Intro to Python

Course overview, Introduction

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Repository with course material

https://github.com/Majid-Sohrabi/Intro_to_Python_2024

Course content

- Introduction into Python (Syntax)
  - Intro to Anaconda, Jupyter Notebook, and other similar environments
  - Data types: integers and strings. Input and output. Strings formatting
  - Data types: floating-point numbers and boolean. Logical operators. Conditionals
  - Different types of loops
  - Data types: lists and tuples. For loop
  - Methods I (Strings)
  - Methods II (Lists)
  - Data types: sets and dictionaries
  - Nested Structures
  - Functions
  - Working with files in Python
  - Python and data science
  - Introduction to MNE-Python tools

Overview

- Compulsory course for year 1
- Cognitive Sciences and Technologies: From Neuron to Cognition
- Duration: 2nd half of the academic year (modules 3 and 4)
- Assessment elements:
  - Homework assignments (30% weight)
  - Quizzes (20% weight), in class short quizz
  - Exam/Project Defence (50% weight), in the form of a project, with **progress tracked during the semester** (topic choice deadline, preliminary results deadline, final result deadline)
- Format: Offline (lecture and seminar)
  - Online

The formula

Final grade = $0.3 \cdot$ Homework score + $0.5 \cdot$ Exam score + $0.2 \cdot$ Quizz

$0 \leq$ Exam score ≤ 10

Rounding to the closest integer

Homework

- Small set of tasks (jupyter notebooks)
- Solve tasks to earn points
- Deadline: 1 week per homework
- Homework grade $= 10 \cdot \min\left(1, \frac{\sum \text{points}}{\text{total}}\right)$

Exam

- Exam in the form of project defence
  - Teams of up to 2 people are OK (roles of all members of a team should be clear and significant)
- Project is either:
  - Participation in a competition (on www.kaggle.com or similar)
- Or:
  - Making comprehensive analysis on a dataset using Python and MNE-Python libraries

- **Please discuss your choice with me**

Exam project timeline

Topic choice

- Soft deadline: March 14
- Hard deadline: March 28

Intermediate status report

- Soft deadline: 4th Module
- Hard deadline: 4th Module

Project defence

- Soft deadline: 4th Module
- Hard deadline: Exam date

- Missing any of the hard deadlines adds a –0.5 points penalty to the exam grade (for each of the missed deadlines)
- Meeting any of the soft deadlines adds a +0.5 points bonus to the exam grade (for each of the met deadlines)

Thank you!

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Exercise

- 1) Find the maximum element in the following sequence:
  - A = [7, 4, 9, 2, 8, 88, 83, 12]

Exercise

- 2) Find the minimum element in the following sequence:
  - A = [7, 4, 9, 2, 8, 88, 83, 12]

Exercise

- 3) Sort the elements in the following sequence in ascending format:
  - A = [7, 4, 9, 2, 8, 88, 83, 12]

Exercise

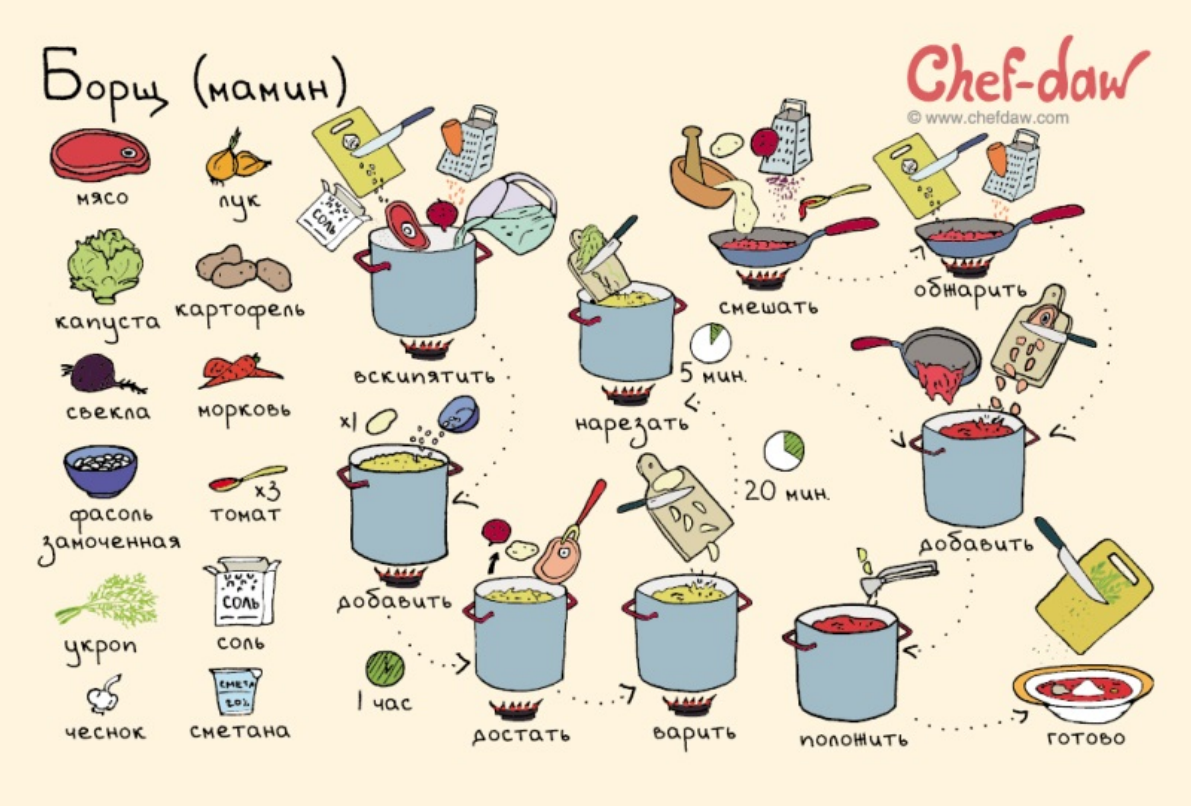
- 4) Sort the elements in the following sequence in descending format:
  - A = [7, 4, 9, 2, 8, 88, 83, 12]

Exercise

- 5) Calculate the average of elements for the following sequence:
  - A = [7, 4, 9, 2, 8, 88, 83, 12]

What does programming look like?

Why do we need languages?



How do programs look for the PC?

1. Leave only three first letters in each word
2. In those three-letter words change all ‘a’ letters to ‘@’ symbol
3. Change all ‘o’ letters ‘o’ to ‘0’
4. Join all the pieces with a dash sign

How do programs look for the PC?

1 **Leave only three first letters in each word**
ima men opt man

2 In those three-letter words change all ‘a’ letters to ‘@’ symbol

3 Change all ‘o’ letters ‘o’ to ‘0’

4 Join all the pieces with a dash sign

How do programs look for the PC?

1. Leave only three first letters in each word
2. **In those three-letter words change all ‘a’ letters to ‘@’ symbol**
   im@ men opt m@n
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im@-men-0pt-m@n

What we will be doing?

1

Think how we would approach a problem

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2

Write step-by-step solution for a human

What we will be doing?

1

Think how we would approach a problem

2

Write step-by-step solution for a human

3

Translate our solution to a language that computer can understand

What we will be doing?

1. Think how we would approach a problem
2. Write step-by-step solution for a human
3. Translate our solution to a language that computer can understand
4. Check that our code works properly