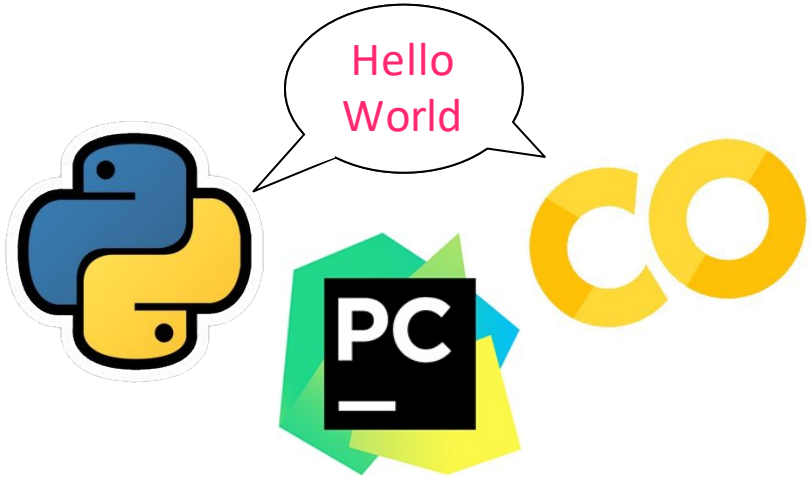
COMP1804
Applied Machine Learning

Lab 1: Python Quick Start

Python Quick Start
on today's menu

- Introduce some basics of Python Programming through examples based on Python

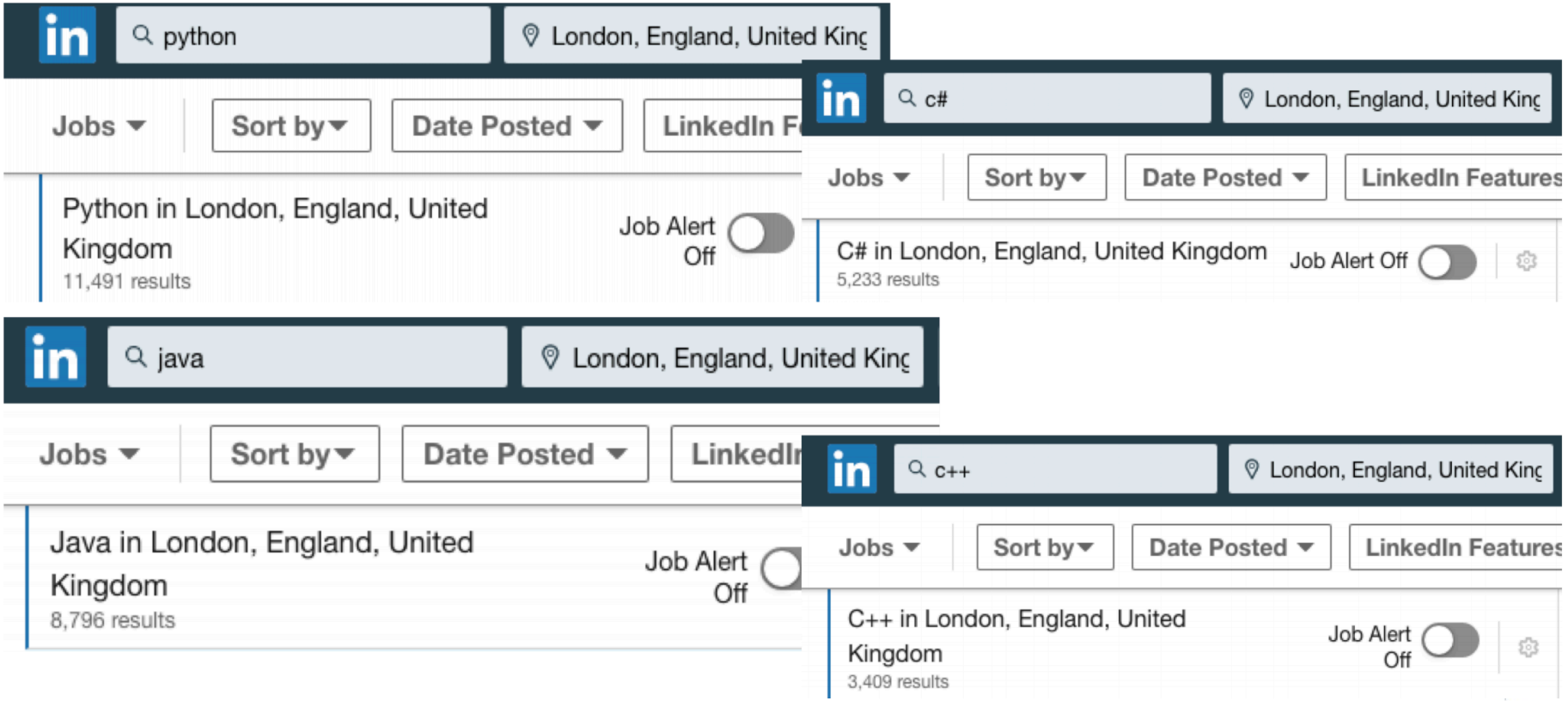


As a side-effect you will start to become familiar with developing in Python Notebooks in Colab

- The serious ML with Python comes a bit later in the course

Python Quick Start

Why python?



Python
so, what's different about Python? (I)

- Easy to learn
  → Few keywords, simple structure, and a clearly defined syntax

- Easy to read
  → Its design philosophy (and language definition) emphasizes on code readability
  → Python code is more clearly defined and its syntax allows programmers to express concepts in fewer lines of code than possible in languages such as C/C++ or Java

In Python

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

In C

```
#include <stdio.h>

int main() {
    printf("Hello World!\n");
}
```

In Java

```
public class Hello {
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }
}
```

Python
so, what's different about Python? (II)

- **Python** is a *dynamically* typed language as opposed to a *statically* typed one
  - No type declarations are needed (of variables, parameters, functions, methods)
  - A name can refer to any type of object
  - Types are bound to values not variables

This leads to Python code being short and flexible

- Example:
  - Python: `name = "27"`
  - Java: `String name = "27";`

Python
so, what's different about Python? (III)

- The syntax, the way the commands are laid out, is slightly different (more on that today).
  - You'll have noticed from the example earlier that Java is more verbose
  - Statements do not end with a special character but with a new line
  - In Python whitespaces are significant.

    Python uses indentation to indicate blocks of code.

    Python uses the colon ":" and indentation/whitespace to group statements.

    To delimit blocks, use whitespace indentation (rather than curly braces "{}" or keywords such as "begin"/"end").

    Statements that are not indented begin in the first column.

Python
so, what's different about Python? (IV)

Indentation needs to be consistent within blocks.

Statements should have the same indentation set from the indentation of the parent statement.

If one line in a group has a different indentation it will be flagged as a syntax error.

Correct:

```
--------
if 5 > 2:
  print("Five is greater than two!")
```

Wrong:

```
-----
if 5 > 2:
print("Five is greater than two!")
```

```
def foo():
    print("Hi")

    if True:
        print("true")
    else:
        print("false")

print("Done")
```

1st level indentation
foo() method statements

2nd level indentation
if and else block code

Code without indentation
Belongs to the source file

Python
so, what's different about Python? (V)

- Comments begin with: #

  If a comment extends multiple lines, use: # in the beginning of each line or:

```
name = "Pankaj"  # employee name
id = 100  # employee id


# This function adds the two numbers
def add(x, y):
    return x + y
```

```
# Single line comment

print('Hello Stechies')

'''
Python program to explain
multiple line comment
print('Hello')
'''

"""
Python program to explain
multiple line comment
print('Hello')
"""

print('Hello Stechies')
```

Single-line Comment

Multi-line Comments

- Everything in Python is an object, including data types (int, float, string: will explain later)

Python
what's different about Python? (VI)

- Is an Object-Oriented language (though many argue that Python is not fully OO!)
  - Because Python does not support *strong encapsulation* (more on that when we cover OO concepts)
  - But encapsulation is only one of the features of OO.
  - Python also supports functional, imperative, and procedural programming paradigms.
- Python has the concept of Function and Method.
- Python is generally considered as an *Interpreted Language*, but Java is a *Compiled Language:* Python is processed at runtime by the interpreter; there is no need to compile the program before executing it

Python Basics

- Let's start writing code…
  - We'll use Jupyter Notebooks to demonstrate the Python language.
  - Notebooks are interactive computing environments that enables developers to author notebook documents that include live code, Interactive widgets, plots, equations, narrative text as well as execute and edit code.

- Download the Python Basics notebook from Moodle and run on google colab:
  - You'll need to login with either your university account or your gmail one
  - If you do not have a gmail account, login with the credentials:
    - Email: comp1804.appliedML@gmail.com
    - Password: comp1804aml

    After downloading the notebook, rename it as : [last_3_digits_of_id]_COMP1804_Lab_1.ipynb
  - Upload the renamed file on google colab
  - Experiment coding and run the code snippets provided

Questions?