Lab 1: Hello World

The aim of this lab is to create a simple Python application to print out a welcome message for a simple Python application.

The aim is to merely print the welcome message. The application should therefore follow the same format as that presented in the lecture.

We will be using the PyCharm IDE for the course and this lab will take you through setting up a new project.

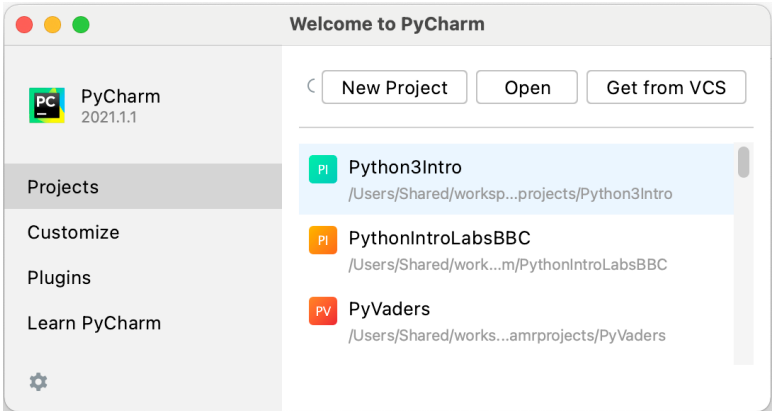
This lab is made up of the following steps:

1. Getting PyCharm running
2. Creating an application
3. Run the application
4. Expanding the application

Step 1: Start up PyCharm

Start up the PyCharm IDE.

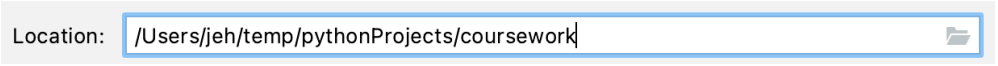
After the splash screen has been shown you should see the Welcome to PyCharm IDE dialog that allows you to create a 'New Project', 'Open' a project or 'Get from VCS' (Version Control System) an existing project:



Select the 'New project' button option.

This will now show you the 'New Project' dialog.

On this dialog you can select the location for your new project, for example:



Select the appropriate location for your work.

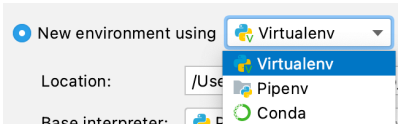
Next, we will set up the Python Interpreter to use with your project. This option may be minimised, if it is open it.

Once open you can select an appropriate Python interpreter and the location for your project.

Depending on the option you used last time you might find that the dialog has selected to use a previously configured interpreter.

If so, change this – first make sure you select 'New environment using '.

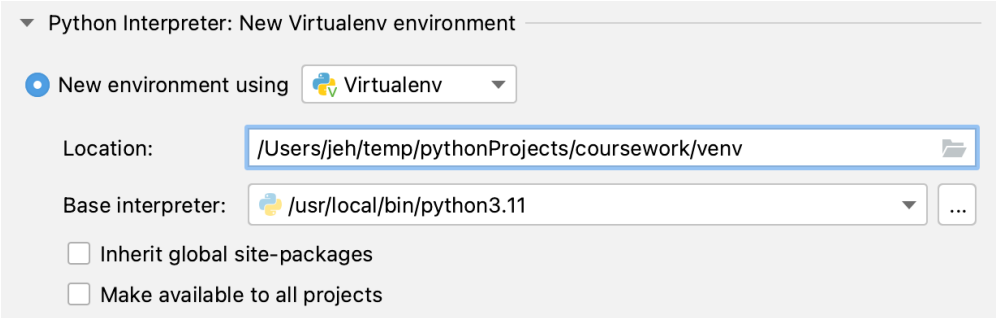
On the associated drop-down box, you can select which type of environment you want to use, including using a venv (virtual environment), a Conda environment or just the plain old pip basic installation for your Python interpreter. We will use the Virtualenv (venv) option:



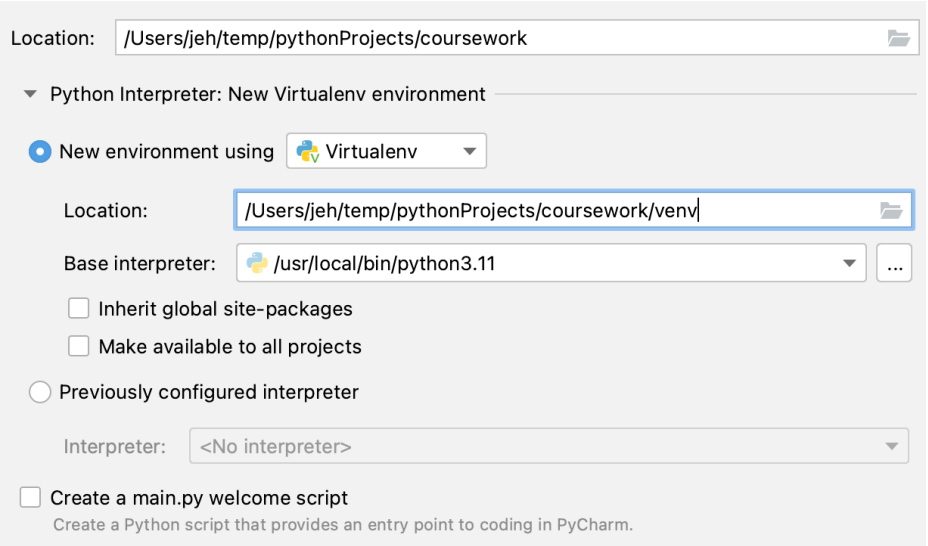
When you select this, you can then select the location for your virtual environment installation. By default, it will be in the venv directory below your project location.

You can also select the version of Python (the base interpreter) to use with this venv.

In the following example I am using the Python 3.9 interpreter and the local venv environment under my coursework directory:



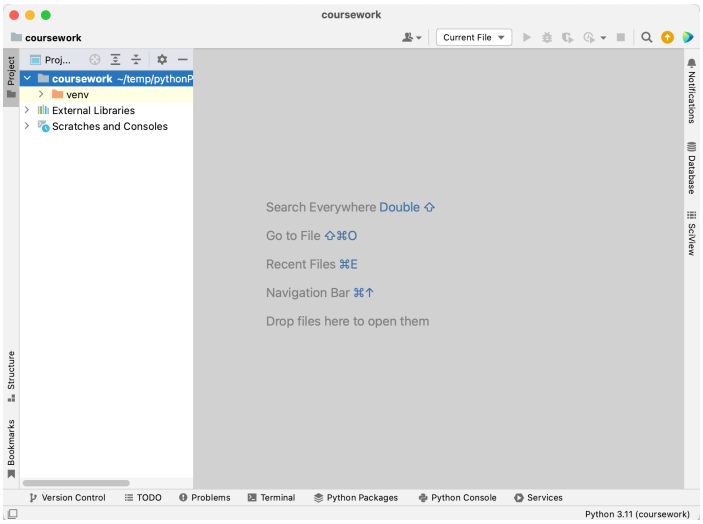
Overall, the dialog should now look like:



Note I have de-selected the 'Create a main.py welcome script' option.

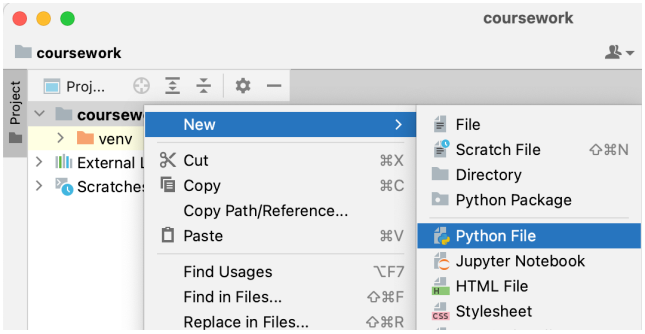
Now click on 'Create.

The IDE will now open with a default layout:

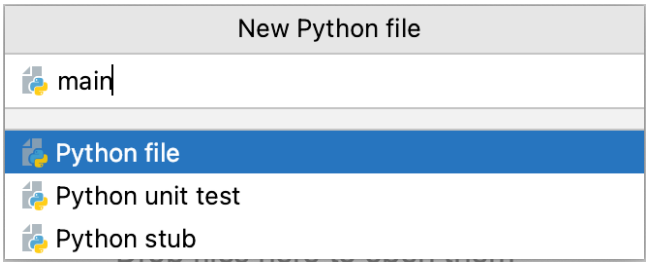


Select the top level node (in the above diagram shown as coursework – bvut it will have whatever name you used for your project).

From the right mouse menu select New->Python File, for example:



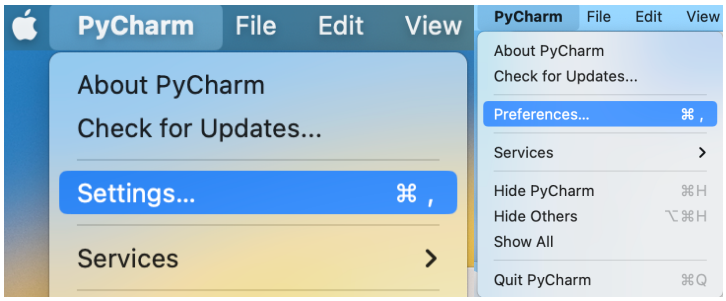
On the resulting dialog, enter the name of the file we will create for example main.py (actually the .py will be added by the editor). But do make sure that the 'python file' option is selected, for example:



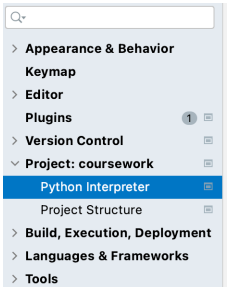
We are now ready to go.

We will now add a package / library to your current Python virtual environment.

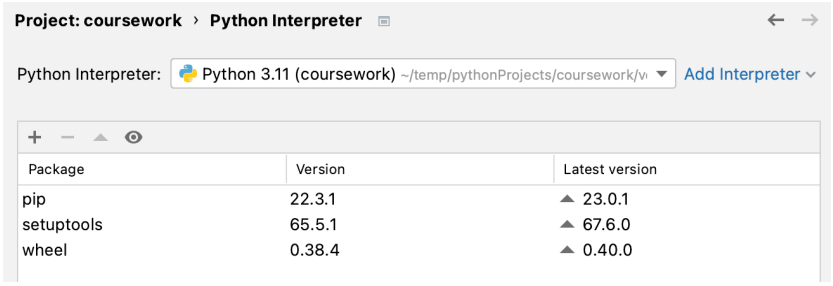
To do this go to the PyCharm>Settings on a Mac or if you are on Widows PyCharm>Preferences menu option.



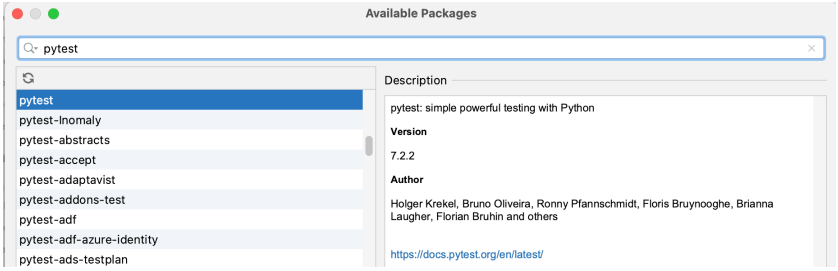
This will display the Settings/Preferences dialog. On this dialog look in the left-hand tree and select the 'Project: <name of project>' node, for example:



You now see the Python Interpreter and the libraries loaded for the current virtual environment displayed on the right-hand side of the dialog:



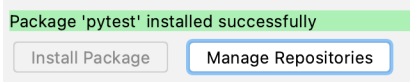
We can now add libraires / packages to your virtual environment using the '+' button above the package table. Click on this button, you should now see the 'Available Packages' dialog. This dialog lists all the packages available on the PyPi repository. There are very, very many. However, we are interested in the pytest library. Type pytest into the search bar at the top of the dialog:



All packages that match (or partially match) the string pytest are listed. We are interested in the core pytest library so make sure that is selected.

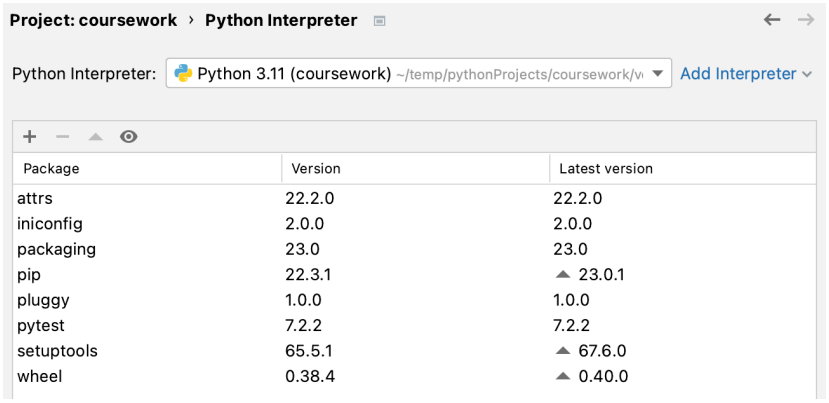
Next click on the 'Install Package' at the bottom of the dialog:

If this is successful you should see a green bar on the dialog with the message that the Package was installed successfully:



Now close the dialog.

You should now find that there is an extended list of packages available in your environment. This includes `pytest` but several other packages as well. These are packages used by `pytest`. Each package has their version number listed along with the latest version number:



Click 'OK' on the bottom right-hand corner of the dialog and return to the main editor window.

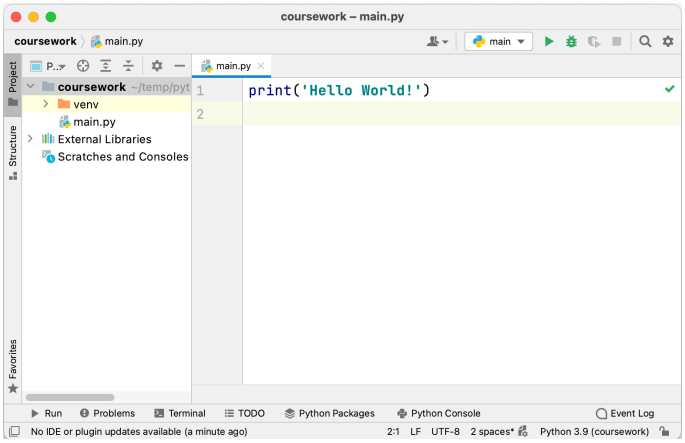
Step 2: Create an application

We will now write some code into our main.py file..

First add the following statement to the file:

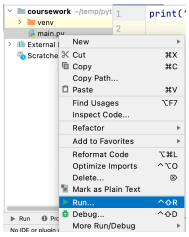
```
print('Hello World!')
```

This is shown in the editor below:

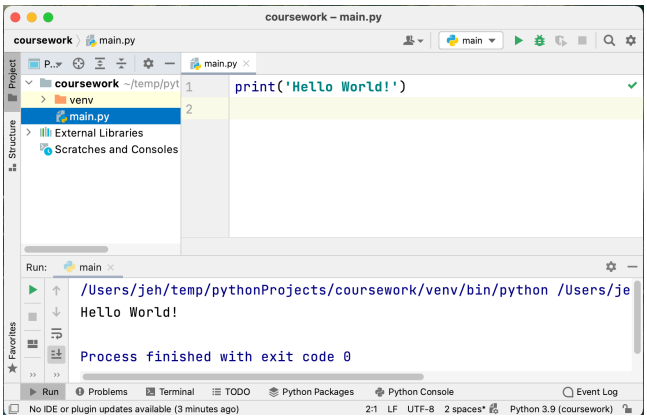


Step 3: Run the application

To run this main program, you can click on the green arrow in the tool bar in the top right-hand side of the IDE. Alternatively, you can select the main.py file in the left hand project view and from the right mouse menu select ‘Run main’:



The ‘Run’ window will now open in the bottom of PyCharm with the output generated by your program. This is shown below:

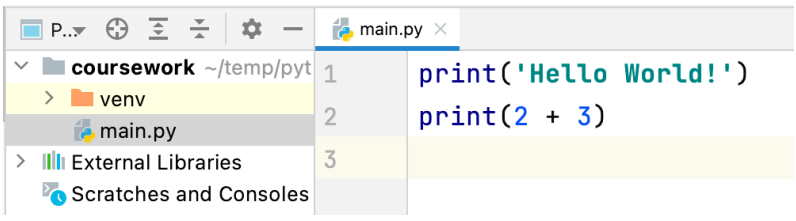


Step 4: Add further code

Modify your program such that it will print out the result of adding 2 and 3 together. This is done by using the ‘+’ operator and two integer numbers, for example:

```
print(2 + 3)
```

For example:



Now rerun your program, you should see:

Finally add the following statement to the end of your program:

```
    print('-' * 25)
```

Now rerun your program – what does it do?