**FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE**

Supervisor's statement of a final thesis

Supervisor:　　　　　　　　Ing. Jaroslav Šmolík
Student:　　　　　　　　　　Bc. Tat Dat Duong
Thesis title:　　　　　　　　Math expression evaluator for literal types in TypeScript
Branch / specialization:　Web Engineering
Created on:　　　　　　　　5 June 2023

Evaluation criteria

1. Fulfillment of the assignment

▸ [1] **assignment fulfilled**
　[2] assignment fulfilled with minor objections
　[3] assignment fulfilled with major objections
　[4] assignment not fulfilled

The thesis fulfills the given assignment beyond expectations and describes and implements functions that may not be considered necessary. All of this is done without compromising the quality of the output, both in terms of the text and the attachments.

2. Main written part   95 / 100 (A)

The thesis consists of 56 content pages, and all of them are consistently rich in content. There are no filler sections in the thesis. In this context, the length is more than sufficient.

The thesis is logically structured, and key decisions (such as the choice of internal number representation) are thoroughly evaluated in contrast to alternative approaches. The thesis does not assume any knowledge of TypeScript, and all constructs are carefully described and explained. The thesis guides the reader from basic building blocks to very complex metaprogramming constructs.

The thesis primarily cites online resources, which is expected given the nature of the assignment. The source code examples are not flawless (e.g., Listing 2.1), but these are rare and minor defects that a careful reader will hardly notice and they do not affect the understanding of the text or its overall exceptional quality.

The text is very well-structured and supplemented with illustrative attachments, which help enhance understanding. The thesis excels in terms of grammar and style.

3. Non-written part, attachments
$100_{/100}$ (A)

The design and implementation of the system components (lexer, parser, square root, etc.) demonstrate the author's excellent understanding of the subject matter and the ability to apply various skills in the development of a non-standard metaprogramming language. The appropriate selection of testing tools, API documentation, and the publication of a usable package are also worth mentioning.

4. Evaluation of results, publication outputs and awards
$95_{/100}$ (A)

Although the outputs may not be particularly useful for conventional TypeScript application development but for rare cases, as mentioned in the thesis, the final library provides the ultimate mathematical module with potential application in other metaprogramming systems as well as in the creation of complex generic types. Such types find utility, for example, in the development of TypeScript libraries and frameworks. Therefore, despite the initial impression, this is certainly not purely theoretical work, and its applicability is confirmed by similar popular metaprogramming packages.

5. Activity of the student

▸ [1] **excellent activity**
[2] very good activity
[3] average activity
[4] weaker, but still sufficient activity
[5] insufficient activity

The student organized meetings, managed the agenda, and was always prepared for consultations.

6. Self-reliance of the student

▸ [1] **excellent self-reliance**
[2] very good self-reliance
[3] average self-reliance
[4] weaker, but still sufficient self-reliance
[5] insufficient self-reliance

The student was extremely independent and solved even complex problems entirely on his own.

The overall evaluation
$98_{/100}$ (A)

I evaluate the thesis as excellent and recommend it for defense. The student has demonstrated not only excellent activity and independence but also extraordinary competence in applying knowledge and experience gained during his studies and in his professional field. The thesis is outstanding, both in terms of theory and implementation. I recommend considering the submission of this thesis for an award.

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

Activity of the student

From your experience with the course of the work on the thesis and its outcome, review the student's activity while working on the thesis, his/her punctuality when meeting the deadlines and whether he/she consulted you as he/she went along and also, whether he/she was well prepared for these consultations.

Self-reliance of the student

From your experience with the course of the work on the thesis and its outcome, assess the student's ability to develop independent creative work.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.