

**MUNI**  
**LAW**

# **Formalization of legal texts using the NAI tool**

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# Outline

1. Theoretical part: what is the required knowledge to use the NAI tool?
2. Practical part: how to use the NAI tool?

# What?

User: provides interpretation of the text, defines the entities and logical structure

Tool: provides background for automated reasoning based on the interpreted facts that are inserted by user

# What?

User: provides human interpretation of text, defines the entities and logical structure

Tool: provides background for automatic reasoning based on the interpreted facts that are inserted by user

AND tool is not dependent on a language of legal text!

# Legal text

- The language of a legal text is different from ordinary language
- Terms bear different meanings
- Source of ambiguities, semantic indeterminacy and vagueness
- Follows some logical rules

# Legal text and deontic logic

- **Term**
- Any legal text (word or proposition), constant
- **Connective**
- Bears information about concept
- Obligation („*it is obligatory that*“)
- Permission („*it is permitted that*“)
- Conjunction, Disjunction, Negation, Equivalence etc...
- **NOT** interpretation and unique meanings of terms

# Connectives in legal text

- Negation
- Or
- And
- Definitional If and Definitonal Only If
- Obligation, Obligation If and Obligation Only If
- Permission, Permission If and Permission Only If
- Forbidden, Forbidden If and Forbidden Only If
- Ideally
- Equivalence

# Connectives - Negation

- Negation of a term - „*Not A*“
- Example:
- Regulation No 593/2008 on the law applicable to contractual obligations (Rome I):
- Art. 4 par. 1: „*To the extent that **the law applicable to the contract has not been chosen in accordance with Article 3** and without prejudice to Articles 5 to 8, the law governing the contract shall be determined as follows.*“

# Connectives - Or

- Disjunction of terms – „A Or B“
- Example:
- Regulation No 593/2008 on the law applicable to contractual obligations (Rome I):
- Art. 3 par. 1: „*The choice shall be made **expressly or clearly demonstrated by the terms of the contract or the circumstances of the case.***“

# Connectives - And

- Conjunction of terms – „*A And B*“
- Example:
- Regulation No 593/2008 on the law applicable to contractual obligations (Rome I):
- Art. 4 par. 1 a): „ *To the extent that **the law applicable to the contract has not been chosen in accordance with Article 3** and without prejudice to Articles 5 to 8, the law governing the contract shall be determined as follows: **a contract for the sale of goods** shall be governed by the law of the country where the seller has his habitual residence.*“

# Connectives - Definitional

- Definitional If – „*If A Then B*“
- Definitional Only If – „*A Only If B*“
- Example:
- „*If it rains then it is wet outside.*“

# Connectives - Permission

- Permission – „*A can (or may) be the case*“
- Permission If – „*If A then B can be the case*“
- Permission Only If – „*A can be the case only if B*“
- Example:
- United Nations Convention on Contracts for the International Sale of Goods
- Art. 45 par. 1: „*If the seller fails to perform any of his obligations under the contract or this Convention, **the buyer may**: (a) exercise the rights provided in articles 46 to 52; (b) claim damages as provided in articles 74 to 77.*“

# Connectives - Forbidden

- Forbidden – „*Term A cannot be the case*“
- Forbidden If – „*If A then B cannot be the case*“
- Forbidden Only If – „*A cannot be the case only if B*“
- Example:
- „*It is forbidden to drive a car if a driver is less than 18 years old.*“

# Connectives - Ideally

- „*A holds in all normatively ideal circumstances*“
- Condition that the legal text (regulation) assumes as ideal situation if met.
- If not, subsequent (not ideal) conditions can be triggered.
- **Example:**
- United Nations Convention on Contracts for the International Sale of Goods
- Art. 30 : „*The seller must deliver the goods, hand over any documents relating to them and transfer the property in the goods, as required by the contract and this Convention.*“

# Connectives - Equivalence

- Equivalence of terms: „*A If and Only If B*“
- Example:
- Regulation No 593/2008 on the law applicable to contractual obligations (Rome I):
- Art. 3 par. 1: „ *A contract shall be governed by the law chosen by the parties. The choice shall be made expressly or clearly demonstrated by the terms of the contract or the circumstances of the case.* “

# Connectives - Obligation

- Obligation – „*A ought to be the case*“
- Obligation If – „*A ought to be the case if B*“
- Obligation Only If – „*A only if B ought to be the case*“
- Example:
  - Regulation No 593/2008 on the law applicable to contractual obligations (Rome I):
  - Art. 3 par. 1: „*A contract shall be governed by the law chosen by the parties.*“

# NAI tool

- <https://nai.uni.lu>
- **Legislations**
  - Any normative legal text (whole/part)
- **Queries**
  - Relating to the legal text
- **Answers/Goals**
  - It does/does not logically follow from the legislation and the assumptions.
  - Binary
- Trial account:
  - [tereza.novotna@mail.muni.cz](mailto:tereza.novotna@mail.muni.cz)
  - Password: tutorial

# Legislation

- Annotation – text editor
  - Formalization – automatically formalized text
  - Vocabulary – the list of terms used
  - Advanced – manually formalized text
- 
- Important buttons
    - Save
    - Edit title

# Using annotations for formalization

- Marking parts of the text with the mouse and labeling the parts as terms or connectives
- Tool automatically transforms annotations to logical formulas
- User can execute queries over formulas

# Annotation of legislation

- The full text of any normative legal document or any other set of rules
- Terms
- Connectives – defining the correct connective
  - obligation, permission, definition, equation, disjunction, conjunction
- Clear

# Formalization of legislation

- Automatically formalized text according to marked terms and connectives (formula)
- Running consistency check
  - Logical consistency/inconsistency
  - For both Formalization and Advanced at the same time
- Description
- Formula

# Obligation- example

- Regulation No 593/2008 on the law applicable to contractual obligations (Rome I):
- *„A contract shall be governed by the law chosen by the parties.“*
- Terms:
  - a contract
  - the law chosen by the parties
- Connective:
  - shall be governed
- Identification of concept: obligation

# Formalization of obligation

- Defining terms, connectives and concepts in text:

## Art. 3 Freedom of choice

1) A **contract** shall be governed by **the law chosen by the parties**.

- Formalization and adding variables:

*A contract shall be governed by the law chosen by the parties*

`(validChoice(X,Y) 0> contract(X,Y))`

- In every case if there is a particular choice, the contract must be governed by the law chosen.

# Vocabulary

- List of used labels for terms in legal text
- Toggle editing

# Advanced formalization

- Manual formalization of text
- In the case of implied relations between parts of the text
- Example: condition for some obligation to be triggered can be in different provision/part of legal text.
- Rome I. Regulation art. 3 example:
  - The choice of law to apply on the contract must fulfill conditions in second sentence (expressed or demonstrated).
  - Relation between first and second sentence?
- Running consistency check – with Formalization at the same time
- Toggle editing

# Query

- Executing queries over formalized normative legal text
  - Important button: Choose legislation
  - Save, Edit
  - Assumptions
  - Goal
- 
- Toggle editing
  - Running consistency check

# Query

- Parties chose the applicable law for a contract and it is the Czech law. What law should a contract be governed by?
- Defining terms:

Parties chose the applicable law for a contract and it is the Czech law . What law should a contract be governed by?

- Answer:

Contract should be governed by the Czech law .

- In every case if there is a choice, it is obligated that the contract is governed by the law chosen.

# **Interactive session**

**<https://tinyurl.com/naitutorial>**