BRNO UNIVERSITY OF TECHNOLOGY
FACULTY OF INFORMATION TECHNOLOGY

Master's Thesis Assignment

155757

Institut:	Department of Intelligent Systems (DITS)
Student:	**Chocholatý David, Bc.**
Programme:	Information Technology and Artificial Intelligence
Specialization:	Mathematical Methods
Title:	**Transducers in Automata Library Mata**
Category:	Algorithms and Data Structures
Academic year:	2023/24

Assignment:

1. Familiarize yourself with the finite automata library Mata [1], the work [3], and string solving methods using finite transducers (such methods for solving replaceAll constraints).
2. Design a representation of finite transducers and an appropriate api for the Mata library that can be used to implement transducer based string solving techniques in the string solver Noodler.
3. Implement the proposal in the Mata library and compare the performance of the implementation with available alternatives.
4. Outline a way to extend the string constraint solving algorithm [3] to support relational constraints implemented by finite transducers.

Literature:

1. Mata library. https://github.com/VeriFIT/mata
2. Tomás Fiedor, Lukás Holík, Martin Hruska, Adam Rogalewicz, Juraj Síc, Pavol Vargovcík: Reasoning About Regular Properties: A Comparative Study. CADE 2023: 286-306
3. Frantisek Blahoudek, Yu-Fang Chen, David Chocholatý, Vojtech Havlena, Lukás Holík, Ondrej Lengál, Juraj Síc: Word Equations in Synergy with Regular Constraints. FM 2023: 403-423

Requirements for the semestral defence:
1, 2

Detailed formal requirements can be found at https://www.fit.vut.cz/study/theses/

Supervisor:	**Holík Lukáš, doc. Mgr., Ph.D.**
Head of Department:	Hanáček Petr, doc. Dr. Ing.
Beginning of work:	1.11.2023
Submission deadline:	17.5.2024
Approval date:	6.11.2023