Python for linguists

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UNIVERSITY OF LEEDS

Computational thinking

- *How to think like a computer scientist*
  `https://openbookproject.net/thinkcs/`
  - Precision in formulating descriptions
  - Problem solving

Our tasks in learning Python

- Introduction into basic concepts

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- Introduction into basic concepts
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- Text annotation: genres and emotions
- Keyword analysis

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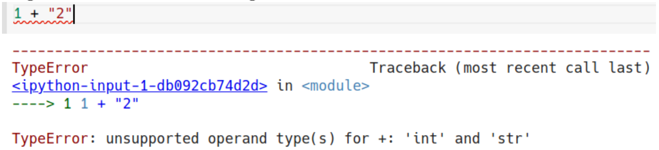
e.g. 1+"2" is not legal



```
1 + "2"
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---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
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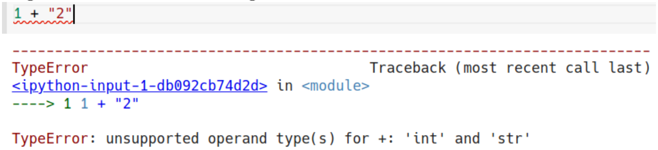

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Semantic errors *the program does not do what you want it to do*

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Class a template of an object:

- defines how variables, functions, and methods work together and what we can do with them

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otebooks scripts within an interactive environment

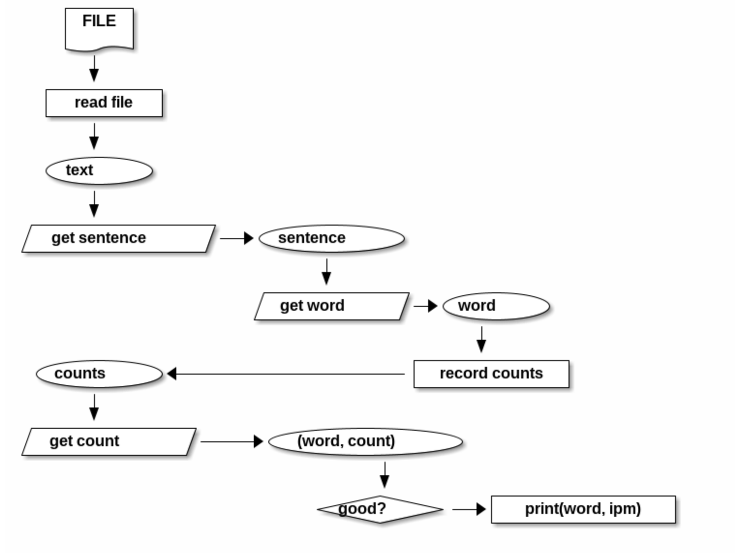
- File extensions: .py (for scripts), .ipynb (for notebooks)
- Google Colab/Jupyter Labs for the notebook interface

Hello world

```
s = "Hello world!"
print(s)
print(s.upper())
print(s.split())
print(s.split("l"))
```

Variable	s
Type	string
Operator	= (assignment)
Function	print()
Methods	upper(), split(), find(), startswith()...

- Now you can open an empty notebook, type the commands at the top as cells and execute them


FILE
read file
text
get sentence
sentence
get word
word
record counts
counts
get count
(word, count)
good?
print(word, ipm)

Word frequency distribution

```
import re
text = requests.get("https://ssharoff.github.io/modl5007/pa
text = text.lower()
corpus_count = 0
dictionary = {}
for sentence in text.split(". "):
  for word in sentence.split():
    corpus_count += 1
    word = re.sub("[^a-z-]+","",word)
    if word in dictionary: dictionary[word] += 1
    else: dictionary[word] = 1
for word in dictionary:
  ipm = dictionary[word] / ( corpus_count / 1000000 )
  if ipm > 1000:
    print(word, ipm)
```

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- Slicing from the start: s[:2] $\rightarrow$ "My"
- Slicing to the end: s[25:] $\rightarrow$ "eels"
- Zero indexing: s[0] $\rightarrow$ "M"; s[1] $\rightarrow$ "y"
  Like house floor counting: first floor

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- Membership operator: `a in [5, 6, 7]`
  `"eel" in "My hovercraft is full of eels"`

Variables

- Legal naming conventions: standard characters, numbers (not at the start) and underscores
- Names need to be informative to reflect the logic of your script
- Variable names are case-sensitive:

```
CamelCase
Title_Case
snake_case
```

Q? What is the difference between:

```
favorite_color = "blue"
favorite_color == "blue"
favorite_color = blue
favorite_color == blue
```

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    return result
    ```

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  - imported from libraries:
    `import LibraryName`

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Q? Find the minimum of three numbers:
7 or 3 or 25?

Compute the minimum of three numbers

- Expanding the case of two numbers:

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def min3(a, b, c):
if a < b:
    if a < c: return a
    else: return c
else:
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HW Write min4(a,b,c,d)

Import statement

- Importing a module for the current script
  For example for regular expressions:

```
import re
re.findall(regex, string)
re.findall(".[aeiou]","Monty Python") \to "Mo","ho"
re.sub("[^a-z-]+","","fjords?!?!?!?") \to "fjords"
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- Trafilatura for web scraping:

```
import trafilatura
from trafilatura.spider import focused_crawler
url_list=focused_crawler(start_url, max_seen_urls=10,
     max_known_urls=50)
```

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  a = "Monty Python".split()

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- Same slicing as with strings: a[:2]

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-
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-
  ```
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  ```

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- `assert` stops execution if something is not right

```
assert len(url_list)>0, "Empty url list"
```

AI frameworks

- Various AI models can help you with writing code:
  Ask ChatGPT, Claude, Copilot, Google Colab etc to:
  Write a function which gets a downloaded HTML file as a parameter and uses the Trafilatura library to extract its text content.
- Use the right prompts: be as specific as possible
- Aim at understanding their output and your ability to modify it
- Be inquisitive: ask AI models why a specific line behaves in the way the AI model suggested
- Be liberal with writing your own commentaries:
  literate programming

Projects

- Think of mini-projects which involve:
  - data collection
  - annotation
  - terminology extraction, etc
- Run this project in two languages
- Each mini-project can consider two-three people:
  - Dividing the tasks
  - Testing
  - Code review (another pair of eyes)