# Supervisor's statement of a final thesis

**Czech Technical University in Prague** **Faculty of Information Technology**

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| **Student:** | Šimon Hrabec |
| **Supervisor:** | Patrick Sanan, Ph.D. |
| **Thesis title:** | Multi-level, Parallel Algorithms for Shape Interpolation on Modern Architectures |
| **Branch of the study:** | Computer Science |

**Date:** 9. 1. 2018

| *Evaluation criterion:* | *The evaluation scale: 1 to 5.* |
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| **1. Difficulty and other comments on the assignment** | ***1 = extremely challenging assignment,***<br>*2 = rather difficult assignment,*<br>*3 = assignment of average difficulty,*<br>*4 = easier, but still sufficient assignment,*<br>*5 = insufficient assignment* |

*Criteria description:*
*Characterize this final thesis in detail and its relationships to previous or current projects. Comment what is difficult about this thesis (in case of a more difficult thesis, you may overlook some shortcomings that you would not in case of an easy assignment, and on the contrary, with an easy assignment those shortcomings should be evaluated more strictly.)*

*Comments:*
This was a very challenging assignment. It involved reviewing and comprehending research-level literature on shape interpolation and implementing and extending algorithms in multiple environments/languages.

| *Evaluation criterion:* | *The evaluation scale: 1 to 4.* |
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| **2. Fulfilment of the assignment** | ***1 = assignment fulfilled,***<br>*2 = assignment fulfilled with minor objections,*<br>*3 = assignment fulfilled with major objections,*<br>*4 = assignment not fulfilled* |

*Criteria description:*
Assess whether the thesis meets the assignment statement. In Comments indicate parts of the assignment that have not been fulfilled, completely or partially, or extensions of the thesis beyond the original assignment. If the assignment was not completely fulfilled, try to assess the importance, impact, and possibly also the reason of the insufficiencies.

*Comments:*
The assignment statement has been satisfied.

| *Evaluation criterion:* | *The evaluation scale: 1 to 4.* |
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| **3. Size of the main written part** | ***1 = meets the criteria,***<br>*2 = meets the criteria with minor objections,*<br>*3 = meets the criteria with major objections,*<br>*4 = does not meet the criteria* |

*Criteria description:*
Evaluate the adequacy of the extent of the final thesis, considering its content and the size of the written part, i.e. that all parts of the thesis are rich on information and the text does not contain unnecessary parts.

*Comments:*
The main written part is perhaps on the short side, but does meet all the criteria.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **4. Factual and logical level of the thesis** | *90 (A)* |

*Criteria description:*
Assess whether the thesis is correct as to the facts or if there are factual errors and inaccuracies. Evaluate further the logical structure of the thesis, links among the chapters, and the comprehensibility of the text for a reader.

*Comments:*
The review of the relevant background is clear and nicely sets up the problem to be solved computationally. It is very clear what algorithms were chosen and which software tools were used to implement them. The chapter structure is good and the reader can easily follow the exposition.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **5. Formal level of the thesis** | *70 (C)* |

*Criteria description:*
Assess the correctness of formalisms used in the thesis, the typographical and linguistic aspect s, see Dean's Directive No. 26/2017, Article 3.

*Comments:*
There are many minor usage errors, typos, and instances of sloppy formatting. The overall presentation is logical and clear, however, and use of both mathematical and software-related terms is clear. Illustrations and code snippets could use a bit more effort or be extended, and tables are not very thorough.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **6. Bibliography** | *80 (B)* |

*Criteria description:*
Evaluate the student's activity in acquisition and use of studying materials in his thesis. Characterize the choice of the sources. Discuss whether the student used all relevant sources, or whether he tried to solve problems that were already solved. Verify that all elements taken from other sources are properly differentiated from his own results and contributions. Comment if there was a possible violation of the citation ethics and if the bibliographical references are complete and in compliance with citation standards.

*Comments:*
The choice of references is good, extending those provided to include additional relevant works. Attention was paid to reference existing multi-level approaches. Formatting and completeness of entries is somewhat inconsistent. Good effort is made to cite both literature and software. Citation ethics are followed.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **7. Evaluation of results, publication outputs and awards** | *70 (C)* |

*Criteria description:*
Comment on the achieved level of major results of the thesis and indicate whether the main results of the thesis extend published state-of-the-art results and/or bring completely new findings. Assess the quality and functionality of hardware or software solutions. Alternatively, evaluate whether the software or source code that was not created by the student himself was used in accordance with the license terms and copyright. Comment on possible publication output or awards related to the thesis.

*Comments:*
The results are interesting and promising but would require significant extension and better presentation to provide a useful publication. Additional scaling studies (and better presentation of the results of these) could give an idea of the benefit of adding a multi-level approach in a GPGPU-enabled environment, which would allow for possible application of these methods in the sorts of real-time mobile environments mentioned in the introduction. Existing open-source software was used appropriately and admirably coupled into the environments used to generate the results.

| *Evaluation criterion:* | *No evaluation scale.* |
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| **8. Applicability of the results** | |

*Criteria description:*
Indicate the potential of using the results of the thesis in practice.

*Comments:*
There is great possibility for using these results in practice, once they are extended somewhat. Being able to assess the practical performance of working, realtime, hardware-accelerated implementations of shape interpolation algorithms is an important step in bringing them into usage in the market.

| *Evaluation criterion:* | *The evaluation scale: 1 to 5.* |
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| **9. Activity and self-reliance of the student** | *9a:*<br>*1 = excellent activity,*<br>*2 = very good activity,*<br>***3 = average activity,***<br>*4 = weaker, but still sufficient activity,*<br>*5 = insufficient activity*<br>*9b:*<br>*1 = excellent self-reliance,*<br>***2 = very good self-reliance,***<br>*3 = average self-reliance,*<br>*4 = weaker, but still sufficient self-reliance,*<br>*5 = insufficient self-reliance.* |

*Criteria description:*
Review student's activity while working on this final thesis, student's punctuality when meeting the deadlines and consulting continuously and also, student's preparedness for these consultations. Furthermore, review student's independency.

*Comments:*
Activity was sporadic and occasionally unfocused, but dedicated. Independence was admirable in researching and mastering new topics and software tools, and somewhat less so in meeting intermediate deadlines and writing up intermediate results.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **10. The overall evaluation** | *80 (B)* |

*Criteria description:*
Summarize the parts of the thesis that had major impact on your evaluation. The overall evaluation **does not** have to be the arithmetic mean or any other formula with the values from the previous evaluation criteria 1 to 9.

*Comments:*
A good attack on a challenging assignment. This work can and should be extended to better showcase the large amount of software development work performed. The background section of the thesis does an excellent job of presenting the algorithmic basis for the work. The results section would ideally be longer and more thorough, better showcasing the scalability of the implementations and offering a view on the usefulness of GPU-accelerated kernels. The concluding sections are thoughtful and show a good understanding of the numerous challenges to be faced.

Signature of the supervisor: