Python in practice

On-spot course

Day 2

14/09/2022

Strings, Built-in functions, File handling

Integrated development environment:

Web: *https://www.jetbrains.com/pycharm/*

Download: https://www.python.org/downloads/

Help: https://www.jetbrains.com/help/pycharm/quick-start-guide.html

Supporting material for the topics:

- Modules:
  - https://www.tutorialspoint.com/python/python_modules.htm
- File-handling basics:
  - https://www.tutorialspoint.com/python/python_files_io.htm
- String operations:
  - https://www.tutorialspoint.com/python/python_strings.htm
- Exception-handling
  - https://www.tutorialspoint.com/python/python_exceptions.htm

Programming tasks

1. Create a variable called text with the value “Hello World! Hello everyone!”. This is the string that we will use in the next few tasks.

2. Print out the 3rd character in it, the one before the last one, using negative indexing to get it, then print out the one that has the highest ASCII value.

3. Print out a slice of the string, starting from the 2nd character and ending on the 5th.

4. Print out the length of the substring, that contains every 3rd character of the original string.

5. Check if the string contains the character which has the ASCII value of 72, then convert the result to string and print it out twice, using the multiplication of strings.

6. Print out the ASCII code for every character of the string, that is larger than the average.

7. Write a function, that creates a file called *data.txt* and writes the name and NEPTUN code of the user into it. Ask the user to provide the name and NEPTUN code.
   While working with files, apply basic error-handling measures.
   Write another function, that reads the contents of the file and writes it to the standard output.

8. Write a function, that reads in the file *data.txt* and writes it to the standard output backwards. Do it both with string operations and indexing.
   While working with files, apply basic error-handling.
   Write another function, that reads the contents of the file and writes it to the standard output.

   The contents of people.txt:
   James Hobson
   John Smith
   Adam Neely
   Linus Sebastian
   Bill Nye
   John Neumann
   Kyle Hill
   Adam Savage
   David Bowie
   Linus Torvalds
   John Williams

Sebastian Lague
John Coltrane
Christopher Eccleston
David Tennant
Matt Smith
Peter Capaldi
Jodie Whittaker
Jenna Coleman
Billie Piper

9. Write a function, that reads in names from a file called people.txt, then writes them into people_organised.txt in ABC order.
   While working with files, apply basic error-handling.

10. Write a function, that takes the names from people.txt and saves the ones that start with ‘S’ into a file called people_s.txt.
    While working with files, apply basic error-handling.

11. Write a function, that takes the forenames and stores them in a list. Write to the standard output, how many times each name occurred.
    While working with files, apply basic error-handling.

12. Write a function, that reads the file data.txt and replaces the commas with tabs.
    While working with files, apply basic error-handling.

    The contents of data.txt:
    John Smith, M, 98, pensioner
    Sarah Jane, F, 45, researcher
    Clara Oswald, F, 23, teacher
    Donna Noble, F, 36, secretary
    Martha Jones, F, 27, doctor
    Jack Harkness, M, 31, police officer
    Mickey Smith, M, 24, car mechanic
    Rose Tyler, F, 21, cashier
    Amy Pond, F, 19, student
    Rory Williams, M, 21, nurse
    River Song, F, 31, archaeologist
    Bill Potts, F, 22, student
    Danny Pink, M, 25, teacher

13. Write a function, that reads in the file data.txt from the previous task, and separates them into two files, based on if the person is male or female.
    While working with files, apply basic error-handling.

Complex exercise

There are several stations, that provide measurements from their environment. These measurements are stored in a file, called measurements.txt in the following format:

Station name, Time, Air pressure, Humidity, UV index, Wind velocity, Wind direction

Each one of these values have a possible minimum and maximum values, but the stations can provide incorrect data.

Air pressure must be between 90.00 and 150.00 kPa.

Humidity must be between 0 and 100%.

UV index must be between 0 and 11.

Wind velocity must be between 0 and 410 km/h.

Wind direction could be any of the 4 cardinal directions, and the 4 in-between directions. (N, S, W, E, NW, NE, SW, SE)

Write a function, that can create a new e, conaining a filtt of th data, where the user an specify he name of the statwhich will have it’s data stred.

Write a unction,at can filtrout incorrect and calculate the arage of the correct oes,for echf the measurement points.