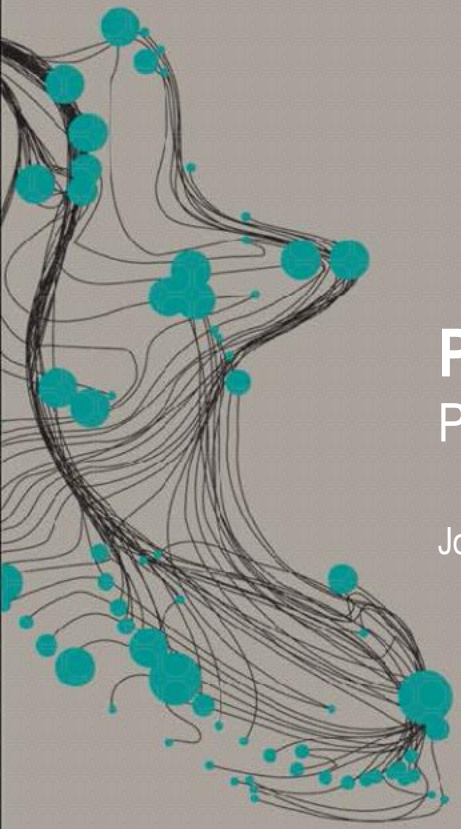
UNIVERSITY OF TWENTE.



Programming Basics

Planning Sustainable Cities (2020-1B)

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About this lecture

This lecture IS NOT about:

- Following *PowerPoint* slides
- Every aspect of programming
- Learning programming language

This lecture IS about

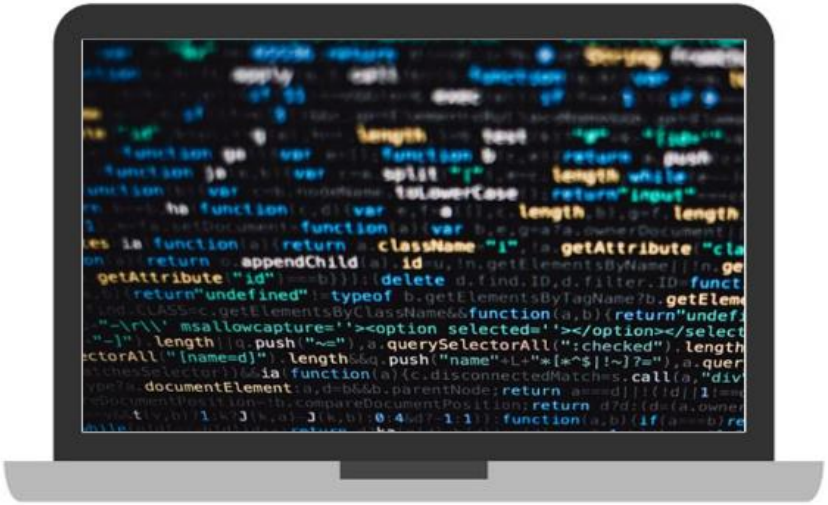
- Practice
- Basic features about programming
- Important elements: variables, data types, conditionals, iteration and function
- Think like a computer scientist

How many times…

You encounter this situation:
choosing and switching back and forth among different GIS and RS software products, and repeat…

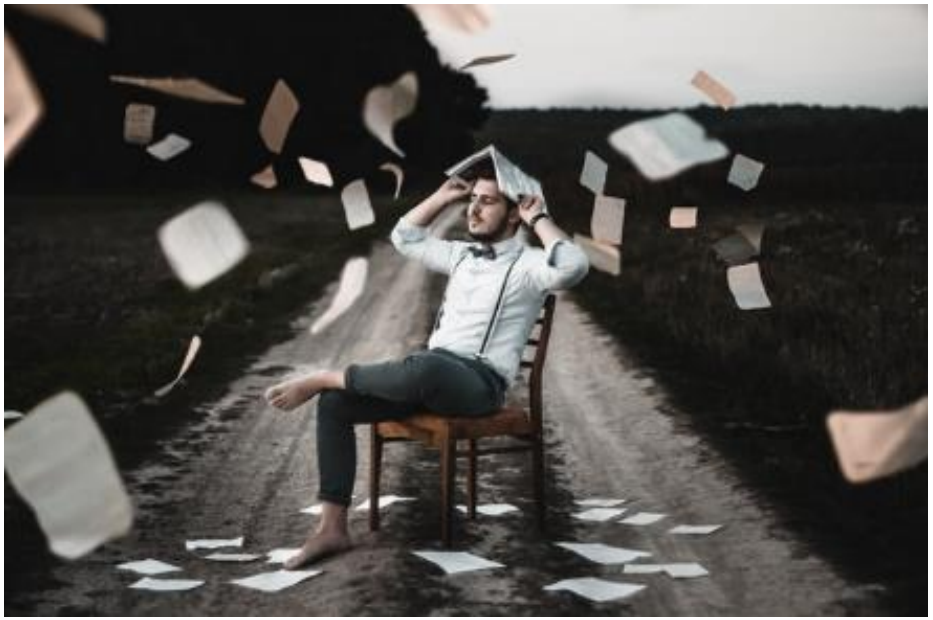
How many times…

You expect that:
you would like to have a streamlined, fit-for-purpose and automated tool that can be reused by you and your colleagues.



The WORST way to learn programming

- Try to learn too many things at once
- Read too much without practice



First program!

jupyter UPM1_py01 Last Checkpoint: a few seconds ago (autosaved)

Logout

File Edit View Insert Cell Kernel Widgets Help

Not Trusted | Python 3

Run | Markdown

0. First program

This is a first program of few lines of codes, what do you see? Could please try to run each lines, and try to interpret what is going on?

In [1]:
```
print('Greetings, there are some sample codes for UPM-1 programming course')
```

```
Greetings, there are some sample codes for UPM-1 programming course
```

In [2]:
```
data = [0.1, -0.6, 0.02, 0.7, -0.3, 0.5, -0.1, -0.9, 0.4]  # Dataset with a list of NDVI values

m = min(data)
l = len(data)
```

In [3]:
```
print(m)
print(type(m))
print(l)
print(type(l))
```

```
-0.9
<class 'float'>
9
<class 'int'>
```

In [4]:
```
data[10]
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
<ipython-input-4-248fdc508cab> in <module>
----> 1 data[10]

IndexError: list index out of range
```

So, what is programming?

- Problem-solving
- Instructions: Ask computer to solve…
- Format: Formal language
- Features: Input, math operations, conditions, repetitions, output
- Elements: Values, variables, functions
- Actions: writing, debugging

Other IDE and modules

Recommended IDE in:

- Anaconda

Commonly used modules:

- GDAL
- Geo Pandas
- Rasterio
- PIL
- Pickle
- …