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 - TEXT STRINGS

Instruction Number

PP_04_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. Write a program that reads a single line of text from the keyboard and then:
   a) displays the entered text on the screen;
   b) calculates and displays the number of characters in the text;
   c) calculates and displays the number of lowercase and uppercase letters in the text;
   d) converts all lowercase letters to uppercase and displays the text again;
   e) converts all uppercase letters to lowercase and displays the text again.

2. Write a program that reads a line of text from the keyboard and then removes all spaces at the beginning and end of the text, e.g.

   `"   John Has a dog   " → "John Has a dog"`

3. Write a program that reads a string consisting of zeros and ones. The program should then determine the number of sequences in the string. A sequence is a substring consisting of one or more identical characters.

Example of program execution:

```
Enter a sequence:   0011101010011
Number of sequences: 8
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4. Write a program that reads a line of text from the keyboard and then counts the number of vowels in the text.

5. Write a program that reads a line of text from the keyboard and then counts the number of words in the line.

6. Write a program that reads a line of text from the keyboard and checks whether it is a palindrome. A palindrome is a text that reads the same forward and backward. Examples of palindromes: „Never odd or even", „A Santa at NASA".

7. Write a program that reads a line of text from the keyboard and counts the occurrences of each letter in the text.

8. Write a program that reads a line of text from the keyboard and encrypts it using the Caesar cipher with a specified shift. The Caesar cipher is a type of substitution cipher in which each letter in the plaintext is replaced by another letter a fixed number of positions away in the alphabet, preserving the direction of the shift. Uppercase and lowercase letters are treated the same.

9. Write a program that reads a line of text containing brackets. The program should check whether the text contains a balanced number of brackets:( ), { }, [ ].

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.