

## CSM6120 (Year 2022-23)

Department of Computer Science, Aberystwyth University

**Practical2:** CSP with various case studies (28 Oct 2022 @MP3.03)

**Instructor:** Prof. Tossapon Boongoen

### 0 General information

Like the previous session, this practical allows students to associate concepts, definition, and components of a **CSP & backtracking search** to a simple software **package in Python**. This is designed to suit students with a minimal background in computer programming, with several examples being provided prior questions (mostly related to samples shown in previous seminars). **Note that a practical work is not an assignment, so that no submission is needed.**

### 1 About the software implementation: *Python*

An implementation of examples in Python can be accessed through the following link. A separate Jupyter notebook file is also provided, "[Student\\_CSP.ipynb](#)".

["https://colab.research.google.com/drive/1oHlv7B1EzS6C9TBBbEfyewzx3crjMhID?usp=sharing"](https://colab.research.google.com/drive/1oHlv7B1EzS6C9TBBbEfyewzx3crjMhID?usp=sharing)

Please make use of comments that are included with codes to understand how the entire notebook works. You are advised to work from the top to the last sections in this notebook. At the top, the first section shown below is to install a package that you need to work with, so it must be executed first. You can do this by simply press on the 'play' icon on the top left of this section.

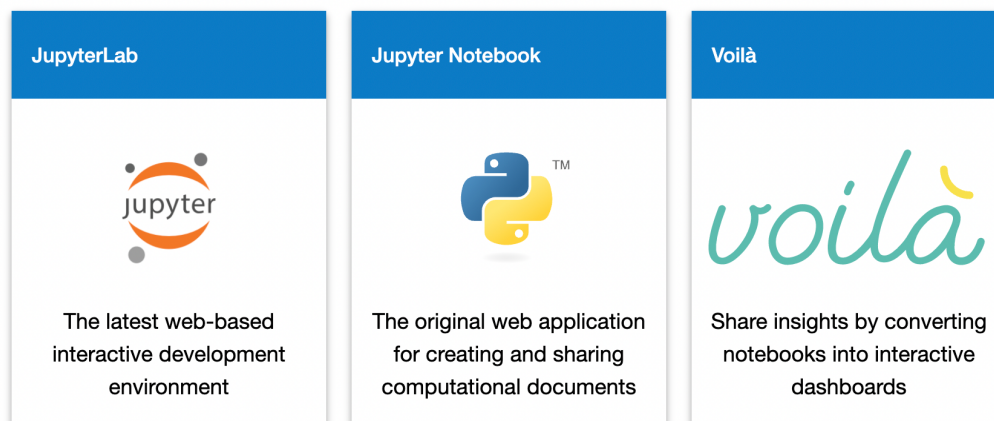
```
▼ An initial step of this practice: install and import the 'python-constraint' package into wokring environment

# Initially, it is required to install this package into your online-working environment
!pip install python-constraint

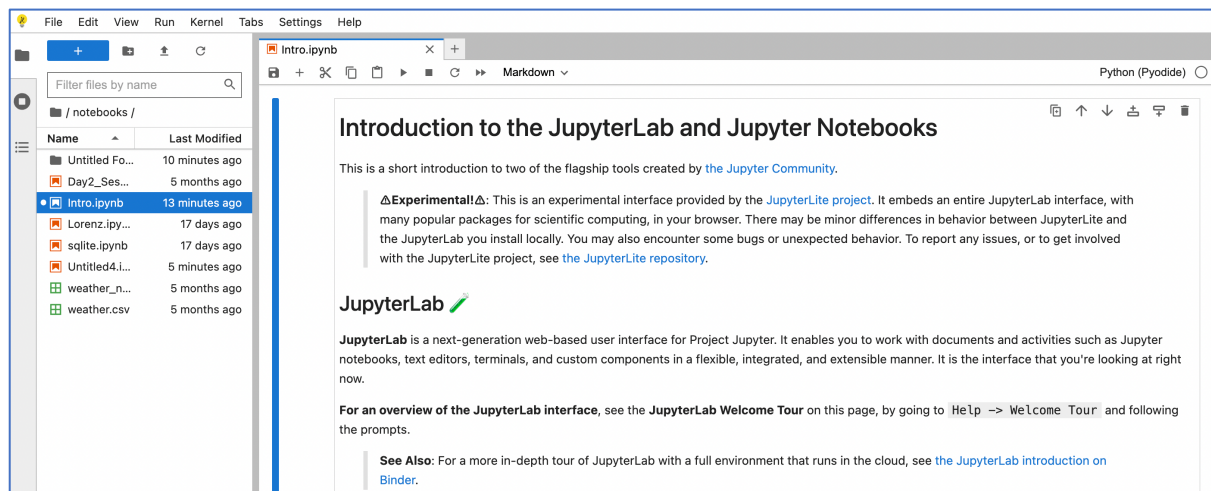
# import classes/methods defined in this 'constraint' package into the working space
from constraint import *

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting python-constraint
  Downloading python-constraint-1.4.0.tar.bz2 (18 kB)
Building wheels for collected packages: python-constraint
  Building wheel for python-constraint (setup.py) ... done
Created wheel for python-constraint: filename=python_constraint-1.4.0-py2.py3-none-any.whl size=24081 sha256=928d2d0d
Stored in directory: /root/.cache/pip/wheels/07/27/db/1222c80eb1e431f3d2199c12569cb1cac60f562a451fe30479
Successfully built python-constraint
Installing collected packages: python-constraint
Successfully installed python-constraint-1.4.0
```

If you have a gmail account, you can easily open the Google Colab console, in which you can upload the notebook file (see the previous point) and start working with it right away. If you do not have that account, you might prefer to make use of a free cloud-based one, e.g., "<https://jupyter.org/try>". On its landing page, click on the "**JupyterLab**" dialogue on the left.



This will bring up the next page, in which you can create a new notebook. Then, you can copy codes from the local file to the online one and run them in sequence (from top to bottom, by code section) to see the result.



## 2 Exercises

Please try all seven questions (if possible), with a coding section having been provided for you to write codes. For each question, a direction and expected result are specified, see below for an example.

▼ **Question 1** : modify the code from Example 1 to include another variable 'c' that can be either 0 or 1.

Write your code in the following code section.

```
# Question 1
# -----
# Write your code in this section ...
```

## 3 Practical session and contact

We will have this practical on Friday, 28<sup>th</sup> October 2022, 4-5 pm. @MP3.03. If you can not participate, please email me ([tob45@aber.ac.uk](mailto:tob45@aber.ac.uk)) if you need help.