Getting started with Object Oriented Programming through Signal Processing

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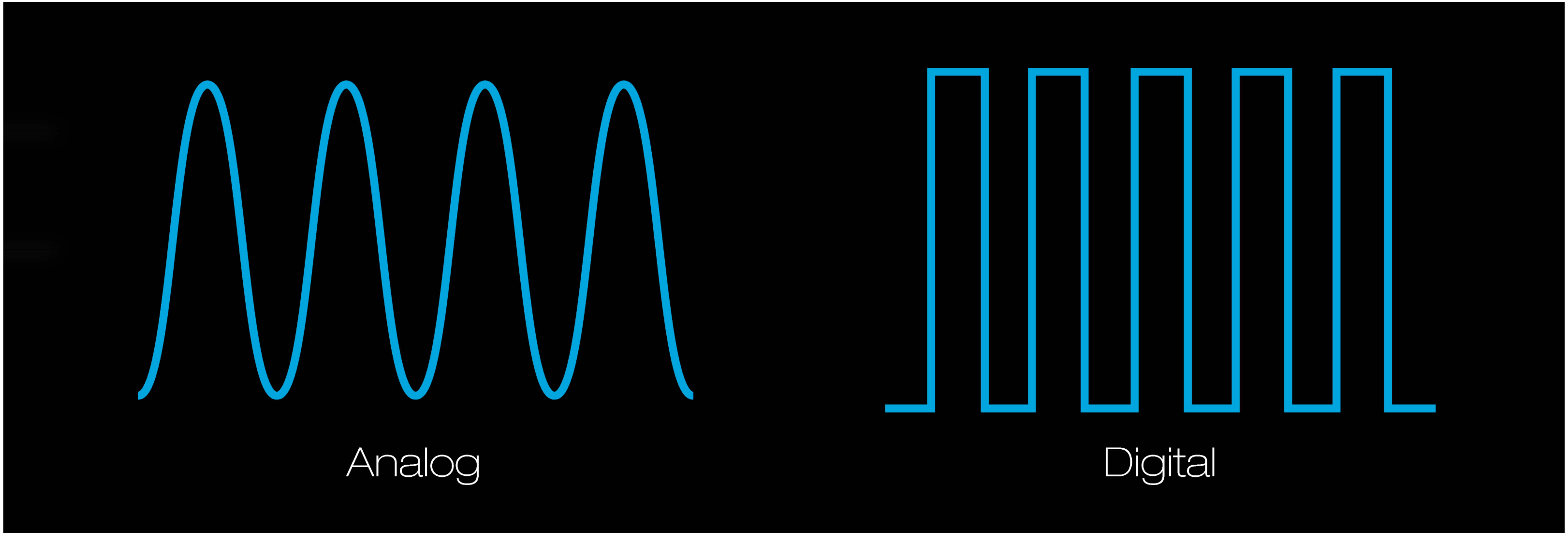
Who I am

- MSC in Tlc Engineering
- Software engineer at Planetek Italia
- Playing with Python for 15 years
- No single-tech fanatic :)

Coming from Bari, South Italy

Why OOP in the AI era?


Analog
Digital

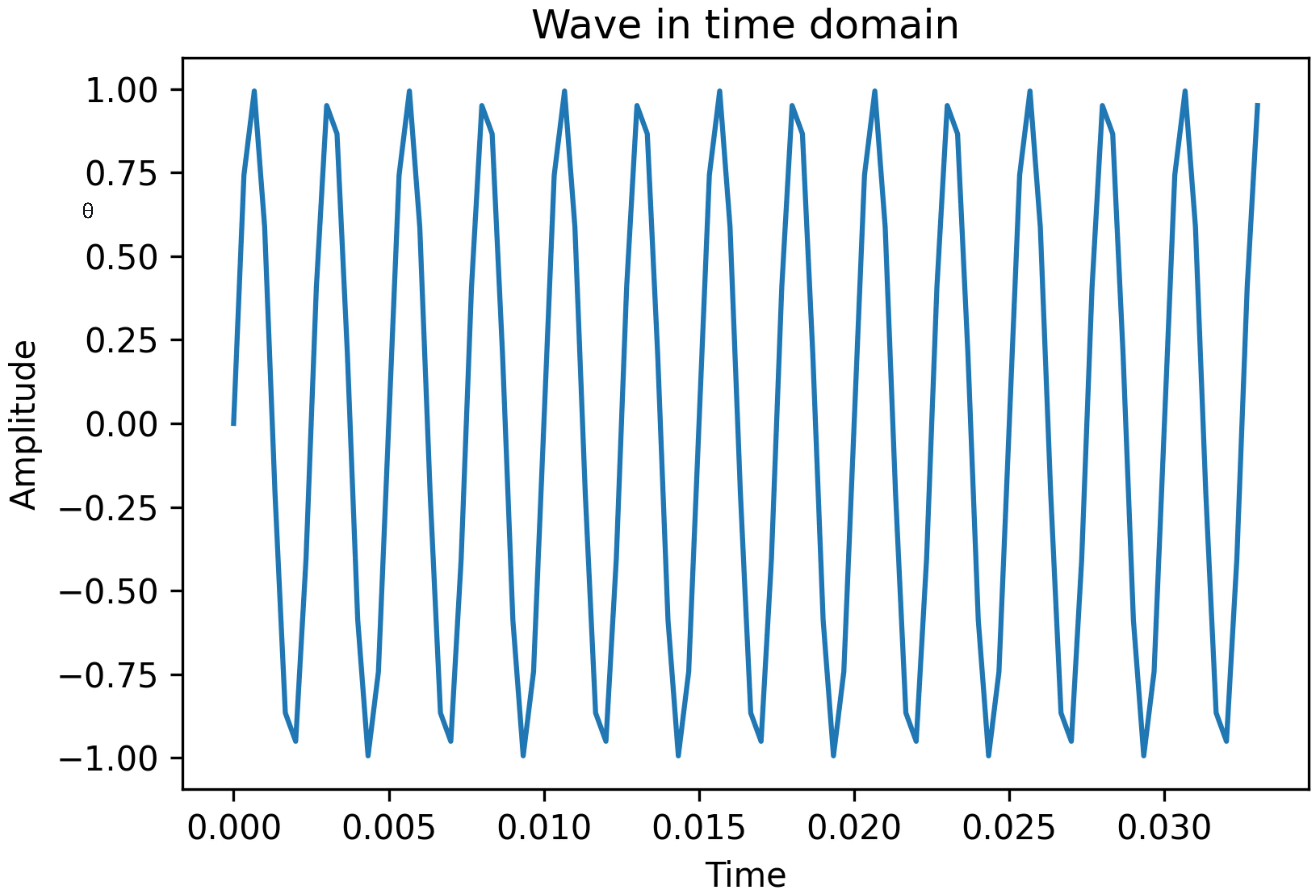
About this crash course

- No previous Signal Processing knowledge
- Live coding, 4 sections, exercise break at the end, solutions provided in *solutions.py*
- Python is required, but Jupyter notebook offers a more in-depth experience
- All the complexity has been wrapped in the *utils modules*

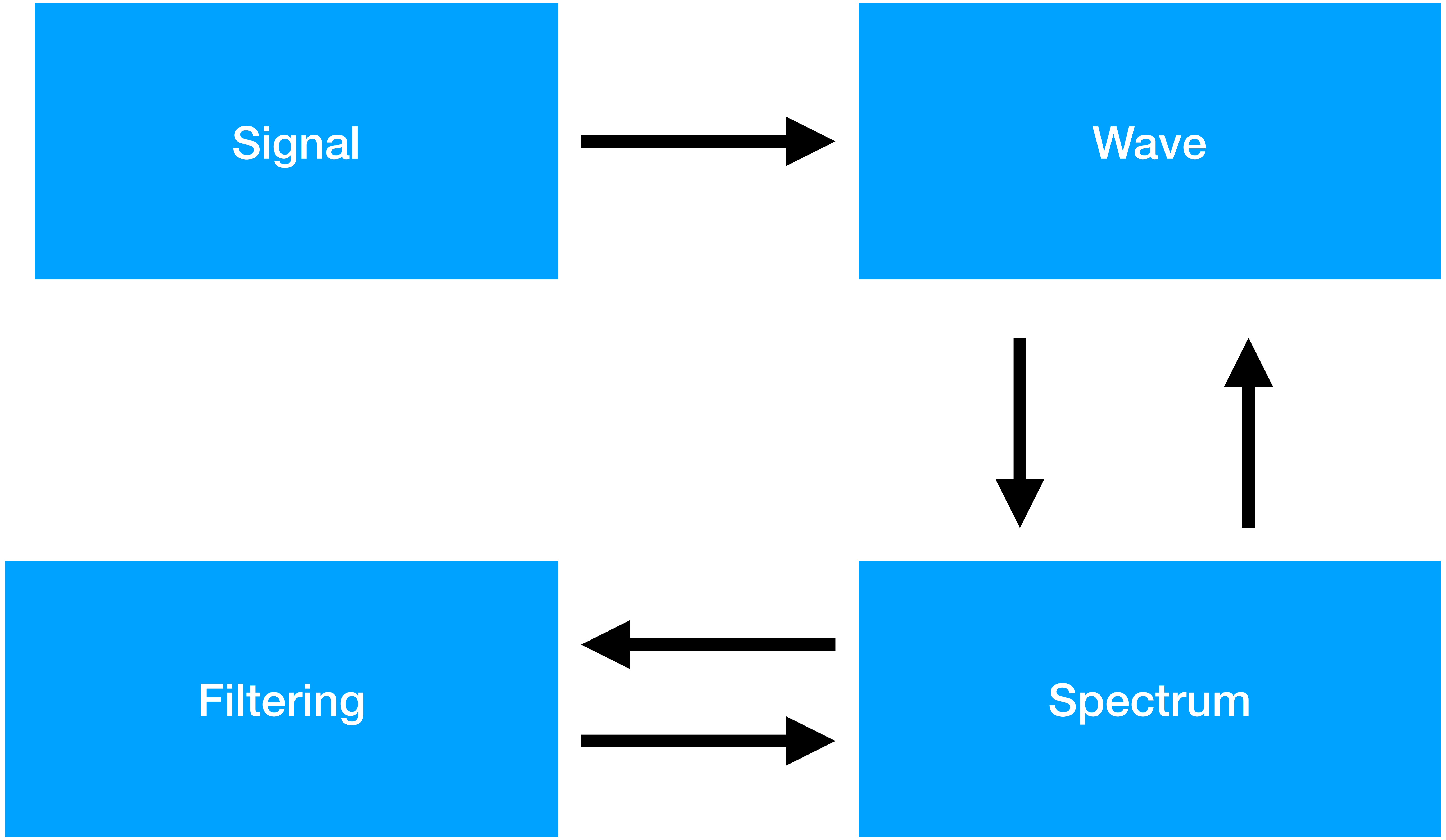
Signal vs Wave

$$x(t) = A * \sin(2\pi f t + \theta)$$

A *is the amplitude*
sin *is the periodic function*
f *is the frequency*
θ *is the offset*



Signal vs Wave vs Spectrum

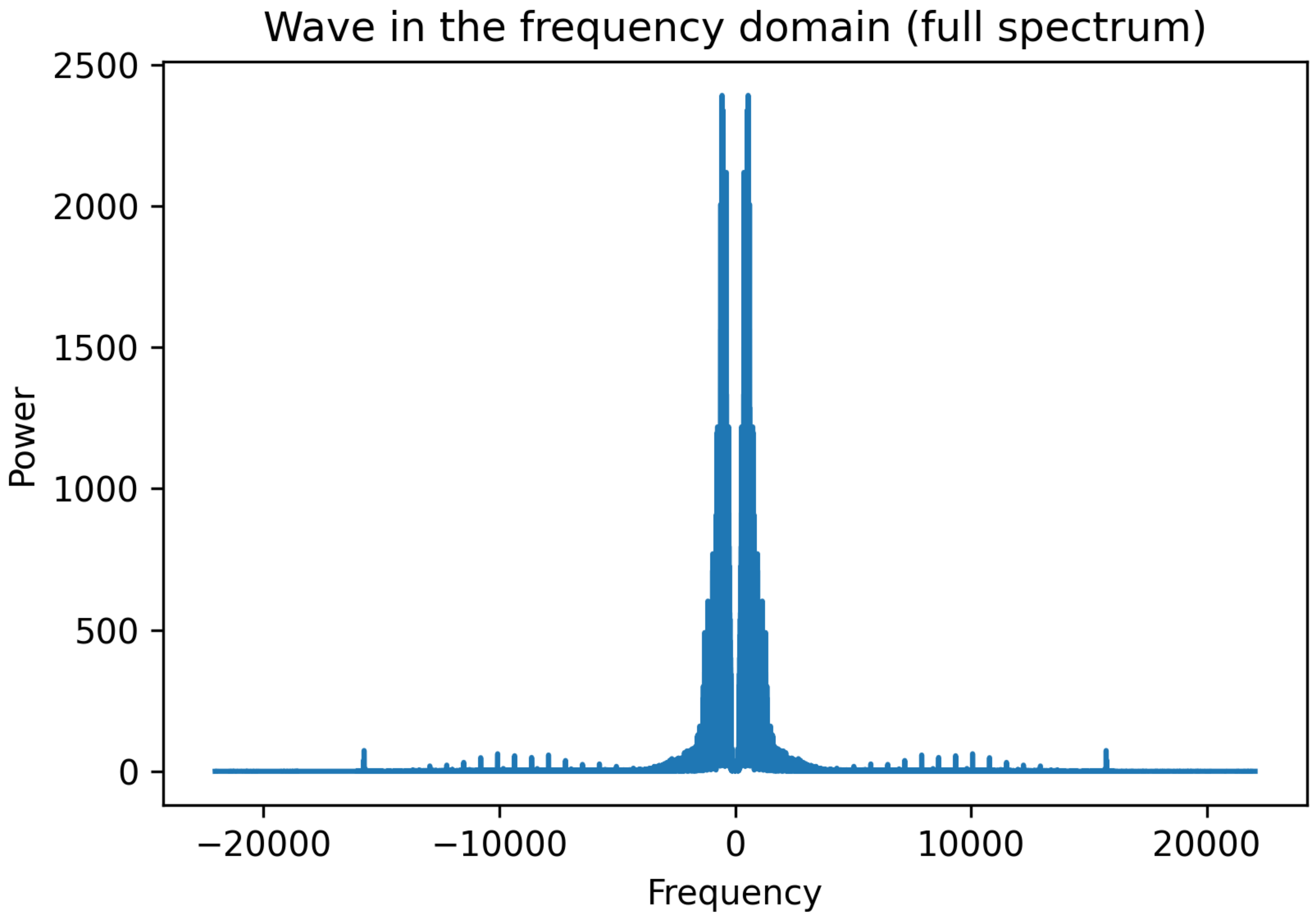


Signal

Wave

Filtering

Spectrum



Wave in the frequency domain (full spectrum)

Get to code!

Wrapping up

- Step 1: Everything in the class
- Step 2: Augmenting our model through delegation and composition
- Step 3: Defining contracts or templates
- Step4: Introducing Design Patterns

Guidelines found so far

- Data encapsulation
- Polymorphism
- Delegation vs Composition
- A class with a single responsibility
- Extends instead of modifying
- Depends on abstractions

Going further

Think DSP

https://greenteapress.com/wp/think-dsp/

SOLID Principles

UML

More Design Patterns

Think first, code later

Thanks

Questions?

Please fill this feedback form