Computer Graphics 2021
Exercise 6: Documentation and Presentation (Project 1)

Prof. Dr. Martin Hering-Bertram
Hochschule Bremen

Problem 1: Mesh Construction

Construct your own triangle meshes using, for example Blender[1] or Cinema4D[2]. Design two or three meshes and export them as OBJs. Adjust your OBJ-parser to read in these meshes, correctly. Lines with additional keywords, for example defining normal vectors, etc. may be skipped. Generate screen shots showing the original mesh rendered as lines together with the resulting subdivision surface.

Problem 2: Documentation in LaTeX

Prepare a LaTeX documentation for the entire project (example in Aulis). The documentation should be **as short as possible**, but contain all details necessary to convey what you have done within the project, such that a skilled student would be able to reproduce your results from your paper and from the references contained. The documentation may be composed of the following information:

- Abstract
- Motivation / Introduction
- Fundamentals / Related Work
- Algorithms
- Implementation
- Numerical Examples
- Conclusions and Future Work
- Acknowledgements
- References

The abstract is a short paragraph summarizing the contents and results of your paper. It does not contain an introduction. Its content is similar to the conclusions section. It is a good idea to write the abstract after finishing the paper.

The first section contains a brief motivation or introduction, for example stating what subdivision is and where it can be applied. At the end of this section, you can summarize your paper (at most one sentence for each section; this replaces a table of contents in short papers).

You can merge Fundamentals and Algorithms in one section. Important is to include references to all relevant scientific papers (use \cite and the bibliography environment). You find most Computer Science papers in the DBLP Computer Science Library Project[3]. LaTeX examples for correct citing are also contained in the DBLP. Another way to find papers is Google Scholar[4]. For example, you can try to locate the paper by Nira Dyn et al., 1987 containing the interpolating subdivision. Some papers can be accessed via the SUUB Library System[5] or by using your HSB login. In cases where this does not

[1] https://www.blender.org/download/
[2] https://www.maxon.net/de/try/
[3] https://dblp.org/
[4] https://scholar.google.de/
[5] https://www.suub.uni-bremen.de/

work, you can try to find a preprint of the paper elsewhere in the web, for example on the author's web page. Please, list only scientific work within the bibliography. Online sources like web links may be listed as footnotes, but may not appear as references.

When describing the algorithms for subdivision curves and surfaces, please also use a few numbered equations. The numbers facilitate that other people easily can comment on your paper.

The section on implementation contains details of your own development. You can provide code examples using the listing environment. Do not use screen shots for code. Explain these listings also within the text. Select relevant examples, do not print your entire code.

The section on examples contains your own surfaces. Here, you can also print a table with numbers, for example how many vertices and triangles are contained in the individual levels of subdivision. Please, also include a brief discussion of your examples and results.

Conclusions are used to summarize your work and outline ideas for future research. The acknowledgements should contain all sources that you have used (APIs, libraries, code from other sources, help from other people, etc.).

All tables and figures should contain a numbered caption containing self-explaining text (can be two or three lines). Please, also refer to each figure from the text using \ref . This is useful, since LaTeX places figures and other floating objects mostly on top of a page.

Grading: The grading of your project is based on the quality of the documentation and of your C++ source code. The code may be authentic (authors listed in each module header), well documented and structured. All assignments of this project should be contained. For uploading multiple files, the zip function of Aulis may be used (do not upload archives).

Upload a PDF documentation generated with LaTeX and the well-documented source code in AULIS by May 28th. Present your Surface Design and Implementation in the laboratory on May 31st (10 min. each group) Focus on the most important details that are unique for your project.