


Lab #3: Markdown

3.1. Objective

Learn how to write reports using the lightweight Markdown markup language.

3.2. Preliminary information

3.2.1. Basics about Markdown

To create a title, use the sign (#), for example: 

```
- # This is heading 1
2 ## This is heading 2
3 ### This is heading 3
4 #### This is heading 4
```

To make text bold, enclose it in double asterisks:

```
1 This text is bold.
```

To make text italic, enclose it in single asterisks:

```
1 This text is italic.
```

To make text bold and italic, surround it with triple asterisks:

```
- This is text is both bold and italic.
```

Quote blocks are created using the > symbol:

```
- > The drought had lasted now for ten million years, and the reign of
  > the terrible lizards had long since ended. Here on the Equator, in the continent which would
  > one day be known as Africa, the battle for existence had reached a new climax of ferocity,
  > and the victor was not yet in sight. In this barren and desiccated land, only the small or the
  > swift or the fierce could flourish, or even hope to survive.
  >
  >
```

An unordered (bulleted) list can be formatted using stars
daughter or dash:

```
- List item 1
2 - List item 2
3 - List item 3
```

To nest one list within another, indent the elements of the child list:

- List item 1
 - List item A
 - List item B
- List item 2

An ordered list can be formatted with the appropriate numbers:

1. First instruction
1. Second instruction
1. Third instruction

To nest one list within another, indent the elements of the child list:

1. First instruction
 1. Sub instruction
 1. Sub instruction
1. Second instruction

The Markdown syntax for an inline link consists of a [link text] part , represented by the text of the hyperlink, and the part (file-name.md) is the URL or file name, which is referenced:

1 [link text](filename.md)

Markdown supports both embedding code snippets in a sentence and placement between offers in the form of separate fenced blocks. Fenced code blocks are an easy way to highlight syntax for code snippets. General format of fenced code blocks:

```
```
language
your code goes here
```
```

Superscripts and subscripts:

2

written as

1H~ 2 ~O

2^{ten}

written as

1 2^{10^6}

Intrertext formulas are made similar to LaTeX formulas. For example, the formula $\sin^2(\) + \cos^2(\) = 1$ will be written as

```
1 $\sin^2(x) + \cos^2(x) = 1$
```

Off formulas:

$$\sin^2(x) + \cos^2(x) = 1$$

{#eq:q:sin2+cos2} with reference in text "See formula ([~@eq:q:sin2+cos2])." records looks like

```
-
2 $\sin^2(x) + \cos^2(x) = 1$ {#eq:q:sin2+cos2}
3
4
5 See formula ([~@eq:q:sin2+cos2]).
```

3.2.2. Handling Markdown Files

We will use Pandoc <https://pandoc.org/> to process Markdown files . Specifically, we need the pandoc program ,

[pandoc-citeproc https://github.com/jgm/pandoc/releases](https://github.com/jgm/pandoc/releases), [pandoc-crossref https://github.com/lierdakil/pandoc-crossref/releases](https://github.com/lierdakil/pandoc-crossref/releases).

You can convert the README.md file as follows:

```
1 pandoc README.md -o README.pdf
```

or so

```
1 pandoc README.md -o README.docx
```

You can use the following Makefile

```
1 FILES = $(patsubst %.md, %.docx, $(wildcard *.md))
2 FILES += $(patsubst %.md, %.pdf, $(wildcard *.md))
3
4 LATEX_FORMAT =
5
6 FILTER =-- filter pandoc-crossref
7
8 %.docx: %.md
9     -pandoc "$<" $(FILTER) -o "$@"
10
11 %.pdf: %.md
12     -pandoc "$<" $(LATEX_FORMAT) $(FILTER) -o "$@"
13
14 all: $(FILES)
15     @echo $(FILES)
16
17 clean:
18     -rm $(FILES) *~
```

3.2.3. Preparation of a report on laboratory work

Laboratory work is a small research work, which should be drawn up according to all approved requirements. When preparing a report on laboratory work, you will master a number of important elements that will later be useful to you when writing term papers and dissertations.

3.2.3.1. Report Structure

According to GOST 7.32-2001, any research work must be contain the following elements:

- title page; - abstract; - introduction; - the main part; - conclusion.

GOST also recommends that the following elements be included in the work:

- list of performers; - content; - normative references; - definitions; - designations and abbreviations; - list of sources used; - applications.

If you are carrying out complex work that is carried out in several stages, then you may you need to include part or all of the elements of the second list.

3.2.3.2. Contents of the main elements of the report

- Title page. The first sheet of work is drawn up strictly according to the model, which is usually given in teaching aids for your subject. It not only requires specifying such elements as the name of the educational institution, type of work and information about the performer, but also arrange them in strict accordance with the standard mi.
- Abstract. The abstract is actually a summary of your entire report and contains a number of statistical information. It must indicate the number of parts, pages of work, illustrations, applications, tables, used literary sources and applications. Here is a list of key words of the work and the actual text of the abstract. The latter implies the main elements of the work from the set goals to the results and recommendations for their implementation. In the practice of universities, the abstract is usually not included in the reports on laboratory work. - Introduction. In the introduction of a typical laboratory work, the goals of the research being conducted and the tasks that will help achieve the goals are usually prescribed. At the same time, there are works in which students become real pioneers. Have you ever experienced a feeling of extreme curiosity and impatience while doing lab work? Feel that in just a couple of minutes you will find the answer to a question that no one has ever found an answer to? It is for such studies that a detailed introduction is written with proof of the relevance and novelty of the topic under study. In order to really conduct research in an area in which, as they say, no human foot has yet set foot, in the introduction you will need to assess the current state of the problem under consideration and justify the need to solve it.

- The main part. Since different universities and disciplines have their own subtleties of laboratory work, the content of the main part is described in detail in the relevant manuals. It is important that this section of the work reflects its essence, describes the methodology and results of the work done. The main part contains the following elements:
 - the purpose of the study; – tasks, the implementation of which will help achieve the goals; - a workflow that describes the actions performed; - other sections provided for by the methodological materials on the studied discipline.
- Conclusion. In this part of the work, you will need to draw conclusions from the results obtained during the laboratory work. To do this, evaluate how well the tasks have been completed. Complex works may contain other elements, for example, recommendations for further application of the results of the work carried out.

3.3. Exercise

- Report the previous lab in Markdown format. – As a report, please provide reports in 3 formats: pdf, docx and md (archived, since it should contain screenshots, Makefile, etc.)

3.4. Report content

The report must include:

1. A title page indicating the number of the laboratory work and the student's full name.
2. Formulation of the task of the work.
3. Description of the results of the task:
 - screenshots (screen shots) that record the performance of laboratory work;
 - answers to questions;
4. Conclusions consistent with the task of the work.