

Written Assignment Guidelines

Course: Programming with Python (DLMDSPWP01)

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1. Objectives of Academic Writing

A written assignment should demonstrate the academic writing capabilities of the student. It acts as a confirmation that students are capable of selecting an academic topic, undertaking the relevant research, and using that research to support their own thoughts and insights.

2. Structure of a Written Assignment

The structure of the assignment should reflect a logical progression of main points and explanatory points. The text should be a coherent and cohesive whole, and follow a linear structure. There should be a logical integration of the main and explanatory points across the various sections, with clear transitions between them. Referring to a key argument in a previous paragraph, for example, can create connections between the points. The body of the assignment is composed of the core argument (around 70% of the assignment), and is preceded by an introduction (around 20%) and followed by a conclusion (around 10%).

2.1 Introduction

The introduction is the first paragraph of an assignment and should be treated as an integral part of the text. The introduction should succinctly but clearly convey the following points, which will then be elaborated upon in the body of the text:

- **Rationale for topic selection:** Why is the topic relevant and what issues, discussed in the body of the assignment, does it raise?
- **Thesis or argument:** What is the central claim? What does the assignment aim to examine or prove? This is a narrow focus area derived from the topic.
- **Topic boundaries and necessary definitions:** What is beyond the scope of the assignment? What is within range? Ensuring the topic is not too broad is key to writing a successful assignment.
- **Outline of the arguments within the assignment:** What can the reader expect in the body, and what structure does the assignment follow?

The introduction should be thought about early on in the planning process, even if it is written last. This helps the introduction to clearly cover the assignment's key arguments, and ensures a logical argumentation process within the assignment itself.

2.2 Body

This part of academic writing should peak, and maintain, interest through coherent and comprehensible argumentation. This is only possible if the assignment has a common thread that links each key point.

Good academic writing does not simply take any result or theoretical position and assume it to be true. Instead, it seeks to prove or disprove the result or position by supporting or countering it with the use of reliable sources and facts. If something is not taken to be common knowledge, then it must be explained and backed up with the use of a theoretically based argument. All assumptions, considerations, and arguments must be proven and discussed. Each argument should be as clear and as well structured as possible.

The topic sentence should be at the beginning of the paragraph with the supporting points clearly connected to it. The structure of individual paragraphs should loosely follow this framework:

- Clearly state the main point of the paragraph using a topic sentence.
- Explain the topic sentence and elaborate on it using supporting points.
- Conclude the argument in a way that leads the reader to the next point.

2.3 Conclusion

The conclusion should give the reader a final, overall impression of the assignment. It should not be a repetition of what was written in the assignment. This is only useful in a longer assignment, for example, a master's thesis. Instead, the conclusion should draw the arguments to a close. It should summarize the key arguments within the assignment and seek to conclude the thesis or main claim, and answer any questions that were raised. The conclusion can also include any follow-up questions or perspectives regarding the topic that could be further researched.

The conclusion should not include any new ideas or arguments, but rather should state the outcomes regarding the central claim or thesis. Also avoid inserting new quotations into the conclusion.

3. Formal Guidelines and Submission Requirements

3.1 Assignment Components

A written assignment is composed of the following sections:

- Title Page (with abstract, if applicable)
- Table of Contents
- List of Diagrams
- Table of Abbreviations
- Text, with an introduction, main body and conclusion
- List of Appendices
- Appendices
- Bibliography

3.2 Quotations and Footnotes

It is absolutely forbidden to use ideas, statements and/or facts that are not the writer's own, without attributing the source. This is plagiarism. Citations should follow the American Psychological Association (APA) style. For direct quotes used in the text, use the following citation format: author's last name, year of publication, and page number, all in parentheses (name, year, page). For example:

The role of Mephistopheles can be described as follows: "Man loves peace, and for this reason he needs an opponent of the same strength, that can motivate him in the face of life's perpetual difficulties" (Schmidt, 2004, p. 102). This makes clear that.....

Indirect quotes do not need page numbers, but do still need to include the author's last name and year of publication. While footnotes are not recommended by the APA style guide, if used they should be placed at the end of the corresponding page, and marked within the text by a superscript number¹.

¹ This is an example of how footnotes are used.

3.3 Bibliography

The bibliography is a mandatory part of every academic work. This is a record of the external sources and materials that have been used. The titles are listed in alphabetical order and the bibliography should always be at the end of the written assignment.

The references are formatted according to APA style (the 6th edition has been used here).

- **Book**

Last name, initials. (year). *Title: Subtitle*. Publisher.

Fisher, R., Ury, W. L., & Patton, B. (2011). *Getting to yes: Negotiating agreement without giving in* (3rd ed.). Penguin Books.

- **Article or Chapter in a Book**

Last name, initials., & last name, initials. (Year of publication). Title of chapter. In initials last name & initials. Editor (Eds.), *Title of book* (pages of chapter). Publisher. DOI if there is one.

Sutherland, F., & Smith, A. C. T. (2013). Leadership for the age of sustainability: A dualities approach to organizational change. In R. T. By & B. Burns (Eds.), *Organizational change, leadership and ethics: Leading organizations towards sustainability*. Routledge.

- **Article in a Journal**

Last name, initials., Last name, initials., & last name, initials. (Year). Title of article. *Title of Periodical*, volume number(issue number), pages. DOI if there is one.

Galbraith, J. R. (2012). The future of organization design. *Journal of Organization Design*, 1(1), 3–6.

- **Database**

The APA discourages including database information in bibliographies because of the broad availability of such resources. APA recommends the following if citing a database is necessary:

When citing a work from one of these databases or platforms, do not include the database or platform name in the reference list entry unless the work falls under one of the exceptions described next (databases with original, proprietary content and works of limited circulation).

- Likewise, do not include URLs from these academic research databases in reference list entries because these URLs will not resolve for readers.
- Instead of a database URL, include a DOI if the work has one.

(<https://apastyle.apa.org/style-grammar-guidelines/references/database-information>)

- **Chapter or Section of a web page**

Last name, initials., & last name, initials. (Date of publication). Title of article. In *Title of book or larger document* (chapter or section number). Retrieved from Full URL

Paiz, J.M., Angeli A., Wagner, J., Lawrick L., Moore K., Anderson M., Soderlund L., ... Keck R. (2013). Reference list: Basic rules. In *Perdue Online Writing Lab*. Retrieved from <https://owl.english.purdue.edu/owl/resource/560/05/>

- **Web Article**

Last name, initials. (Year, Month Day). Title of article. Title of Newspaper. Retrieved from full URL

Fagan, J. (2019, March 25). Nursing clinical brain. OER Commons. Retrieved from <https://www.oercommons.org/authoring/nursing-clinical-brain/view>

The Purdue Online Writing Lab suggests the following basic rules (amongst others) for bibliographies (Paiz et al., 2013):

- Use a hanging indent of one half inch for each reference, i.e. all lines after the first line are indented.
- Ensure the author's last name comes first, followed by initials. Use ellipses only after the sixth author, and list the last author's name.
- The bibliography should be alphabetized by last name of the first author of each work.
- Multiple works by the same author should be listed in chronological order.

For more information, visit <http://www.apastyle.org/index.aspx> or <https://owl.english.purdue.edu/owl/resource/560/1/>

3.4 Submission

Submit the research essay through the online platform **Turnitin**. The instructions for submitting your work can be found in a separate manual on myCampus. There you can also find out how you can view your grade directly on Turnitin after it's published on CARE. Please note that it is not possible to hand in your submission by email or any other means.

For questions about Turnitin please contact pruefungsamt@iubh-fernstudium.de.

3.5 Format

Length	12-15 Pages (Appendix, containing your entire source code is not limited)
Margins	Uniform margins of 2cm on top, bottom, left and right.
Font	Main body: Arial 11 pt; Headings Arial 12 pt
Line Spacing	1.5
Sentences	Justified; hyphenation
Footnotes	Arial 10 pt., Justified
Paragraphs	6 pt. spacing after line breaks
Sections and subsections	A maximum of 3 levels (1. Main heading, 1.1 Section, 1.1.1 Subheading)
	The preceding and following technicalities numbered with Roman numerals (I. List of abbreviations, II. List of illustrations, III. List of tables...)
	Do not underline; use " <i>italics</i> " sparingly to emphasize passages.
Anti-Plagiarism Pledge/Affidavit	<p>This pledge must be submitted electronically (via myCampus) before you can submit your assignment.</p> <p>Please refer to the corresponding guidelines in myCampus – Turnitin.</p>

3.6 Grading

The grading criteria and their corresponding weight are listed below. These are subdivided into text that concerns the human language part of the term paper and source code that concerns the programming language Python.

Grading Descriptors	Explanation	Weight
Introduction	Introduction, definition of topic, and thematic scope <i>Shown by chosen approach to solve the task (text)</i>	8%
Structure	Composition and structure <i>The structure reflects in classes, methods and attributes, the level of generalization in programming, as well as time and the composition in their combination (source code)</i>	16%
Reasoning	Quality of argument and research <i>Shown by the final functionality of the program's source code (source code)</i>	40%
Conclusion	Conclusion and recommendations <i>Clear scientifically written (text) discussion of the advantages, disadvantages and limitations of</i> <ul style="list-style-type: none"> - <i>chosen approach to solve the task with discussion of other possible approaches</i> - <i>program structure</i> - <i>modules and frameworks used</i> 	16%
Language	Linguistic expression and spelling (text)	10%
Layout	Neatness in formatting and correct citations (text)	10%

Take note of the criteria listed above during the planning and writing of your assignment.

4. Topic

The starting point for your term paper is the coursebook, the contents of which will serve as the basis for an in-depth examination of one of the following questions. You are expected to research and cite from sources corresponding to your chosen topic.

4.1 Description of the Task

You get (A) 4 training datasets and (B) one test dataset, as well as (C) datasets for 50 ideal functions. All data respectively consists of x-y-pairs of values.

Structure of all CSV-files provided:

X	Y
x1	y1
...	...

xn	yn
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Your task is to write a Python-program that uses training data to choose the four ideal functions which are the best fit out of the fifty provided (C) *.

- i) Afterwards, the program must use the test data provided (B) to determine for each and every x-y-pair of values whether or not they can be assigned to the four chosen ideal functions**; if so, the program also needs to execute the mapping and save it together with the deviation at hand
- ii) All data must be visualized logically
- iii) Where possible, create/ compile suitable unit-test

* The criterion for choosing the ideal functions for the training function is how they minimize the sum of all y-deviations squared (Least-Square)

** The criterion for mapping the individual test case to the four ideal functions is that the existing maximum deviation of the calculated regression does not exceed the largest deviation between training dataset (A) and the ideal function (C) chosen for it by more than factor $\sqrt{2}$

In order to give proof of your skills in Python related to this course, you need to adhere to certain criteria when solving the exercise; these criteria are subsequently described under 'Details.'

4.2 Details

You are given four training datasets in the form of csv-files. Your Python program needs to be able to independently compile a SQLite database (file) ideally via sqlalchemy and load the training data into a single five-column spreadsheet / table in the file. Its first column depicts the x-values of all functions. Table 1, at the end of this subsection, shows you which structure your table is expected to have. The fifty ideal functions, which are also provided via a CSV-file, must be loaded into another table. Likewise, the first column depicts the x-values, meaning there will be 51 columns overall. Table 2, at end of this subsection, schematically describes what structure is expected.

After the training data and the ideal functions have been loaded into the database, the test data (B) must be loaded line-by-line from another CSV-file and – if it complies with the compiling criterion – matched to one of the four functions chosen under i (subsection above). Afterwards, the results need to be saved into another four-column-table in the SQLite database. In accordance with table 3 at end of this subsection, this table contains four columns with x- and y-values as well as the corresponding chosen ideal function and the related deviation.

Finally, the training data, the test data, the chosen ideal functions as well as the corresponding / assigned datasets are visualized under an appropriately chosen representation of the deviation.

Please create a Python-program which also fulfills the following criteria:

Its design is sensibly object-oriented

It includes at least one inheritance

It includes standard- und user-defined exception handlings

For logical reasons, it makes use of Pandas' packages as well as data visualization via Bokeh, sqlalchemy, as well as others

Write unit-tests for all useful elements

Your code needs to be documented in its entirety and also include Documentation Strings, known as "docstrings"

Table 1: The training data's database table:

X	Y1 (training func)	Y2(training func)	Y3(training func)	Y4(training func)
x1	y11	y21	y31	y41
...
xn	y1n	y2n	y3n	y4n

Table 2: The ideal functions' database table:

X	Y1 (ideal func)	Y2 (ideal func)	...	Ym (ideal func)	...	Y50 (ideal func)
x1	y11	y21	...	ym1	...	y50_1
...
xn	y1n	y2n	...	ymn	...	y50_n

The database table of the test-data, with mapping and y-deviation

X (test func)	Y (test func)	Delta Y (test func)	No. of ideal func
x1	y11	y21	N1
...
xn	y1n	y2n	y3n

4.3 Additional Task

Assume that your successfully created project is on the Version Control System Git and has a Branch called develop. On this Branch, all operations of the developer team are combined.

Write the Git-commands necessary to clone the branch and? develop on your local PC. Imagine that you have added a new function. Write all necessary Git-commands to introduce this project to the team's develop Branch.

Please note: You need the commands for commit, push. Afterwards, you would make a Pull-request and your contribution would be added "merged" to the develop Branch after one or several of your team has reviewed your changes.

4.4 Remarks

The Dataset for this task will be made available on request for each particular student. Therefore, a ticket for the tutor should be opened, whereupon the access to the data will be granted. A copy will be sent to the responsible persons – thus a later manipulation by the students is prevented.

Your entire source code is expected to be contained in the appendix of your written assignment, so that we are able to test your entire program, including the outputs. Your input data is not required.

The aim is to fully reconstruct your work, your decisions and your assessment of the task result through your assignment.

5. Tutorial Support

Students have the option to make use of any one of several opportunities to get support for their written assignment with the course tutor. Taking advantage of these opportunities is the responsibility of the student and the use of these services is voluntary. The tutor for the course offers regular online tutorials (dates posted on myCampus). It is also possible to contact the tutor via email, especially with formal questions. Please note: a review of outlines and aspects of the assignment is not intended here, since the student's ability to work independently is part of the evaluation and counts as a part of the overall assessment.

6. Suggested Reading for Academic Writing

Turabian, K. L. (2013). A manual for writers of research papers, theses, and dissertations. University of Chicago Press.

Swales, J. M., & Feak, C. R. (2012). Academic writing for graduate students, essential tasks and skills. University of Michigan Press.

Bailey, S. (2015). Academic writing for international students of business (2nd Revised ed.). Routledge.

7. Bibliography

Paiz, J.M., Angeli A., Wagner, J., Lawrick L., Moore K., Anderson M., Soderlund L., ... Keck R. (2013). Reference List: Basic Rules. In Purdue Online Writing Lab. Retrieved from <https://owl.english.purdue.edu/owl/resource/560/05/>

Good luck with your written assignment!