Bialystok University of Technology
Faculty of Electrical Engineering
Department of Electrotechnics, Power Electronics
and Electrical Power Engineering

Instruction
for a specialist workshop on

Python Programming 1

Subject code: **CP1S02005E**

(Full-Time Studies)

PYTHON - DICTIONARIES AND SETS

Instruction Number

PP_06_EN

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Contents

Teaching Materials for Students of the Faculty of Electrical Engineering at BUT.

1. Workstation Description

1.1. Equipment used

A PC-class computer with the Microsoft Windows 10 operating system is used during classes.

1.2. Software

The computers are equipped with the Visual Studio Code 1.86 (or newer) source code editor along with the appropriate extension (Python extension for Visual Studio Code).

2. Exercises Procedure

In the specialist workshop, selected tasks assigned by the instructor must be completed. Different groups may perform different tasks.

1. Define a dictionary where the key is a number from the range 1 to 20, and the value is the square of that number. Display the dictionary on the screen.

2. Write a program containing two lists. The first list should contain the keys, and the second list should Define a dictionary where the key is a number from the range 1 to 20, and the value is the square of that number. Display the dictionary on the screen.

3. Write a program containing a dictionary where the keys are students' last names, and the values are lists of students' grades. Calculate and display the average grade for each student.

4. Create two dictionaries in the program. The first dictionary stores product names as keys and their prices as values. The second dictionary represents a shopping list, containing product names as keys and their quantities as values. Calculate and display the total cost of the shopping.

5. Create a dictionary consisting of 10 elements, where product names are stored as keys and their prices as values. Display the names and prices of the three most expensive products and the three cheapest products.

6. Write a program that reads a line of text from the keyboard. Create a dictionary containing the frequency of each letter in the text.

7. Create a list in the program containing repeating elements. Based on the list, create a dictionary where the keys are the elements from the list, and the values are their occurrences.

8. Create two sets and fill them with pseudo-random numbers from the range [1, 9]. Display the union, difference, and intersection of the sets, as well as the elements that appear in only one of them.

9. Create a list containing repeating elements. Convert the list into a set to remove duplicates. Display the elements of the list on the screen.

10. Create two sets containing arbitrary elements. Remove the common elements from both sets. Display the sets after removing the common elements.

3. Literature

[1] Ramalho L., Fluent Python: clear, concise, and effective programming. Sebastopol, O'Reilly, 2022.

[2] Matthes E., Python Crash Course, San Francisco, CA, No Starch Press, 2019.

[3] Sweigart A., Automate the Boring Stuff with Python, San Francisco, CA, No Starch Press, 2020.

[4] Lutz M., Learning Python, Sebastopol, CA, O'Reilly Media, 2013.

[5] https://www.python.org/doc/ Python, documentation.

4. Health and Safety Requirements

To begin the practical part of the exercise, it is mandatory to familiarize yourself with the health and safety instructions and fire safety guidelines and to adhere to the rules contained therein.

During laboratory sessions, the following rules must be observed:

- Verify that the devices available at the laboratory workstation are complete and show no signs of physical damage.
- If possible, adjust the workstation conditions to suit individual ergonomic needs. Position the computer monitor to ensure constant and comfortable visibility for all team members.
- Check the correctness of device connections.
- The computer may only be turned on with the instructor’s permission.
- Eating and drinking are prohibited while working with the computer.
- Upon completion of work, log out before leaving the workstation. The operating system may only be shut down upon explicit instruction from the instructor.
- Making any modifications, switching components, or replacing elements of the workstation is strictly prohibited.
- Changing the computer's configuration, including the operating system and software, is not allowed unless it is part of the class program and performed under the instructor’s supervision.
- In the event of a power failure, immediately turn off all devices.
- Any missing equipment or malfunctions must be reported to the instructor.
- It is forbidden to operate, manipulate, or use devices not included in the current exercise.
- In case of electric shock, immediately disconnect the workstation from the power supply. Do not touch the affected person before the power is turned off.