COMP1008: Exercise 0
Python and Jupyter Notebook Installation and Basics

1 WELCOME TO COMP1008!

The weekly COMP1008 computing sessions are to build up your knowledge and experience that will be assessed via a COMP1008 coursework and prepare for other AI modules at the School.
- ✓ Installation and basics of Python
- ✓ Data manipulation and operations in Python, Data visualisation, Data pre-processing
- ✓ Linear regression, Artificial Neural Networks, Decision trees

The weekly exercise materials will be released on Monday in Moodle. You are encouraged to complete each exercise flexibly at your own time. You can ask questions a) via Microsoft Teams, or b) in the computing support session in A32. We will answer questions on Teams within two working days. The convenor and a team of teaching assistants will be at all computing support sessions on Fridays.

Depending on your cohort, your timetable will work as follows:

Time	Cohort A	Cohort B
Friday 11:00 – 12:00	Computing support in	
Friday 12:00 – 13:00		Computing support in

At the end of your session, please ensure that you vacate A32 for your peers in the other cohort.

2   INTRODUCTION

In COMP1008, you will be using the programming language Python. Python should be easier to use than C, since we do not need to take care of memory management, and implementations of many data structures are already done for us!

Some of you may already have experience in using Python; however, we appreciate that many of you do not. Exercise 0 is therefore to:
1. Get you set up with an installation of Python (and supporting frameworks).
2. Give you a brief introduction to Python, relating to some examples you saw in the first semester.

Once you have installed Anaconda and familiarised yourself with Jupyter Notebook, you should be able to move on to next week's exercise on basics of data manipulation using NumPy and pandas to read data and perform some simple operations on the datasets. This is essential to build successful machine learning models.

In COMP1008, you will be required to provide Jupyter Notebook (not plain Python source code). If you are already familiar with Python but have not used Jupyter Notebook's before, please continue to follow this guide!

3 INSTALLATION OF JUPYTER NOTEBOOK

3.1 INSTRUCTIONS FOR SETTING UP PYTHON AND JUPYTER NOTEBOOK

Everything is already set up on A32 machines and the Computer Science remote desktop (accessible using the remote desktop app.

If you prefer to use your own devices, you can also download and install the latest version of Anaconda from https://www.anaconda.com/products/distribution. Anaconda is an all-in-one distribution which will install Python and packages, Jupyter, and many other tools by default. We will use these in COMP1008 for the exercises, mini project(s), and coursework.

3.2 ANACONDA NAVIGATOR

Anaconda Navigator is a piece of software that manages the Anaconda installation and shows us all the tools that are currently available. From here, we can launch existing software, update software and packages, as well as install new packages.

From the start menu, search for "Anaconda Navigator" and launch as shown in Figure 1. Once it's loaded, you'll see the window shown in Figure 2.

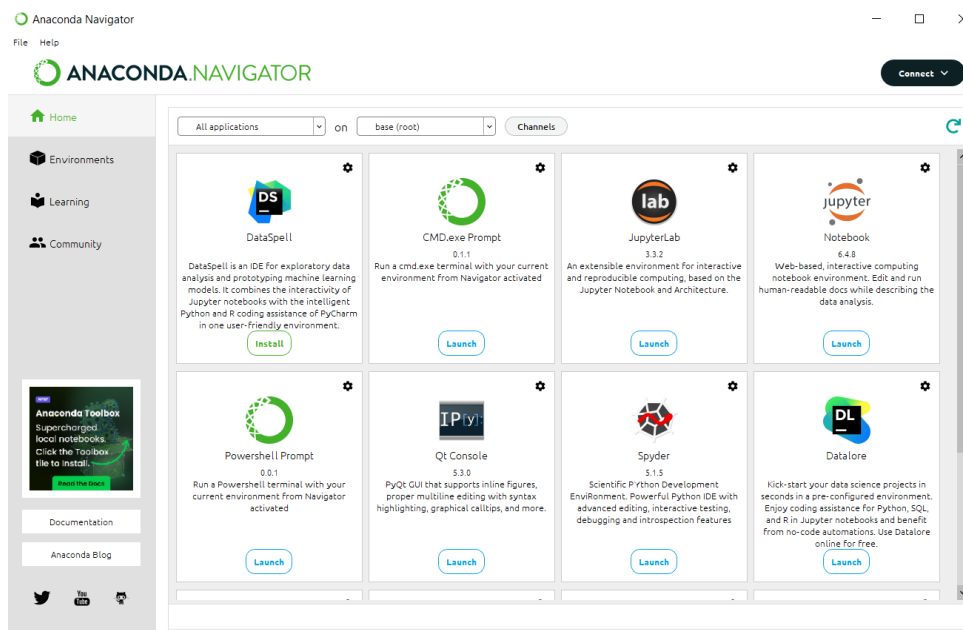Figure 1 - Anaconda Navigator entry within the Windows start menu.

Figure 2 - Default view of Anaconda Navigator.

Within Anaconda Navigator, you can see various pieces of Python related software that was installed by Anaconda. In COMP1008, we will use "Jupyter Notebook". We will not use any of the other features of Anaconda in COMP1008.

3.3   PYTHON PACKAGES

This exercise ensures that the required Python packages have been installed for completing exercises and coursework in COMP1008. Implementing these from scratch by programming in Python is complex, and not one of the aims of COMP1008! When using the Anaconda environment, we do not install packages with pip as we do in Python programming!

You can check the Python packages by launching a new terminal (command line) window within Anaconda Navigator. To get to the terminal, click on **Environments**, then the run button next to **base (root)**, then "**Open Terminal**" as shown in Figure 3. You should then see a standard terminal window with the line prefixed with "(base)".
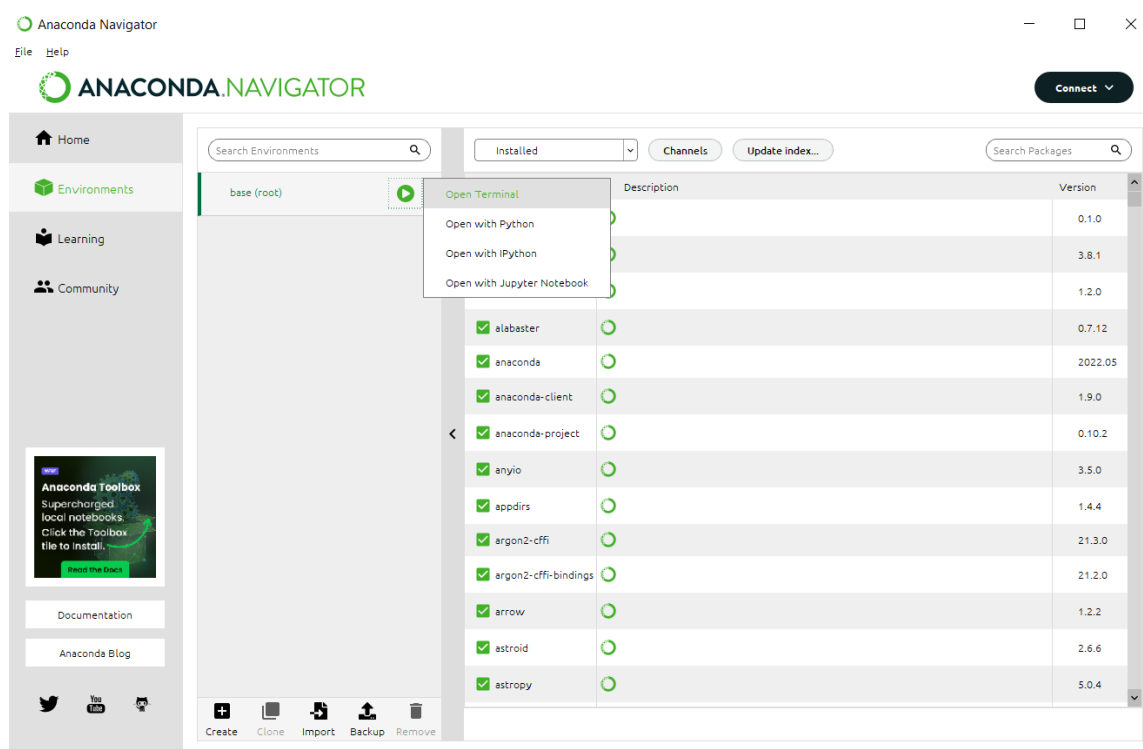

Figure 3 – The terminal option in Anaconda Navigator

Type "conda" in the terminal window and press Enter; you should see the list of possible arguments for this command line tool. You can use "list" and "install" to ensure the required packages are ready to go! Enter the command "conda list". You will see a list of all the packages installed by the default Anaconda installation, with their package version and build identifier. In COMP1008 we will use the following packages:
- Matplotlib   // for plotting and visualizing data
- NumPy   // for handling arrays and matrices
- Pandas   // for data manipulation and analysis
- scikit-learn   // for building machine learning models

TIP: On Windows, you can type "conda list | Find matplotlib" or "conda list | Find "matplotlib"" to find the matplotlib packages. On UNIX based OS-es you can do this with "conda list | grep matplotlib".

These packages are already installed on the CS remote desktop, and the Anaconda installation usually installs them by default. If you notice that any of these, e.g. matplotlib, are not installed, you can download and install it using the command "conda install matplotlib". You should be prompted to proceed with the installation, listing the requested package and its dependencies. Type [y] and press Enter, conda will do the rest!

3.4 JUPYTER NOTEBOOK

Now everything is set up, this exercise helps you to get familiarise with the Jupyter Notebook environment for completing the exercises and coursework in COMP1008, as follows:

- First, move the pre-prepared notebook "python-installation-and-basics.ipynb" and the "img" into a suitable folder in your OneDrive.
- Then launch Anaconda Navigator directly from the start menu. This can apply all the necessary configurations and package settings.
- Find the Jupyter Notebook card within Anaconda Navigator and click "Launch". In the background, this will start a webserver which you can access locally. The Jupyter Notebook User Interface will be automatically opened in your default web-browser, as shown in Figure 4.
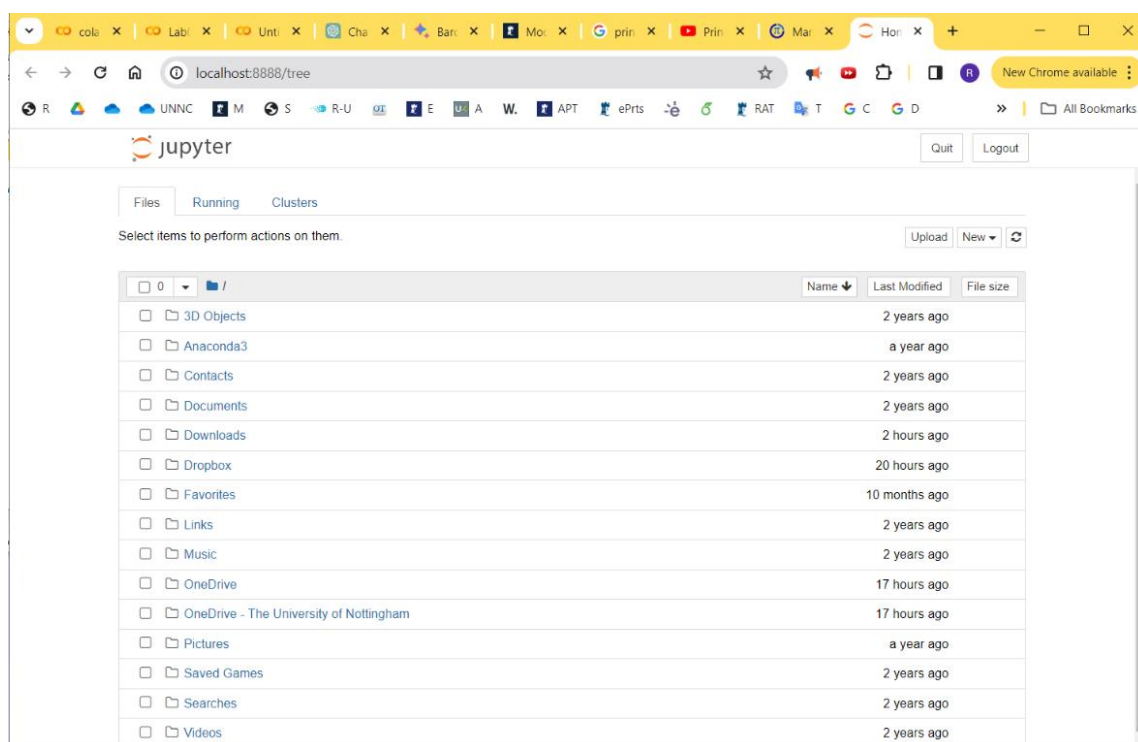

Figure 4 - Default Jupyter Notebook environment

By default, Jupyter Notebook will find your files under "C:\Users\[USERNAME]". This directory may be wiped after logging out. We **strongly recommend** that you backup your Jupiter Notebook files in your University OneDrive. Just search run OneDrive and sign in with your university credentials. Your OneDrive files should be automatically synchronized. Navigation of your files is straight forward. The default view in Figure 4 contains a list of all the files and folders in your default user directory.

The remainder of this week's exercise will be to go through the python-installation-and- basics.ipynb Jupyter Notebook file, which provide a brief Python basics tutorial. Click to open the file in Jupyter Notebook, and you will be presented with a new view where you can read through the next steps.