install anaconda-navigator`

### DOWNLOADING

#### Will it work on my machine?

Anaconda Distribution is available for Windows 10 x86\_64 and newer, macOS 10.12 and newer, or any Linux distribution with a glibc version greater than 2.17 (CentOS 7). Anaconda Distribution install requires 3.5 GB and Miniconda requires 400 MB.

#### Quick install

<https://docs.anaconda.com/anaconda/install>

#### Getting started with Anaconda

<https://docs.anaconda.com/anaconda/user-guide/getting-started>

#### Getting started with conda

[docs.conda.io/projects/conda/en/latest/user-guide/getting-started.html](https://docs.conda.io/projects/conda/en/latest/user-guide/getting-started.html)

### EXPLORING

Packages included in Anaconda 4.4+, or installed with `"conda install PACKAGENAME"`

1. NumPy  
[numpy.org](https://numpy.org)  
N-dimensional array for numerical computation
2. SciPy  
[scipy.org](https://scipy.org)  
Scientific computing library for Python
3. Matplotlib  
[matplotlib.org](https://matplotlib.org)  
2D Plotting library for Python
4. Pandas  
[pandas.pydata.org](https://pandas.pydata.org)  
Powerful Python data structures and data analysis toolkit
5. Seaborn  
[seaborn.pydata.org/](https://seaborn.pydata.org/)  
Statistical graphics library for Python
6. Bokeh  
[bokeh.org](https://bokeh.org)  
Interactive web visualization library
7. Scikit-Learn  
[scikit-learn.org/stable](https://scikit-learn.org/stable)  
Python modules for machine learning and data mining
8. NLTK  
[nltk.org](https://nltk.org)  
Natural language toolkit
9. Jupyter Notebook  
[jupyter.org](https://jupyter.org)  
Web app that allows you to create and share documents that contain live code, equations, visualizations, and text
10. R essentials  
[docs.anaconda.com/anaconda/user-guide/packages/r/language/](https://docs.anaconda.com/anaconda/user-guide/packages/r/language/)  
80+ of the most used R packages for data science  
installed with `'conda install r-essentials'`  
[Complete R package list](https://docs.anaconda.com/anaconda/user-guide/packages/r/language/#complete-r-package-list)  
[repo.anaconda.com/pkgs/r/](https://repo.anaconda.com/pkgs/r/)





# Install Python

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This Module assumes you have a Basic Knowledge

- From your own experience
- From another module
- From your own learning
- Or you can learn some bits yourself

Lots of resources available

- See Note, website, Python website, Google!

RTFM

- Online Python Documentation <https://docs.python.org/3/>



# Install Python



## Go install Python

- You might have this done already
- Or already installed from another module



Go to <https://www.python.org/>



## Install latest version

## Follow Installation Instructions

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```
# Python 3: Fibonacci series up to n
>>> def fib(n):
>>>     a, b = 0, 1
>>>     while a < n:
>>>         print(a, end=' ')
>>>         a, b = b, a+b
>>>     print()
>>> fib(1000)
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610
987
```

**Functions Defined**

The core of extensible programming is defining functions. Python allows mandatory and optional arguments, keyword arguments, and even arbitrary argument lists. [More about defining functions in Python 3](#)

1 2 3 4 5

Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)



# Python Useful Links

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Python website. <https://www.python.org/>

Python Online Documentation. <https://docs.python.org/3/>

PyPi – Python Package Index. <https://pypi.org/>

Google's Python Tutorials. <https://developers.google.com/edu/python/>

Lots and lots of resources available.



# Data Science Notebooks



Lots of other similar  
products/notebooks

<https://datasciencenotebook.org>

# Jupyter Notebook - on Anaconda

## Starter Guide

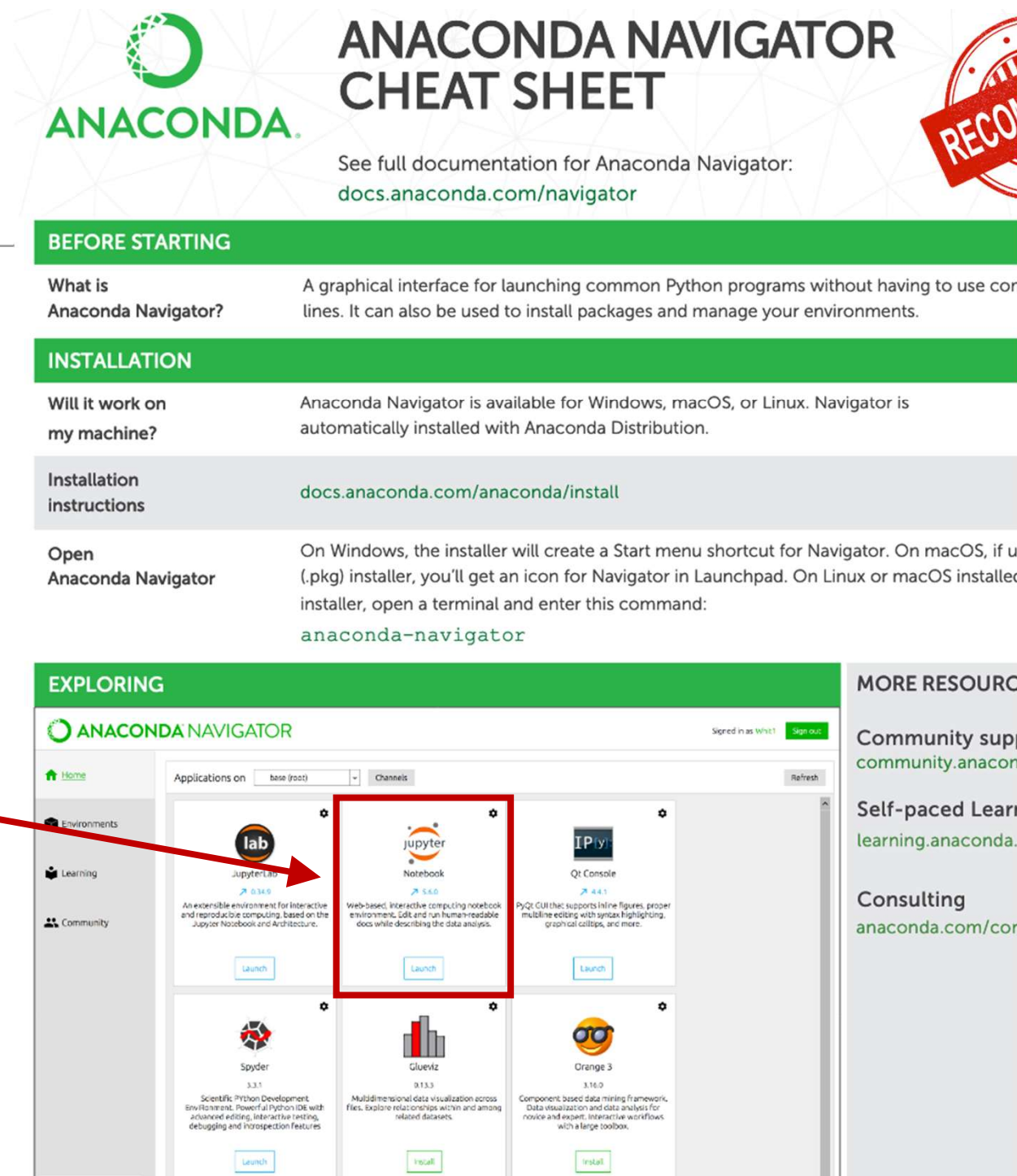
<https://docs.anaconda.com/downloads/3613d324acc0a4b3c203fd79c71a2b45/Anaconda-Starter-Guide.pdf>

## Jupyter Notebook

or just type the following on command line

```
jupyter notebook
```

see next few slides



**ANAACONDA NAVIGATOR CHEAT SHEET**

See full documentation for Anaconda Navigator: [docs.anaconda.com/navigator](https://docs.anaconda.com/navigator)

**BEFORE STARTING**

**What is Anaconda Navigator?** A graphical interface for launching common Python programs without having to use command lines. It can also be used to install packages and manage your environments.

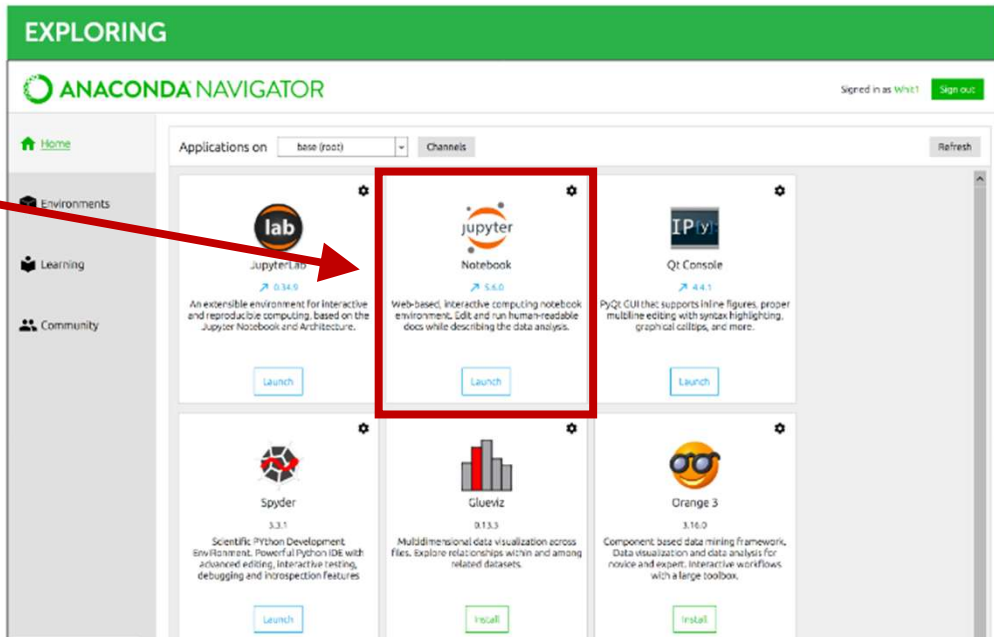
**INSTALLATION**

**Will it work on my machine?** Anaconda Navigator is available for Windows, macOS, or Linux. Navigator is automatically installed with Anaconda Distribution.

**Installation instructions** [docs.anaconda.com/anaconda/install](https://docs.anaconda.com/anaconda/install)

**Open Anaconda Navigator** On Windows, the installer will create a Start menu shortcut for Navigator. On macOS, if using the .pkg installer, you'll get an icon for Navigator in Launchpad. On Linux or macOS installed via terminal, open a terminal and enter this command:  
`anaconda-navigator`

**EXPLORING**



The screenshot shows the Anaconda Navigator interface with a sidebar on the left containing 'Home', 'Environments', 'Learning', and 'Community'. The main area displays a grid of application tiles. A red box highlights the 'Jupyter Notebook' tile, which includes a 'Launch' button. A red arrow points from the text 'jupyter notebook' in the previous slide to this 'Launch' button. Other tiles include 'JupyterLab', 'Qt Console', 'Spyder', 'Glueviz', and 'Orange 3', each with its own 'Launch' or 'Install' button.

**MORE RESOURCES**

- Community support: [community.anaconda.com](https://community.anaconda.com)
- Self-paced Learning: [learning.anaconda.com](https://learning.anaconda.com)
- Consulting: [anaconda.com/consulting](https://anaconda.com/consulting)





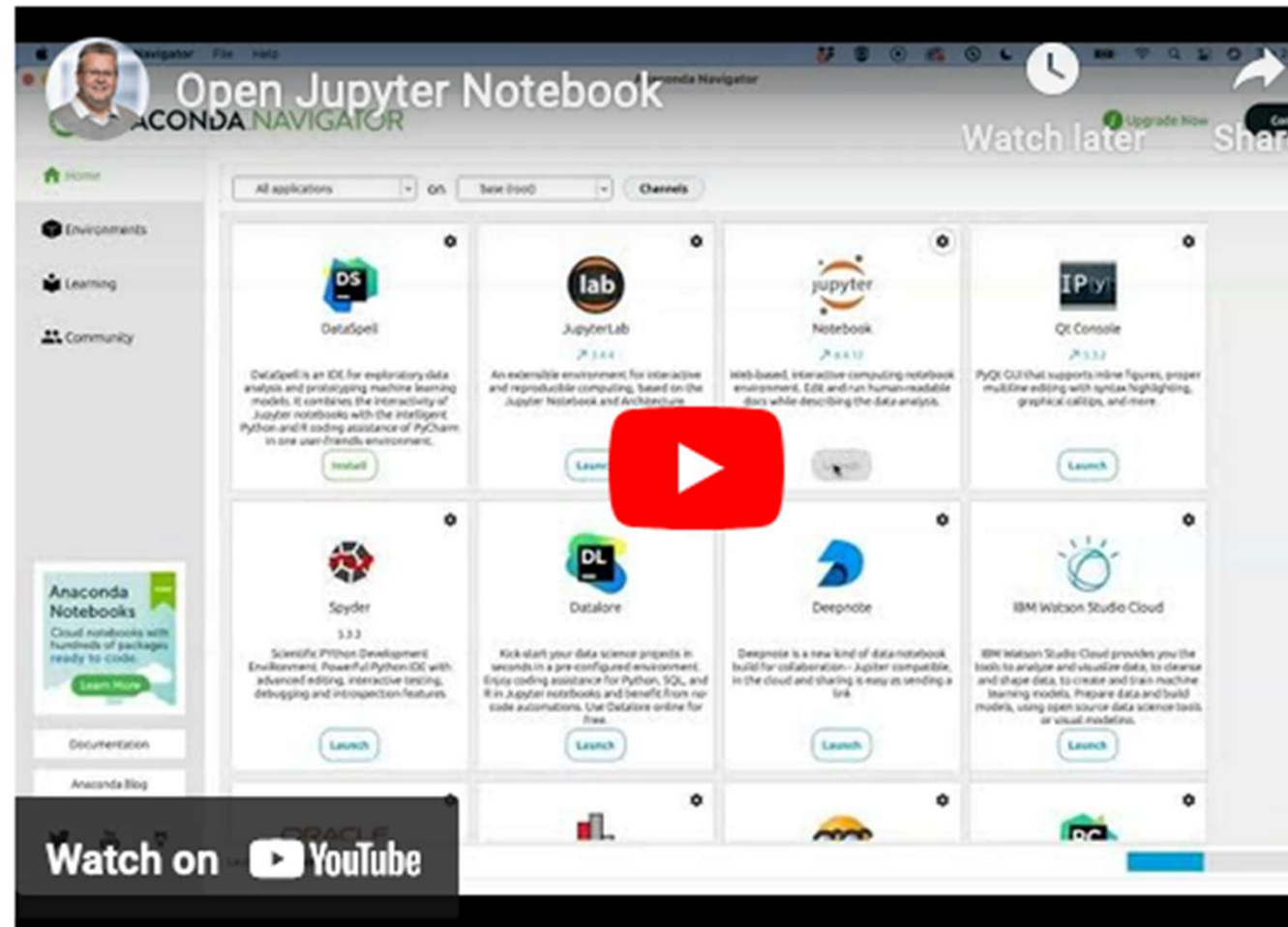
# Jupyter Notebook – on Anaconda – Watch the Video

Video available on module webpage

Steps through how to open Jupyter Notebook in Anaconda Navigator

Also shows how to open Lab Exercise Notebook

- Notebook can be downloaded from webpage









# Install Jupyter Notebook

Very Popular  
I'll be using this  
Demo Code

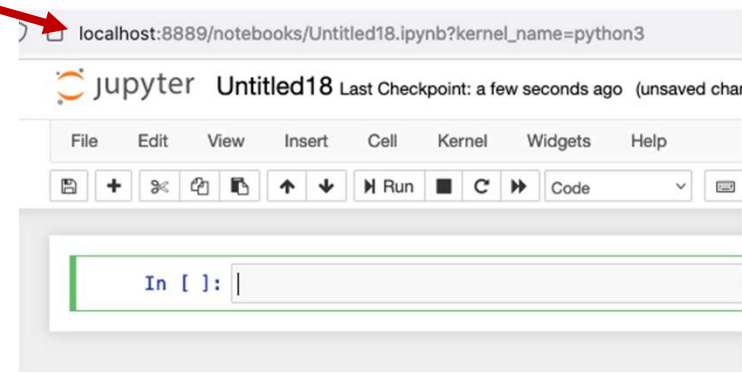
Home page : <https://jupyter.org/>

Run the install command in a terminal window

- `pip3 install notebook`

To run Jupyter Notebook, run the following in a terminal window

- `jupyter notebook`
- A webpage will open in your default browser
- Under new, select Python. A Jupyter Notebook will Open





# Jupyter Notebook on the Cloud

## Anaconda Cloud - Notebook

Home page : <https://anaconda.cloud/>

Create an Account

It's FREE to use

- With some limits – It's FREE
- Storage, Compute resources, etc restrictions

Lots of online resources, examples, etc.

It's hosted on the Cloud – Need to be online to use it!

- No internet -> No access to it.

### Welcome to Anaconda Cloud



#### Introduction to Anaconda

Watch an introductory course on Anaconda Distribution, conda, and creating your first Python program.

Start Learning ▶



#### Code Online

**Now featuring new AI-powered code generation, insights, and debugging!**

Prefer to code in your browser? Start coding immediately with Anaconda Notebooks! No installation or configuration necessary.

See Sample Notebook ▶



#### Anaconda Distribution

Get started with the most fun AI, and ML packages. Easily manage applications, packages, and environments using Navigator instead of the command line.

Install Distribution ▶

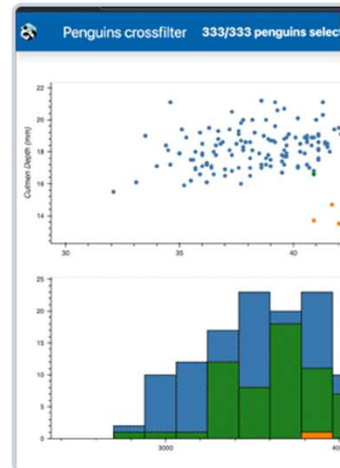


### Get Started for Free

Create an account or sign in to access this feature and so much more!

Create Free Account

Already have an account? [Sign In](#)





# Install Jupyter Lab

Newer Version of Jupyter Notebook  
I might use this from time to time

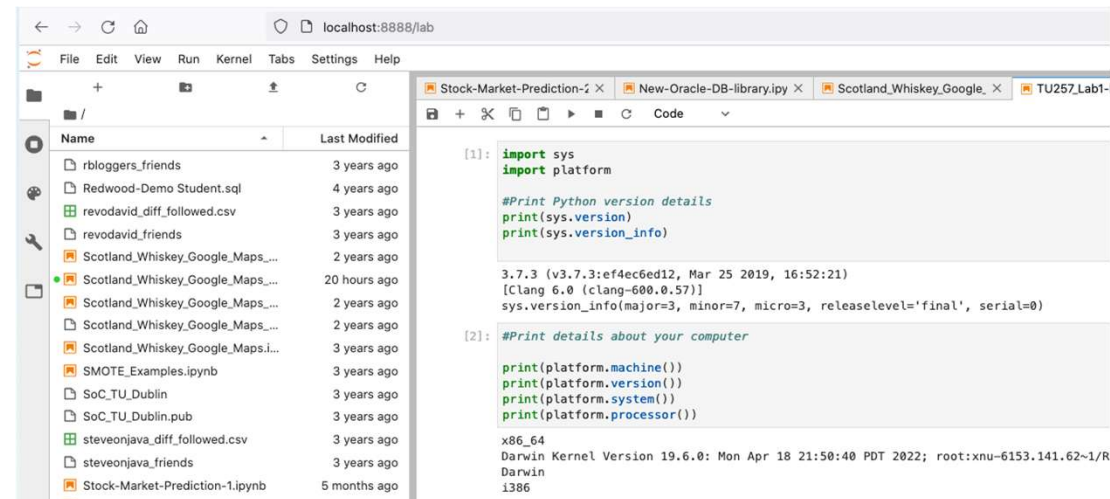
Home page : <https://jupyter.org/>

Run the install command in a terminal window

- `pip3 install jupyterlab`

To run Jupyter Notebook, run the following in a terminal window

- `jupyter-lab`
  - or `jupyter lab`
- Open Notebook in similar way to Jupyter Notebook
- For now, Jupyter Notebook as slightly more features. Lab will catch up at some point/





# Google Colab

Cloud hosted Notebook environment by Google

No local install of Python, Jupyter, etc

Need a Google account.

- Notebooks are saved to your Google Drive or Github.

Free to use, but has limited computing resources

- Although you can use limited GPUs on this for free
- Pay for more computing power. (This isn't needed for this course)



The screenshot shows a Google Colab notebook titled "Untitled". The interface includes a menu bar with "File", "Edit", "View", "Insert", "Runtime", "Tools", and "Help". Below the menu, there are buttons for "+ Code" and "+ Text". The notebook content consists of two code cells. The first cell contains Python code to import 'sys' and 'platform', and print Python version details. The output shows the Python version as 3.7.13 (default, Apr 24 2022, 01:04:09) and the GCC version as 7.5.0. The second cell contains Python code to print details about the computer, including machine architecture, platform version, system information, and processor. The output shows the machine as x86\_64, platform version as #1 SMP Sun Apr 24 10:03:06 PDT 2022, system as Linux, and processor as x86\_64.

```
[1] import sys
import platform

#Print Python version details
print(sys.version)
print(sys.version_info)

3.7.13 (default, Apr 24 2022, 01:04:09)
[GCC 7.5.0]
sys.version_info(major=3, minor=7, micro=13, releaselevel='final', s

#Print details about your computer

print(platform.machine())
print(platform.version())
print(platform.system())
print(platform.processor())

x86_64
#1 SMP Sun Apr 24 10:03:06 PDT 2022
Linux
x86_64
```

THE  
DECISION  
IS YOURS



If unsure, install Jupyter Notebook

# Important

This module **will not look** at or go into detail about

- Python basics
- Syntax
- Structure of Python
- Different types of objects
- Writing functions

These things are/were covered elsewhere

or you can pick these up quickly

or can find these things elsewhere



We **will concentrate** on the different Libraries and Functions available in Python

Will focus on using these Functions to analyze data

**Live programming**, in this module, is **not** really possible

- Error prone
- Time consuming
- Boring to watch
- Wasted time

To avoid these issues **Prepared Notebooks** are made available

- **Focuses** on the **important Tasks** and Steps
- Is **Reproducible** => VERY Important for Analysis
- **Templates for you to use**

How does it work?

---



Download the Notebook (see webpage). Then Run it. Write code for questions.

```
t sys
```

```
t platform
```

```
t Python version details
```

```
(sys.version)
```

```
(sys.version_info)
```

```
t details about your computer
```

```
(platform.machine())
```

```
(platform.version())
```

```
(platform.system())
```

```
(platform.processor())
```

```
[1]: import sys  
import platform
```

```
#Print Python version details  
print(sys.version)  
print(sys.version_info)
```

```
3.7.3 (v3.7.3:ef4ec6ed12, Mar 25 2019, 16:52:21)  
[Clang 6.0 (clang-600.0.57)]  
sys.version_info(major=3, minor=7, micro=3, releaselevel='final', serial=0)
```

```
[2]: #Print details about your computer
```

```
print(platform.machine())  
print(platform.version())  
print(platform.system())  
print(platform.processor())
```

```
x86_64  
Darwin Kernel Version 19.6.0: Mon Apr 18 21:50:40 PDT 2022; root:xnu-6153.141.62~1/RELEASE_ARM_T8020  
Darwin  
i386
```

webpage for notebook. You can download and Open this notebook on your machine – See web

for Coding Exercises : The notebook will ask you to write some simple Python code



# Lab Exercise

Download the Notebook from webpage

Open it in Jupyter Notebook

Run the sample code

Can you write some simple code?

Can you print your name

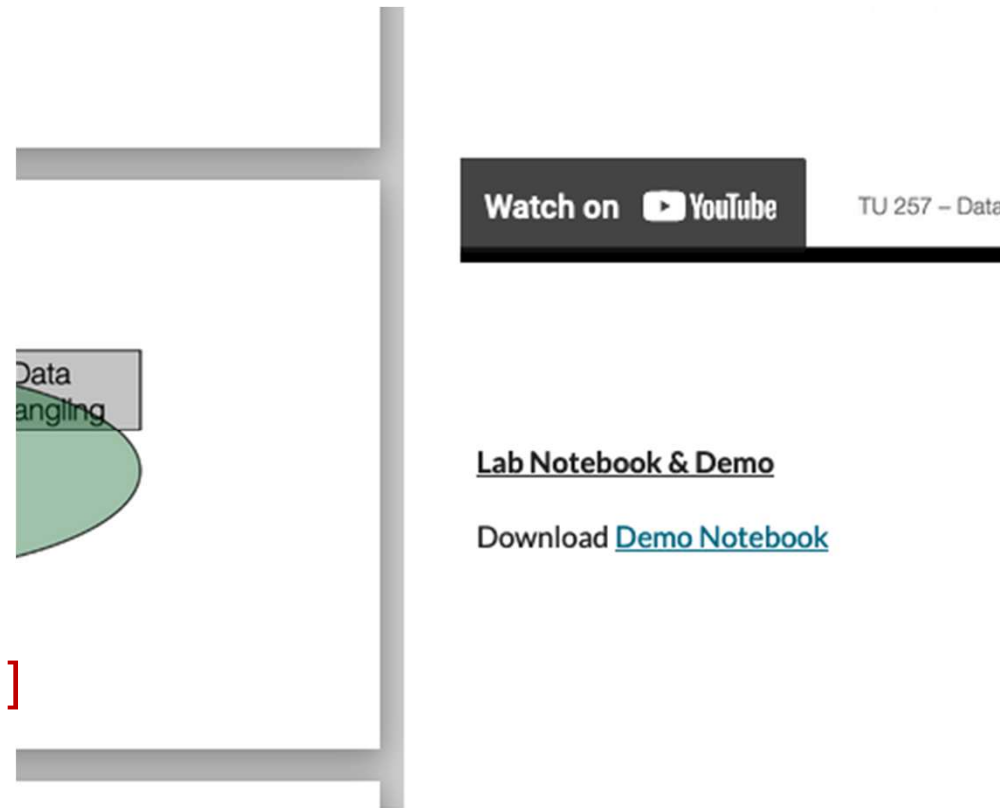
Can you create a variable and print it

... [what else can you do? From what you learned in Semester 1]

Save the notebook

That's it

- You do not need to upload or submit it anywhere



# Complete all Exercises before Next Week

- Install Anaconda/Python
- Decide what tool/notebook you will use
- Install tool/notebook
- Do a quick check to make sure it is working (see previous slides)