Python for linguists

Serge Sharoff

Centre for Translation Studies
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

- Introduction into basic concepts

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- Text annotation: genres and emotions
- Keyword analysis for your projects

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e.g. “1+"two"” is not legal

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1 + "2"
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TypeError                                 Traceback (most recent call last)
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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 a variable:

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

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- Google Colab for the notebook interface

Hello world

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

Variable s

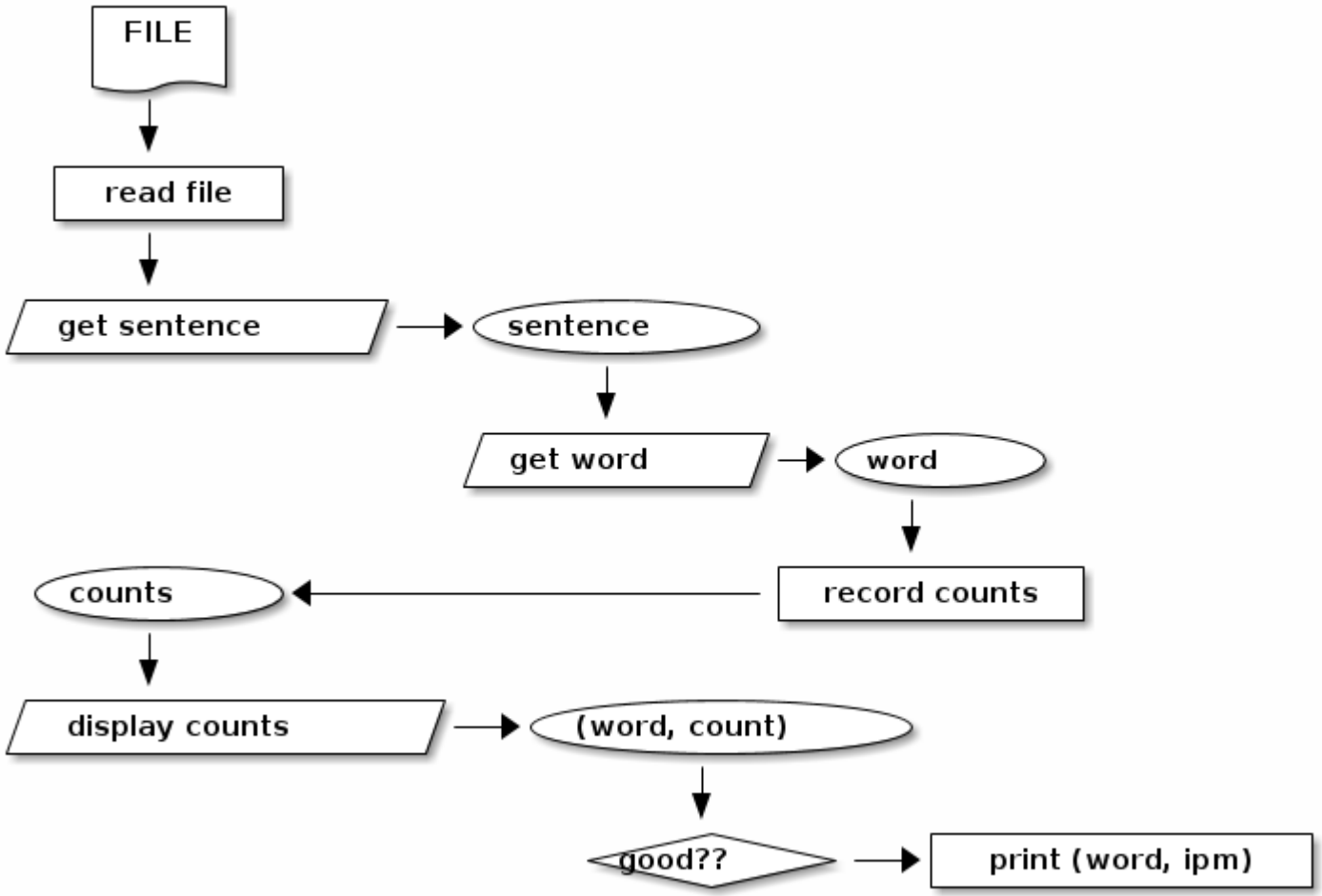
Type string

Operator = (assignment)

Function print()

Methods upper(), split(), find(), startswith()...

- Now open an empty notebook in Google Colab, type the commands at the top as cells and execute them


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

Word frequency distribution

```
import re
text = requests.get("http://corpus.leeds.ac.uk/teaching/mod
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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  `not 5/2==2; int(5/2)==2`
- Membership operator: `a in [5, 6, 7]`

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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do something
return result
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  - imported from libraries:
    `import LibraryName`

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

Compute the minimum of three numbers

- Expanding the case of two numbers:

```
def min3(a, b, c):
if a < b:
    if a < c:
return a
    else:
return c
else:
    if b < c:
return b
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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-]+","","Monty Python") \to "MontyPython"
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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 = ["Once", "upon", "a", "time"]
  a = "Monty Python".split()

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

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- ```
  for key in d:
      ipm[key] = d[key] / ( CorpusSize / 1000000)
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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 an HTML file as its parameter and uses the Trafilatura library to extract its text content.
- Use the right prompts: be as specific as possible
- Understanding their output and your ability to modify it
- Be inquisitive and ask AI models why a specific line behaves in this way
- Be liberal with your own commentaries: literate programming

Projects

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