

Python Crash Course

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Overview

Next Wednesday →

Advanced Examples / Exercises / Q&A

Introduction,
Variables & Arithmetic

Data Structures

Conditional
Statements

Today ↑

Iterations

Plotting

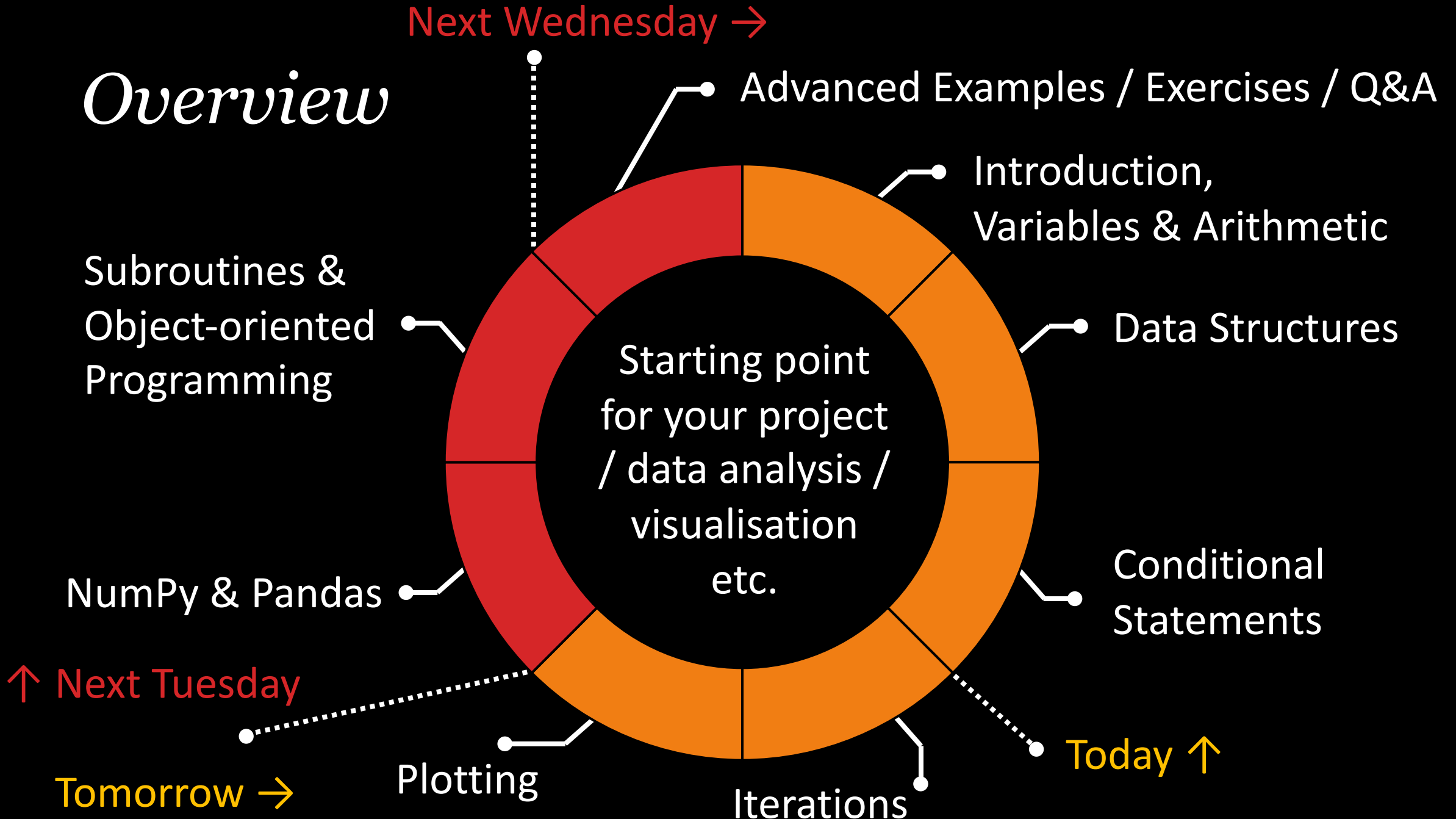
Tomorrow →

↑ Next Tuesday

NumPy & Pandas

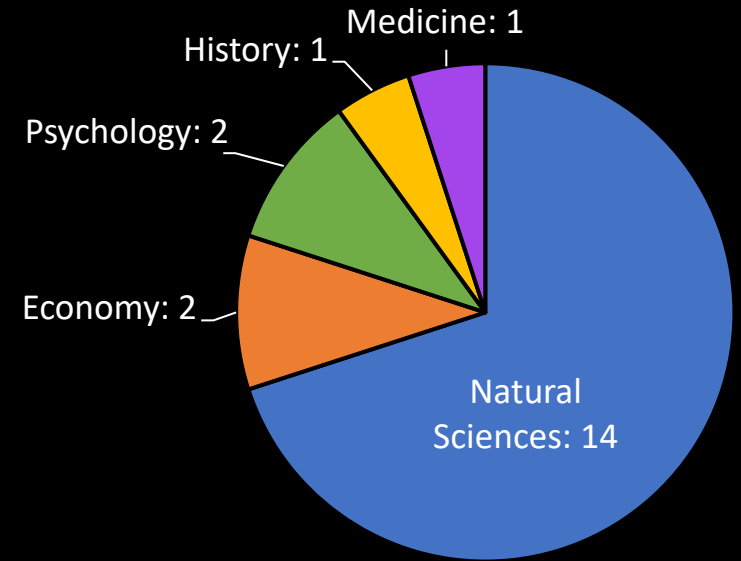
Subroutines &
Object-oriented
Programming

Starting point
for your project
/ data analysis /
visualisation
etc.



Your Experience and Goal

- What is your **programming experience so far** and an **intermediate goal** for you?



Narjes → Anne-Catherine → Marco → Andrea → Alexander →
→ Anne → Sheida → Airi → Fabienne → Huiying → Daniela →
→ Stéphanie → Ramya → Nurudeen → Daniele → Anna →
→ Geoffrey → Yang → Luca → Michael

My Programming Career

ETH zürich



ETH zürich



School classes programming in **Java**

Studying Physics: **C++**, **MatLab**, **Python**

Project: Analysis & Graphical User Interface in **C**, **Python**

Physics modelling in **Fortran**, **Python**

M.Sc. thesis: Data Mining & simulations in **R**, **Python**

Ph.D. thesis: Machine / Deep Learning research in **Python**

Data Scientist / Researcher / Software Engineer: **Python ...**

Python vs. other Languages



- Python is a dynamically typed programming (script) language
- Code is interpreted
- A lot of details *under the hood*
- **Zen** of Python: Simple, explicit, sparse, readable, practical

→ **Fast prototyping, quick to learn**

- Statically typed: fix type and object
- Code is compiled
- A lot of explicit control
- Efficient implementations, elaborate syntax

→ **Fast and powerful codes**

Python & C++ Examples






```
1 name = input("Please enter your name: ")
2 print("Good morning,", name)
```

- Both have the same output:

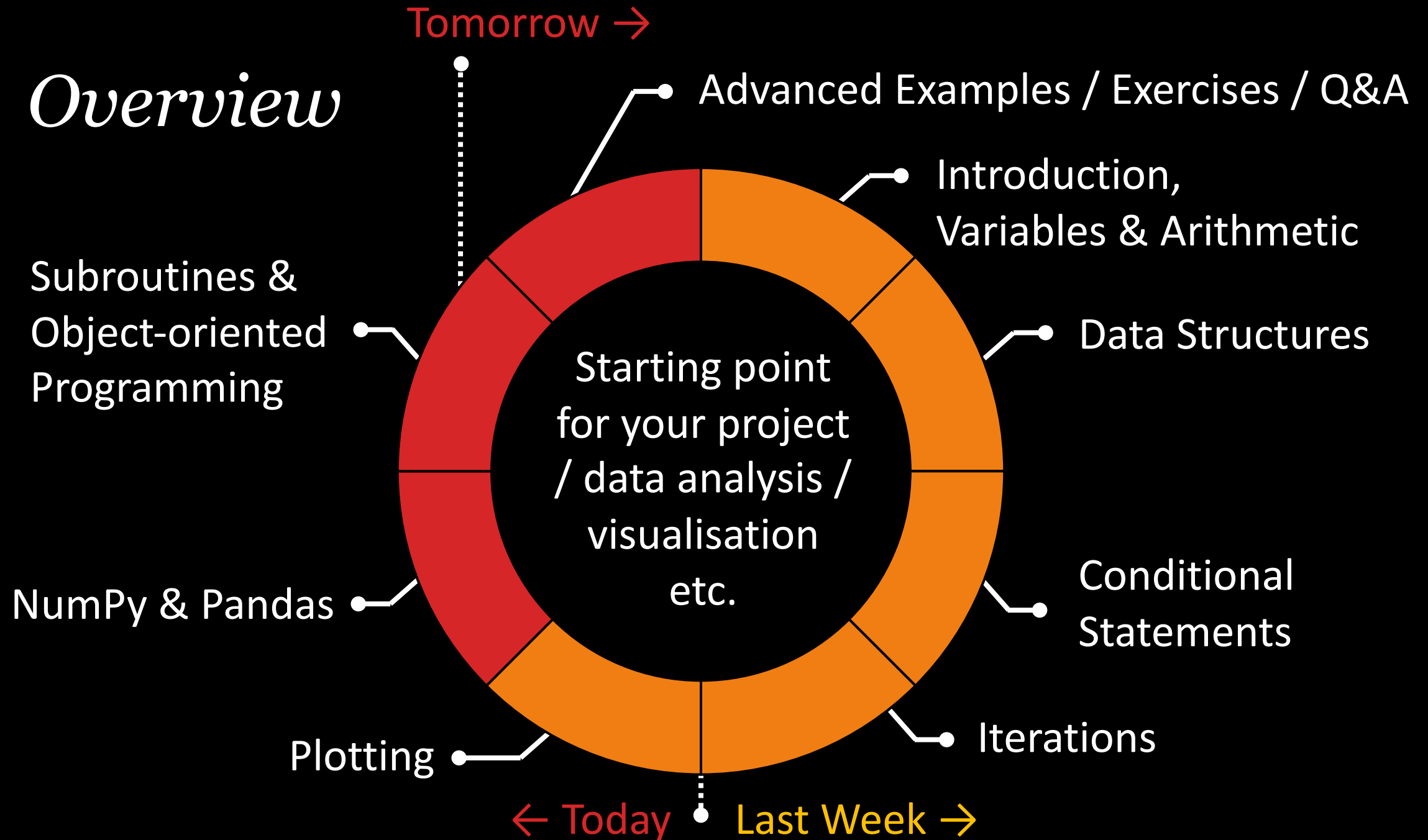
Please enter your name: Monty
Good morning, Monty

```
1 #include <iostream>
2 #include <string>
3
4 using namespace std;
5
6 int main() {
7     string name;
8
9     cout << "Please enter your name: ";
10    cin >> name;
11    cout << "Good morning, " << name << endl;
12
13    return 0;
14 }
```

Start your Working Environment

1. Access the course environment via **Noto link** provided in E-Mail and sign in with your SWITCH edu-ID ("**Use your Switch AAI login**")
 2. **Or:** Download new material, start Jupyter Lab and open notebooks
- Suggestions on how to work in this course:
 -  +  : Follow presentation, while executing scripts yourself, making adjustments and notes in your own notebook
 -  : Follow presentation, switch to programming environment for exercises

Overview



Different Ways to Execute Scripts

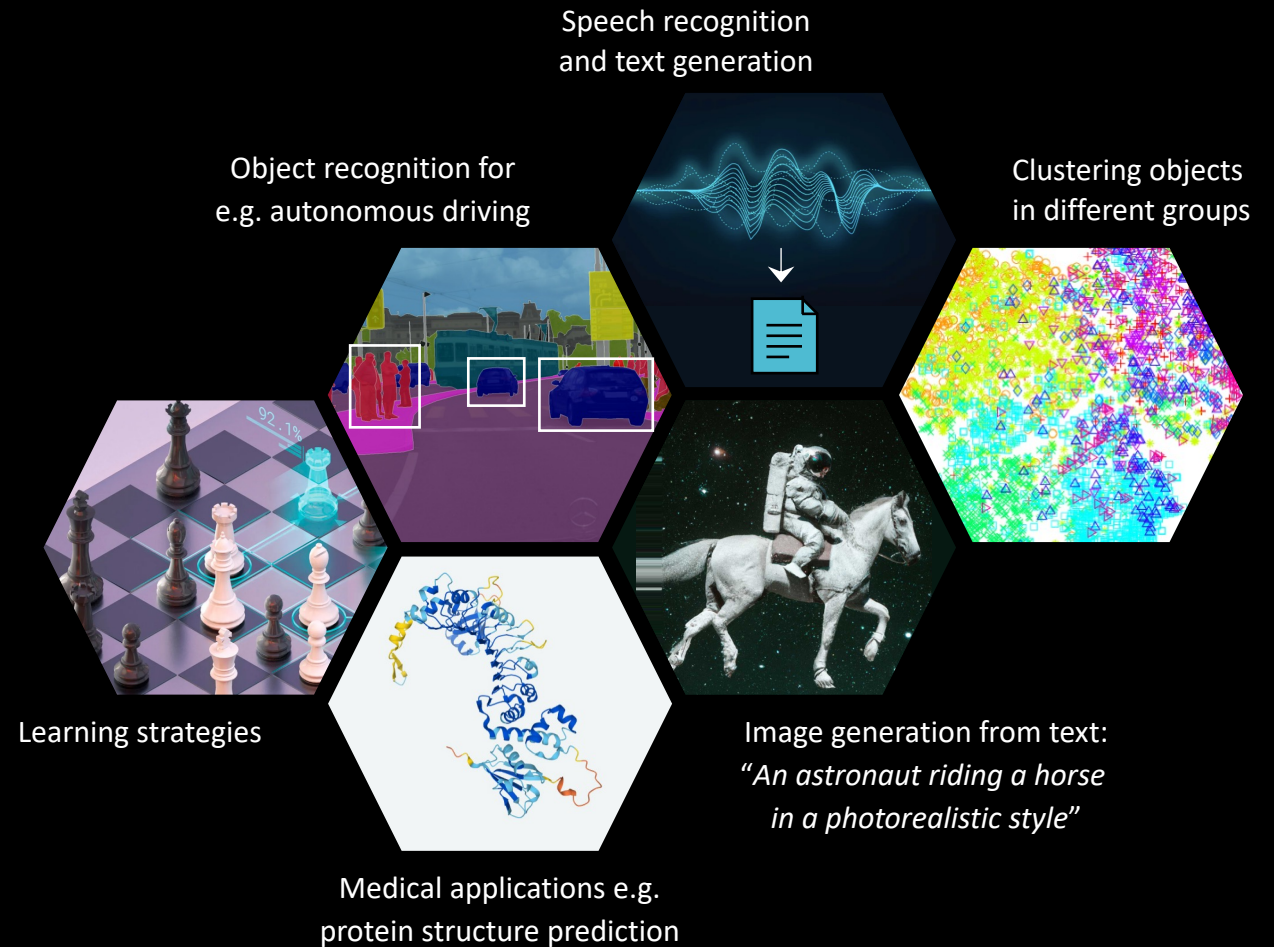
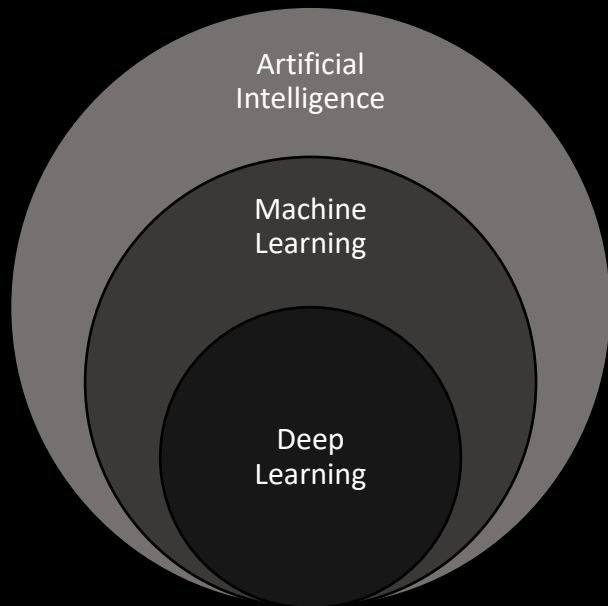
- **Jupyter Notebooks** (as in this class): Document-style, combining executable scripts with rich documentation and formatting; LaTeX can be used
- **Terminal**: Execute scripts via the terminal
 1. Write your script in an editor and save it to a *my_script.py* file
 2. Execute the script in the terminal with *python my_script.py*
- **Spyder**: Integrated development environment (IDE) combining an editor with a terminal and other useful functionalities
- Or any other editor / IDE such as Atom, Sublime Text, PyCharm etc.

Selection of References

- **Quick overview** with interactive tutorials on some basic topics (similar to the course) and more advanced concepts:
<https://www.learnpython.org/>
- **More detailed overview** with interactive tutorials on a lot of topics:
<https://www.w3schools.com/python/default.asp>
- One of my favourites with tutorials on specific (advanced) topics, easy-to-read books:
<https://www.realpython.com/>
- Overview of resources for beginners:
<https://wiki.python.org/moin/BeginnersGuide>

Advanced Python & Machine Learning

- **Next semester:**
 - More advanced Python concepts
 - Introduction to Machine Learning



Suggestions for the Feedback



- Preparation information / Youtube videos adequate?
- What did / didn't you like about Noto?
- Content appropriate: anything missing for you?
- Too fast or slow, shallow or deep?
- Insightful exercises?

Thank you and good luck as new Pythonistas! 😊

Some Additional Links

- Download the course material from
<https://github.com/samarinm/pythonCC>
- On script languages:
https://en.wikipedia.org/wiki/Scripting_language
- On the difference between interpreter and compiler:
<https://www.programiz.com/article/difference-compiler-interpreter>
- On dynamic and static type checking:
https://en.wikipedia.org/wiki/Type_system#Type_checking