



# Python in practice

On-spot course

## ***Day 4***

16/09/2022

*Exam*

### ***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 EXAM:***

- Basics of syntax
  - o [https://www.tutorialspoint.com/python/python\\_basic\\_syntax.htm](https://www.tutorialspoint.com/python/python_basic_syntax.htm)
  - o <https://perso.limsi.fr/poital/ media/python:cours:mementopython3-english.pdf>
- Variables
  - o [https://www.tutorialspoint.com/python/python\\_variable\\_types.htm](https://www.tutorialspoint.com/python/python_variable_types.htm)
  - o [https://www.tutorialspoint.com/python/python\\_numbers.htm](https://www.tutorialspoint.com/python/python_numbers.htm)
  - o [https://www.tutorialspoint.com/python/python\\_strings.htm](https://www.tutorialspoint.com/python/python_strings.htm)
  - o [https://www.tutorialspoint.com/python/python\\_lists.htm](https://www.tutorialspoint.com/python/python_lists.htm)
  - o [https://www.tutorialspoint.com/python/python\\_tuples.htm](https://www.tutorialspoint.com/python/python_tuples.htm)
  - o [https://www.tutorialspoint.com/python/python\\_dictionary.htm](https://www.tutorialspoint.com/python/python_dictionary.htm)
  - o [https://www.tutorialspoint.com/python/python\\_date\\_time.htm](https://www.tutorialspoint.com/python/python_date_time.htm)
- Operators
  - o [https://www.tutorialspoint.com/python/python\\_basic\\_operators.htm](https://www.tutorialspoint.com/python/python_basic_operators.htm)
- Cycles
  - o [https://www.tutorialspoint.com/python/python\\_loops.htm](https://www.tutorialspoint.com/python/python_loops.htm)
- Decision making
  - o [https://www.tutorialspoint.com/python/python\\_decision\\_making.htm](https://www.tutorialspoint.com/python/python_decision_making.htm)
- Functions
  - o [https://www.tutorialspoint.com/python/python\\_functions.htm](https://www.tutorialspoint.com/python/python_functions.htm)
- Modules
  - o [https://www.tutorialspoint.com/python/python\\_modules.htm](https://www.tutorialspoint.com/python/python_modules.htm)
- File-handling basics:
  - o [https://www.tutorialspoint.com/python/python\\_files\\_io.htm](https://www.tutorialspoint.com/python/python_files_io.htm)
- String operations:
  - o [https://www.tutorialspoint.com/python/python\\_strings.htm](https://www.tutorialspoint.com/python/python_strings.htm)
- Exception-handling
  - o [https://www.tutorialspoint.com/python/python\\_exceptions.htm](https://www.tutorialspoint.com/python/python_exceptions.htm)
- Tkinter basic
  - o [https://www.tutorialspoint.com/python/python\\_gui\\_programming.htm](https://www.tutorialspoint.com/python/python_gui_programming.htm)

- Tkinter widgets

- [https://www.tutorialspoint.com/python/tk\\_button.htm](https://www.tutorialspoint.com/python/tk_button.htm)
- [https://www.tutorialspoint.com/python/tk\\_canvas.htm](https://www.tutorialspoint.com/python/tk_canvas.htm)
- [https://www.tutorialspoint.com/python/tk\\_checkbutton.htm](https://www.tutorialspoint.com/python/tk_checkbutton.htm)
- [https://www.tutorialspoint.com/python/tk\\_entry.htm](https://www.tutorialspoint.com/python/tk_entry.htm)
- [https://www.tutorialspoint.com/python/tk\\_frame.htm](https://www.tutorialspoint.com/python/tk_frame.htm)
- [https://www.tutorialspoint.com/python/tk\\_label.htm](https://www.tutorialspoint.com/python/tk_label.htm)
- [https://www.tutorialspoint.com/python/tk\\_listbox.htm](https://www.tutorialspoint.com/python/tk_listbox.htm)
- [https://www.tutorialspoint.com/python/tk\\_menubutton.htm](https://www.tutorialspoint.com/python/tk_menubutton.htm)
- [https://www.tutorialspoint.com/python/tk\\_menu.htm](https://www.tutorialspoint.com/python/tk_menu.htm)
- [https://www.tutorialspoint.com/python/tk\\_message.htm](https://www.tutorialspoint.com/python/tk_message.htm)
- [https://www.tutorialspoint.com/python/tk\\_radiobutton.htm](https://www.tutorialspoint.com/python/tk_radiobutton.htm)
- [https://www.tutorialspoint.com/python/tk\\_scale.htm](https://www.tutorialspoint.com/python/tk_scale.htm)
- [https://www.tutorialspoint.com/python/tk\\_scrollbar.htm](https://www.tutorialspoint.com/python/tk_scrollbar.htm)
- [https://www.tutorialspoint.com/python/tk\\_text.htm](https://www.tutorialspoint.com/python/tk_text.htm)
- [https://www.tutorialspoint.com/python/tk\\_toplevel.htm](https://www.tutorialspoint.com/python/tk_toplevel.htm)
- [https://www.tutorialspoint.com/python/tk\\_spinbox.htm](https://www.tutorialspoint.com/python/tk_spinbox.htm)
- [https://www.tutorialspoint.com/python/tk\\_panedwindow.htm](https://www.tutorialspoint.com/python/tk_panedwindow.htm)
- [https://www.tutorialspoint.com/python/tk\\_labelframe.htm](https://www.tutorialspoint.com/python/tk_labelframe.htm)
- [https://www.tutorialspoint.com/python/tk\\_messagebox.htm](https://www.tutorialspoint.com/python/tk_messagebox.htm)

- Tkinter colors

- [https://www.tutorialspoint.com/python/tk\\_colors.htm](https://www.tutorialspoint.com/python/tk_colors.htm)
- <https://www.wikipython.com/tkinter-ttk-tix/summary-information/colors/>

## Exam

The measurements.txt file contains the data of smart plant sensors. Each unit sent one data packet per day for 100 days.

The GUI program works with the contents of the measurements.txt file.

Example line from the file:

*Taros, 2022-12-01, 9.722090931282377, 17.403150319593653, 89.35331920565088, 283.4879378574485*

*[Name, Date, Temperature, Humidity, Soil moisture, Sun wattage]*

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

Temperature: 0-20 °C

Humidity: 0-100%

Soil moisture: 0-100%

Sun wattage: 164-340W

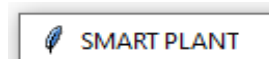
Write a function that filters the correct data and writes correct data into a file.

The screenshot shows a window titled "SMART PLANT" with a light blue background. It contains several input fields and buttons for data processing. On the left, there's a section "Enter the Sensor name:" with a text input field labeled "Sensor:" containing a green box, and an "OK" button below it. Below this, it says "Data: Error" in red. In the center, there's a section "Select operation!" with two checkboxes: "Display data" and "Write to file". At the bottom, there's a label "Error message: -". On the right, there's a section "Filter and calculate:" with "Date min:" and "Date max:" input fields, each with an "OK" button. Below these are four radio buttons: "MIN", "MAX", "Quantity", and "Average", with an "OK" button to their right. At the bottom right, there's a text input field for "Enter the file name in case of SAVE" with an "OK" button.

## Description

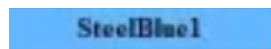
- Window title:

SMART PLANT



- Window colour:

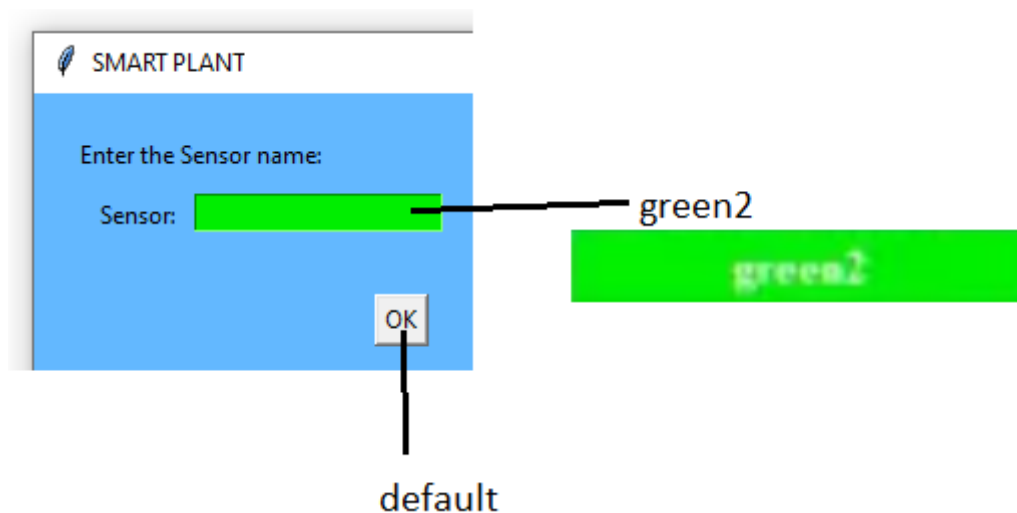
SteelBlue1



- Window size

400x500

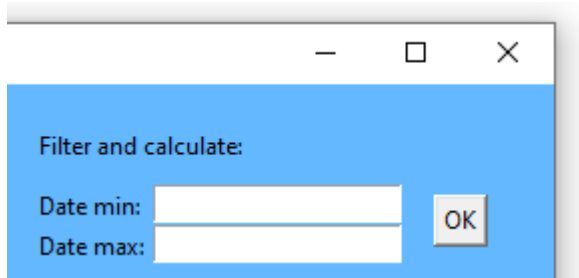
- Enter the name of the sensor



Input field for entering the name of the sensor. The sensor name is stored when the OK button is pressed.

Valid Sensor names: "Panda Lillies", "Moon Peaches", "White Lotus",  
"Blue Mountain Flower", "Red Lotus", "Sea Prunes", "Taros",  
"White Jades", "Bacui Berries", "Moon Flower"

- Enter the MIN and the MAX date

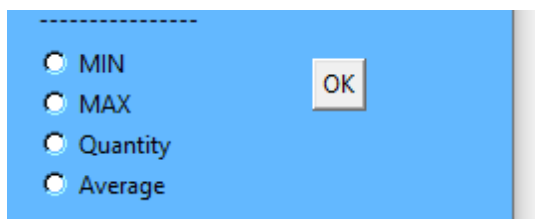


Input section for specifying start and end dates for filtering.

Date input format: 2022-12-01 [yyyy-mm-dd]

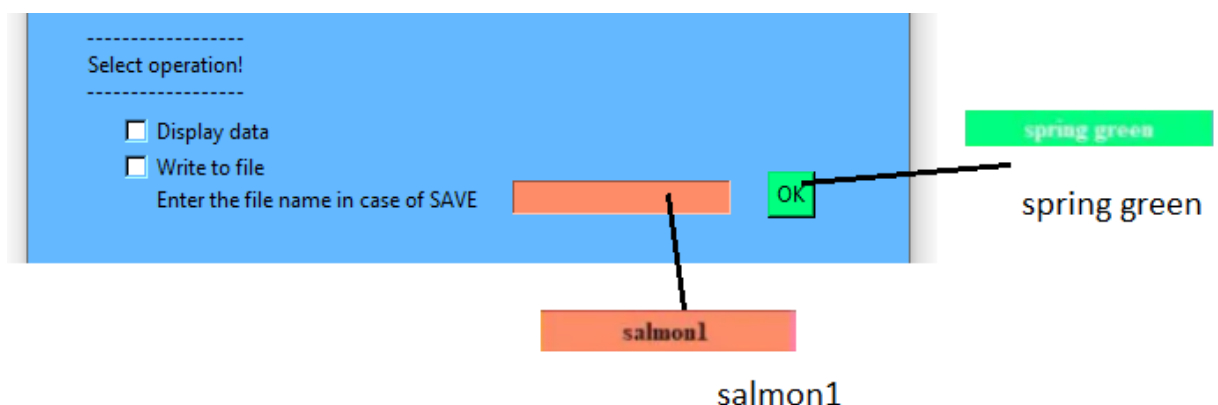
The values are stored when the OK button is pressed.

- Calculation configuration:



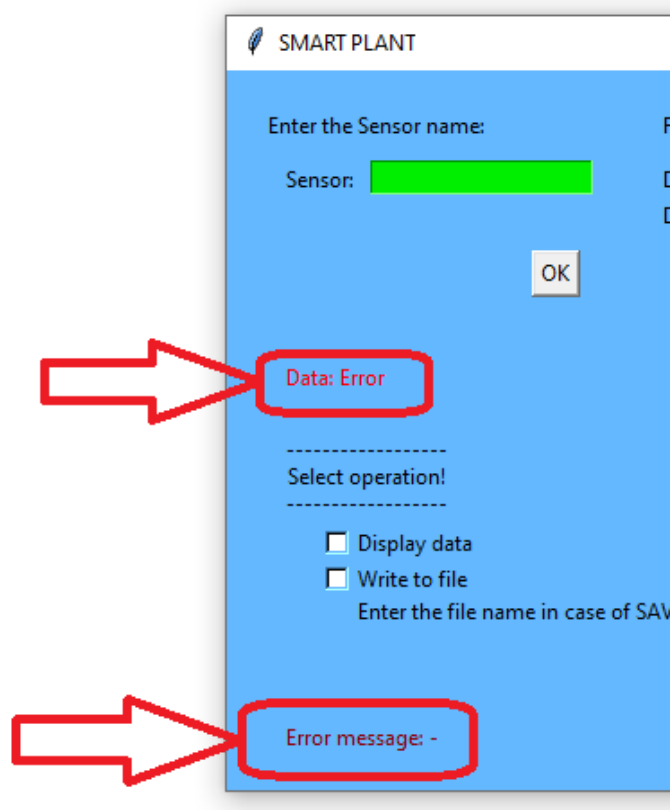
Minimum, maximum, average, quantity operations can be selected. Only one operation is allowed at a time. Quantity specifies the number of correct data packets (lines).

- Display / Write to file



Write the result to STDOUT and/or write it to the specified file when the OK button is pressed.

- Use basic error handling during file operations.  
Display relevant Error messages on the GUI.



Enter the Sensor name:

Sensor:

Filter and calculate:

Date min:

Date max:

OK

-----

☐ MIN

☐ MAX

☐ Quantity

☐ Average

OK

Data: Error

Select operation!

☐ Display data

☐ Write to file

Enter the file name in case of SAVE

OK

Error message: -

Enter the Sensor name:

Sensor:

Filter and calculate:

Date min:

Date max:

OK

-----

☐ MIN

☐ MAX

☐ Quantity

☐ Average

OK

Data: Error

Select operation!

☐ Display data

☐ Write to file

Enter the file name in case of SAVE

OK

Error message: -