

Meiji Gakuin University, Tokyo

Legal Norm and Legal System in **Pure Theory of Law** and in **Logical Jurisprudence**

Friedrich Lachmayer

9th July 2007

based on:

The Structure of Legal System - in Terms of Logical Jurisprudence

22th of February 2007
IRIS 2007, Salzburg, Austria
by Hajime Yoshino
Meiji Gakuin University

based on:

Logical Structure of Change of Legal Relation and its Representation in Legal Knowledge Base System

June 4 – 8, 2007, Stanford, California

11th International Conference on

Artificial Intelligence and Law

by Hajime Yoshino

Meiji Gakuin University

based on:

Tractatus Logico-Juridicus (1)

by Hajime Yoshino

1.

Introduction:

Pattern of Visualization

Metalevel

Societal Institutions
State, Law, Legal Science

Societal Stage

2.

*Historical Situation
of Hans Kelsen*

Austrian Monarchy
→ 1918

Societal Stage

Austrian Monarchy
→ 1918

Kelsen
ao. Professor

Societal Stage

„Justice“
„Natural Law“

Austrian Monarchy
→ 1918

Kelsen
ao. Professor

Societal Stage

Austrian Monarchy
→ 1918

Kelsen
ao. Professor

Kelsen

New Democratic State

1920: Constitution

Kelsen

Austrian Monarchy
→ 1918

Kelsen
ao. Professor

New Democratic State

1920: Constitution

Laws

Decisions

Kelsen

Legal Science
„Pure Theory of Law“

**Scientific
Hypothesis**

„Basic Norm“

New Democratic State

Constitution

Kelsen

Legal Science
„Pure Theory of Law“

Scientific Hypothesis

„Basic Norm“

Validity

Constitution

Laws

Decisions

PTL as a Hypostasis
= Personification

Kelsen

Legal Science
„Pure Theory of Law“

Scientific
Hypothesis

„Basic Norm“

Validity

Constitution

Laws

Decisions

Normative Monism

Kelsen

Legal Science
„Pure Theory of Law“

Scientific Hypothesis

Norm-Sentence

„Basic Norm“

Validity

Norm

Norm

Norm

Norm

Norm

Norm

Norm

Norm

Norm

Norm

3.

Towards

Legal Logic

and Legal Informatics

Purity

Kelsen

**„Pure Theory
of Law“**

**Scientific
Hypothesis**

Traditional Legal Concepts

Purity

Kelsen

„Pure Theory
of Law“

Scientific
Hypothesis

Customary Law

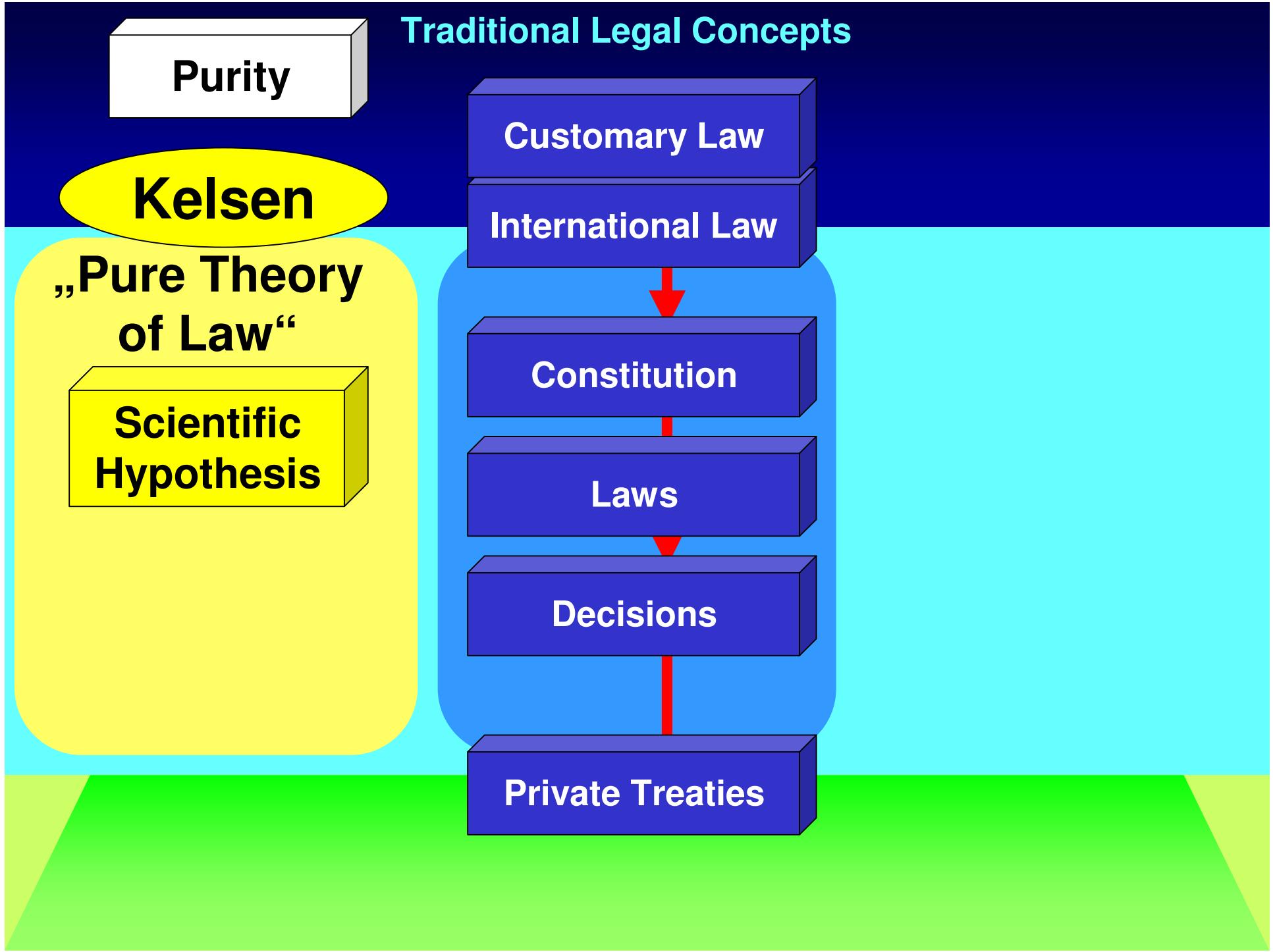
International Law

Constitution

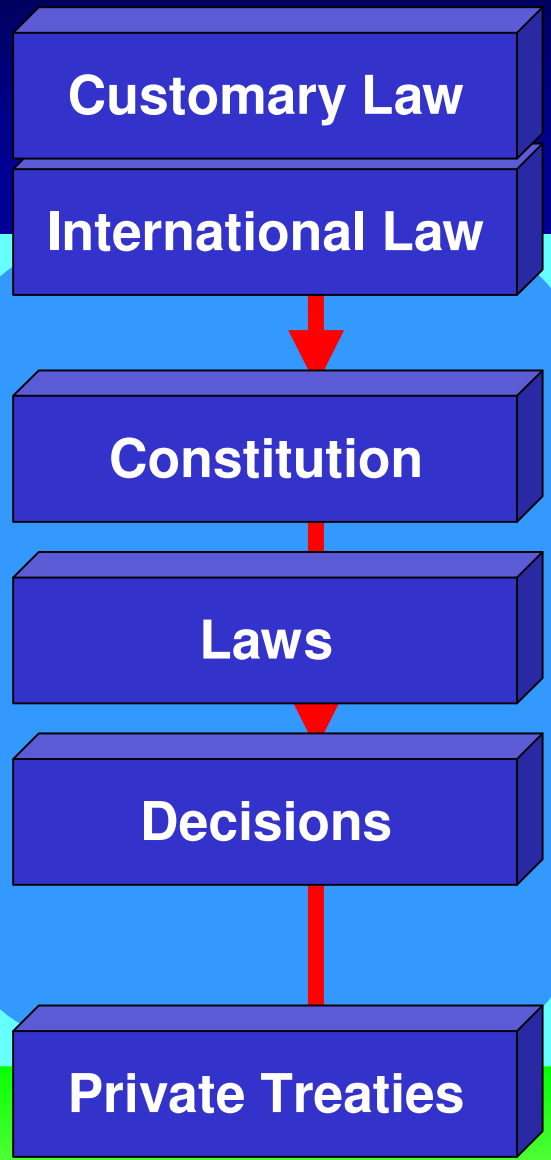
Laws

Decisions

Private Treaties



Traditional Legal Concepts

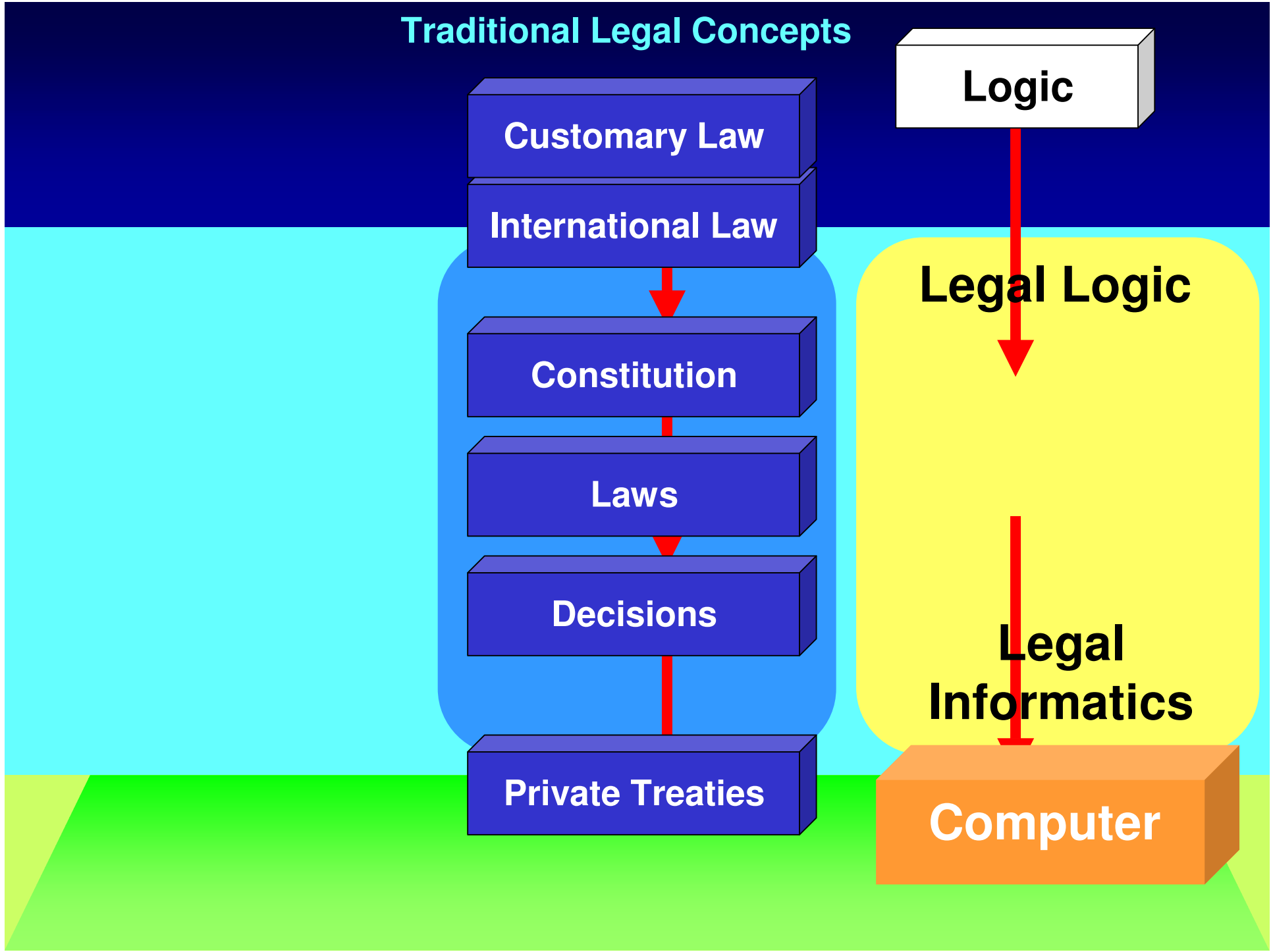


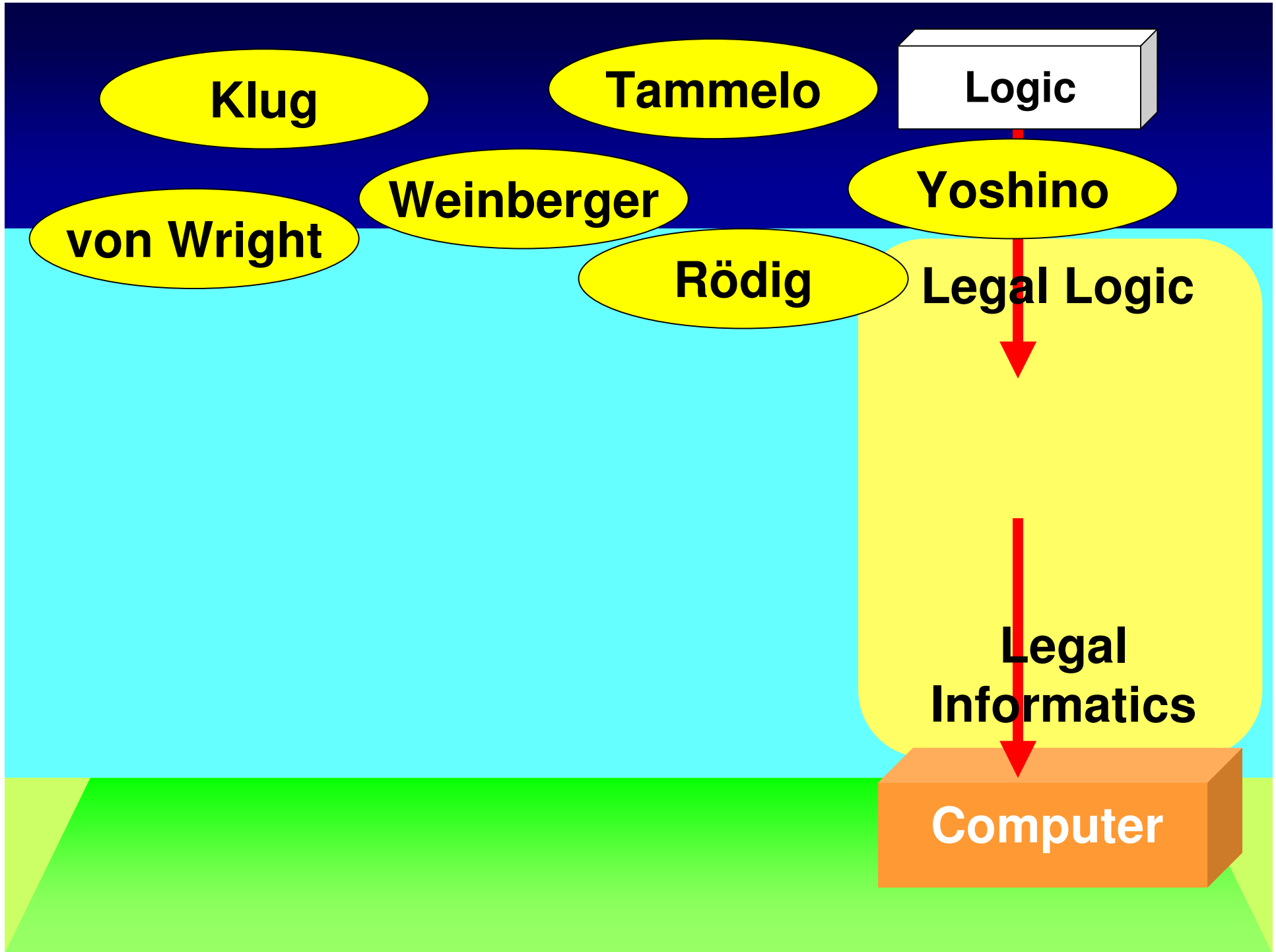
Logic

Legal Logic

Legal Informatics

Computer





Klug

Tammelo

Logic

von Wright

Weinberger

Yoshino

Rödig

Legal Logic

Legal Informatics

Computer

Logic

Yoshino

**Logical
Jurisprudence**

LJ

LJ

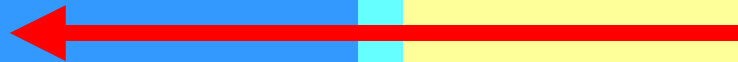
Logical Jurisprudence

State, Law

**whole
Legal System**

LJ - Logical Jurisprudence

**Logical
Jurisprudence**



*try to analyze and explain the whole legal system
using minimum elements*

Stage of Rights and Duties

Metalevel

Logic

LJ

State, Law

LJ - Logical Jurisprudence

IR Inference Rule
Modus Ponens

V Validity

S Sentence

three Primitives:

Stage of Rights and Duties

(1) “sentence”

*LJ considers that norm as a meaning does not exist.
LJ starts from sentences.*

(2) “validity” of sentence

*legal validity as legal truth
“is_valid(sentence1, goal1, time1)”*

(3) “inference rule”

Modus Ponens: 

State, Law

LJ - Logical Jurisprudence

LRS
Legal Rule-Sentence

*LJ starts not from Legal Norms
but from Legal Sentences*

Stage of Rights and Duties

Different Types of Legal Sentences

Legal **Rule** Sentences – Legal **Fact** Sentence

Legal **Object** Sentences – Legal **Meta** Sentences

Elementary Legal Sentences – **Complex** Legal Sentences

Different Types of Legal Sentences

Legal **Rule** Sentences – Legal **Fact** Sentence

Legal **Object** Sentences – Legal **Meta** Sentences

Elementary Legal Sentences – **Complex** Legal Sentences

State, Law

LR Legal Rule

LJ - Logical Jurisprudence

Legal **Rule** Sentences
describe Legal Rules

LRS
Legal Rule-Sentence

Stage of Rights and Duties

Metalevel

Logic

LJ

State, Law

LJ - Logical Jurisprudence

Legal **Fact** Sentences
describe Legal Facts

LFS

Legal Fact-Sentence

LF Legal Fact

Stage of Rights and Duties

Metalevel

Logic

LJ

State, Law

LJ - Logical Jurisprudence

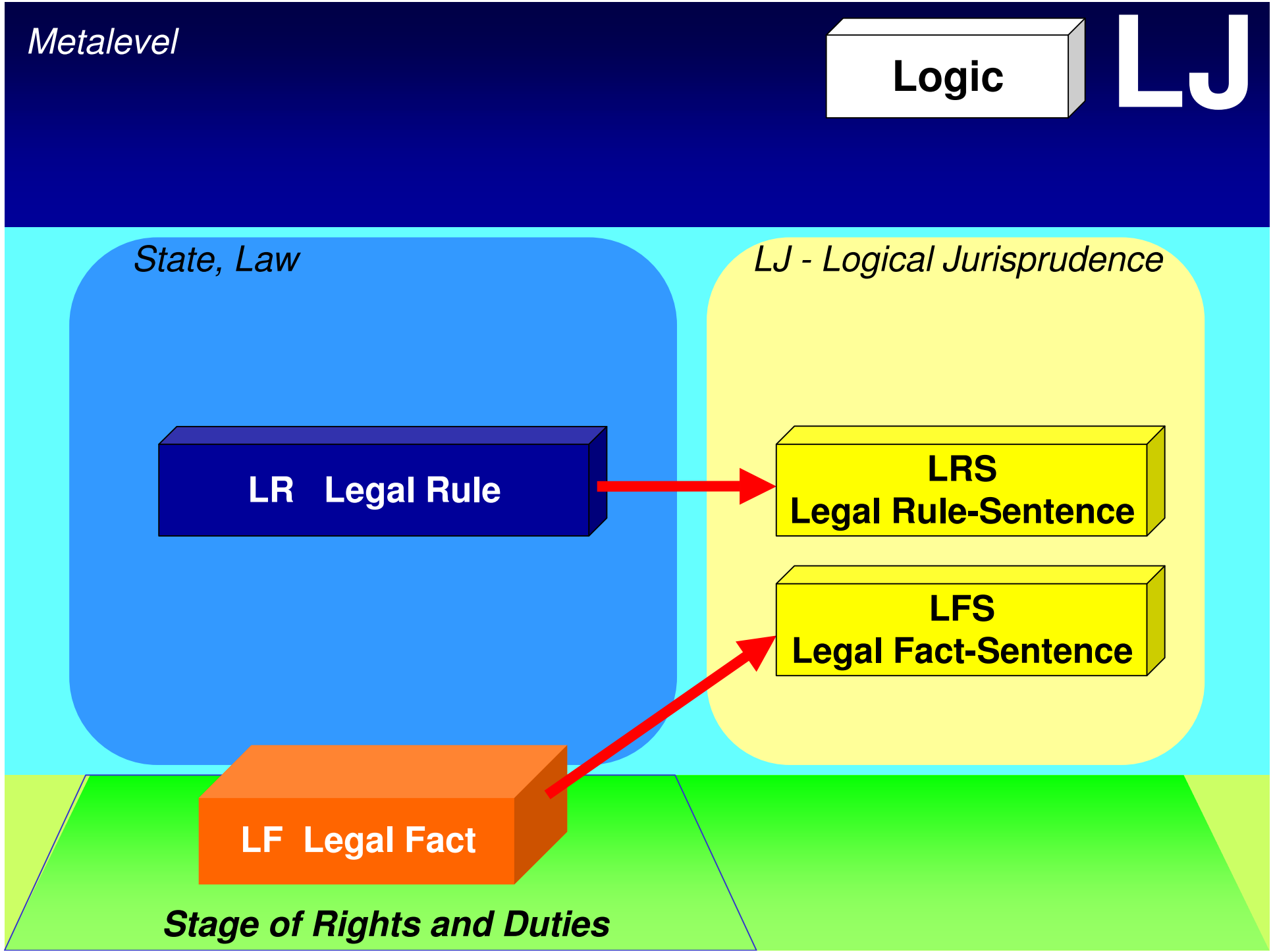
LR Legal Rule

LRS
Legal Rule-Sentence

LFS
Legal Fact-Sentence

LF Legal Fact

Stage of Rights and Duties



Different Types of Legal Sentences

Legal **Rule** Sentences – Legal **Fact** Sentence

Legal **Object** Sentences – Legal **Meta** Sentences

Elementary Legal Sentences – **Complex** Legal Sentences

Metalevel

Logic

LJ

State, Law

LJ - Logical Jurisprudence

Legal
Role

Legal Object
Obligation

Legal
Role

LOS
Legal Object Sentence

Legal **Object** Sentences describe Legal Objects,
especially Obligations
Stage of Rights and Duties

Metalevel

Logic

LJ

State, Law

LJ - Logical Jurisprudence

LRS

Legal Rule-Sentence

LFS

Legal Fact-Sentence

LOS

Legal Object Sentence

Legal
Role

Legal Object
Obligation

Legal
Role

Stage of Rights and Duties

Metalevel

Logic

LJ

State, Law

LJ - Logical Jurisprudence

LMS

Legal Meta Sentence

LRS

Legal Rule-Sentence

LFS

Legal Fact-Sentence

LOS

Legal Object Sentence

Legal Role

Legal Object
Obligation

Legal Role

Stage of Rights and Duties

Metalevel

Logic

LJ

State, Law

LMS / Inference Rule

LRS

Legal Rule-Sentence

LFS

Legal Fact-Sentence

LOS

Legal Object Sentence

Legal Role

Legal Object
Obligation

Legal Role

Stage of Rights and Duties

State, Law

LJ - Logical Jurisprudence
Legal **Meta** Sentence

describes about the Validity
of Legal Sentences

LMS
Legal Meta Sentence

describes validity

LS
Legal Sentence

Stage of Rights and Duties

Different Types of Legal Sentences

Legal **Rule** Sentences – Legal **Fact** Sentence

Legal **Object** Sentences – Legal **Meta** Sentences

Elementary Legal Sentences – **Complex** Legal Sentences

State, Law

LN:
***One must
drive a car
under 100 km
/hour
on a highway***

LJ - Logical Jurisprudence

ELS
**Elementary
Legal Sentence**

*is the smallest unit
of Legal Sentences*

“
*One must drive a car
under 100 km /hour on a highway*”

Stage of Rights and Duties

**LN =
Legal Language**

***The driver (= Role!)
must drive a car
under 100 km /hour
on a highway***

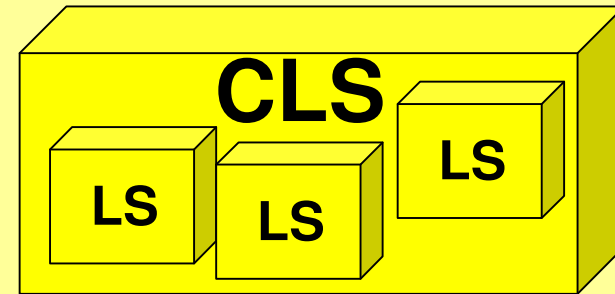
**LRS =
Scientific
Language
about
Legal Language**

Reference
←

“
One must
drive a car
under 100 km /hour
on a highway”

State, Law

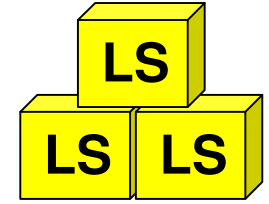
LJ - Logical Jurisprudence



Complex Legal Sentence
*is a group of Legal Sentences
which has an unique name
includes Legal Sentences*

Stage of Rights and Duties

Structure of Connection of Legal Sentences



- (1) *“**And**” Structure of the Connection*
- (2) *Connection in **Complex** Sentence*
- (3) *Connection of **LOS** with **LMS***
- (4) *Connection of **LMS** with **LMS***

Structure of Connection of LS: (1)

State, Law

LJ - Logical Jurisprudence



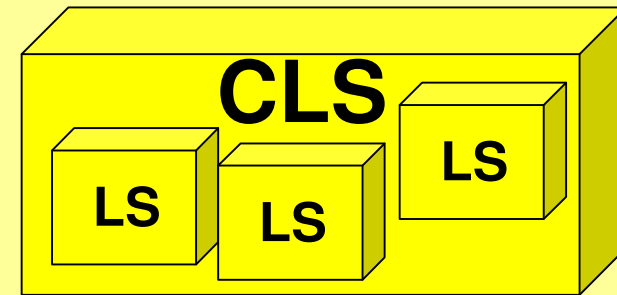
„AND“ structure
= a group of LS

Stage of Rights and Duties

Structure of Connection of LS: (2)

State, Law

LJ - Logical Jurisprudence



Complex Legal Sentence
is a group of Legal Sentences
which has an unique name
includes Legal Sentences

Stage of Rights and Duties

Metalevel

Logic

LJ

Structure of Connection of LS: (3)

State, Law

LJ - Logical Jurisprudence

Connection of Legal Object Sentences with Legal Meta Sentences

LMS
Legal Meta Sentence

validity

LOS
Legal Object Sentence

Legal Role

Legal Object
Obligation

Legal Role

Stage of Rights and Duties

Metalevel

Logic

LJ

Structure of Connection of LS: (4)

State, Law
**Connection of
Legal Meta Sentences
with
Legal Meta Sentences**

LJ - Logical Jurisprudence

LMS
Legal Meta Sentence



validity

LMS
Legal Meta Sentence

LRS
Legal Rule Sentence

Stage of Rights and Duties

Metalevel

Logic

LJ

BLRS
Basic Legal
Rule Sentence

LJ - Logical Jurisprudence

FLMRS Fundamental
Legal Metarule Sentence

MRS
Legal Metarule Sentence

LRS
Legal Rule Sentence

State, Law

Basic Legal Rule Sentence

→ Validity of the final
highest legal meta sentence

Stage of Rights and Duties

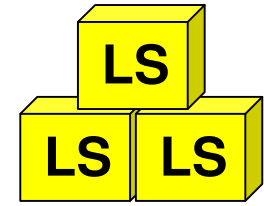
Final founding the validity LS law through Basic Legal Rule Sentence

BLRS

The validity of the final, highest legal meta sentence, whose validity can not be deduce through the application of legal meta rule sentences, is called the basic legal meta rule sentence (BLRS).

The **validity** of the basic legal meta rule sentence **is to be presupposed,** namely asserted as a fact sentence.

LJ



Legal Inference

Logic

LJ

State, Law

LJ - Logical Jurisprudence

Legal
Rules

Legal
Facts

Logic

LJ

State, Law

LJ - Logical Jurisprudence

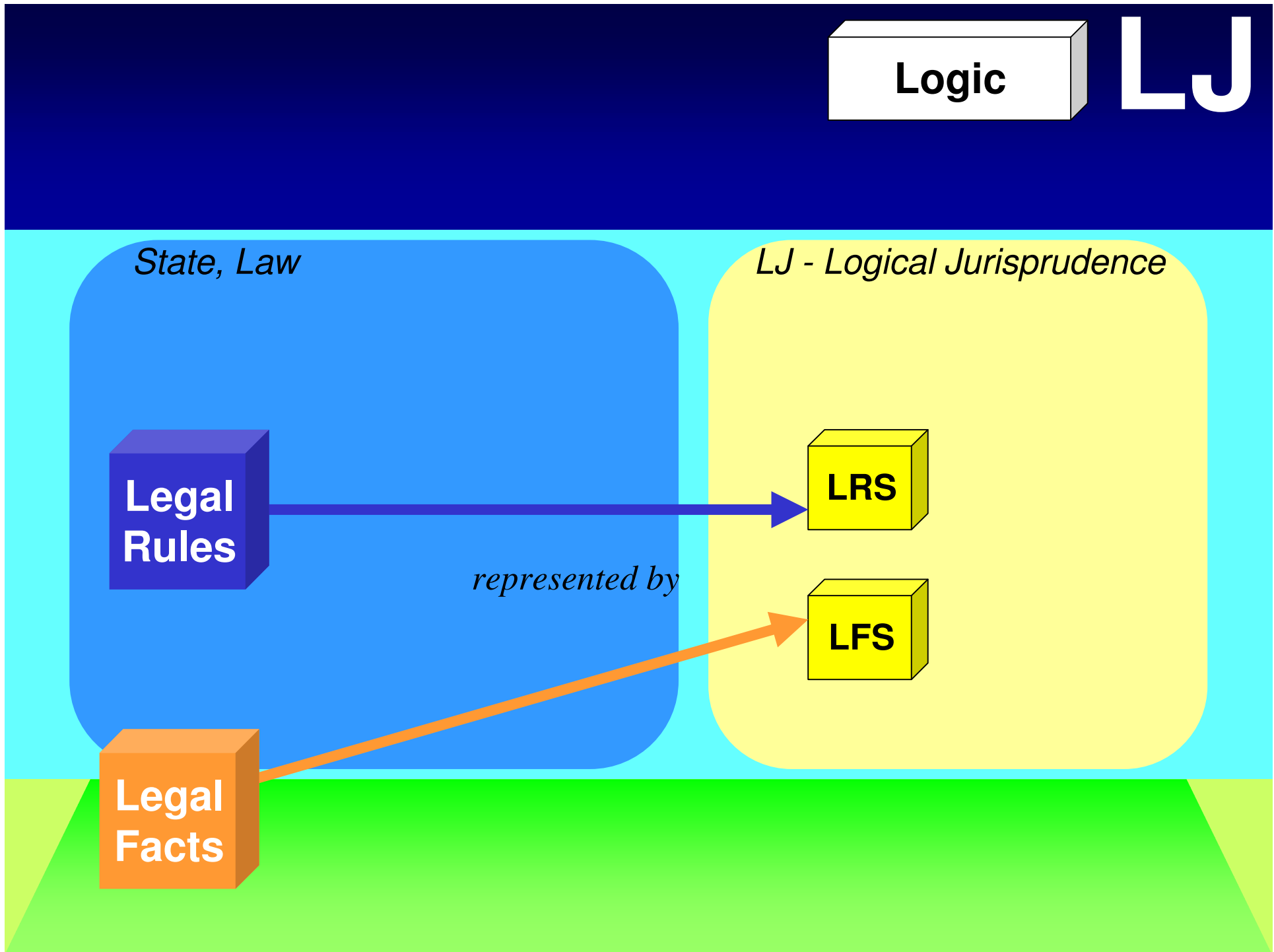
Legal Rules

represented by

LRS

LFS

Legal Facts



Logic

LJ

State, Law

LJ - Logical Jurisprudence

Legal Rules

represented by

IR Inference Rule
Modus Ponens

LRS

**proved
validity**

LFS

Legal Facts

Logic

LJ

State, Law

LJ - Logical Jurisprudence

Legal Rules

represented by

IR Inference Rule
Modus Ponens

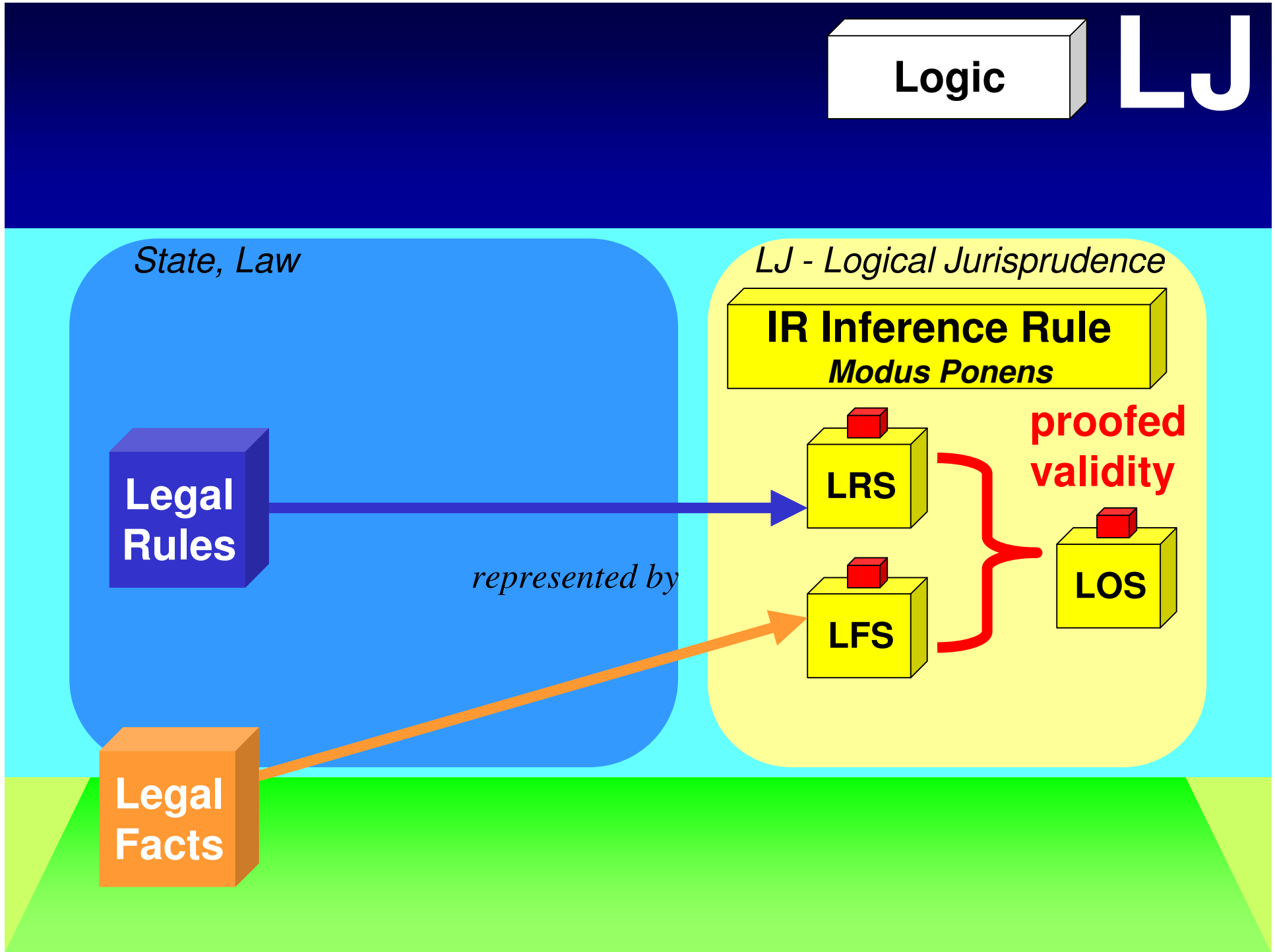
LRS

proved
validity

LFS

LOS

Legal Facts



Logic

LJ

State, Law

LJ - Logical Jurisprudence

Legal Rules

IR Inference Rule
Modus Ponens

represented by

LRS

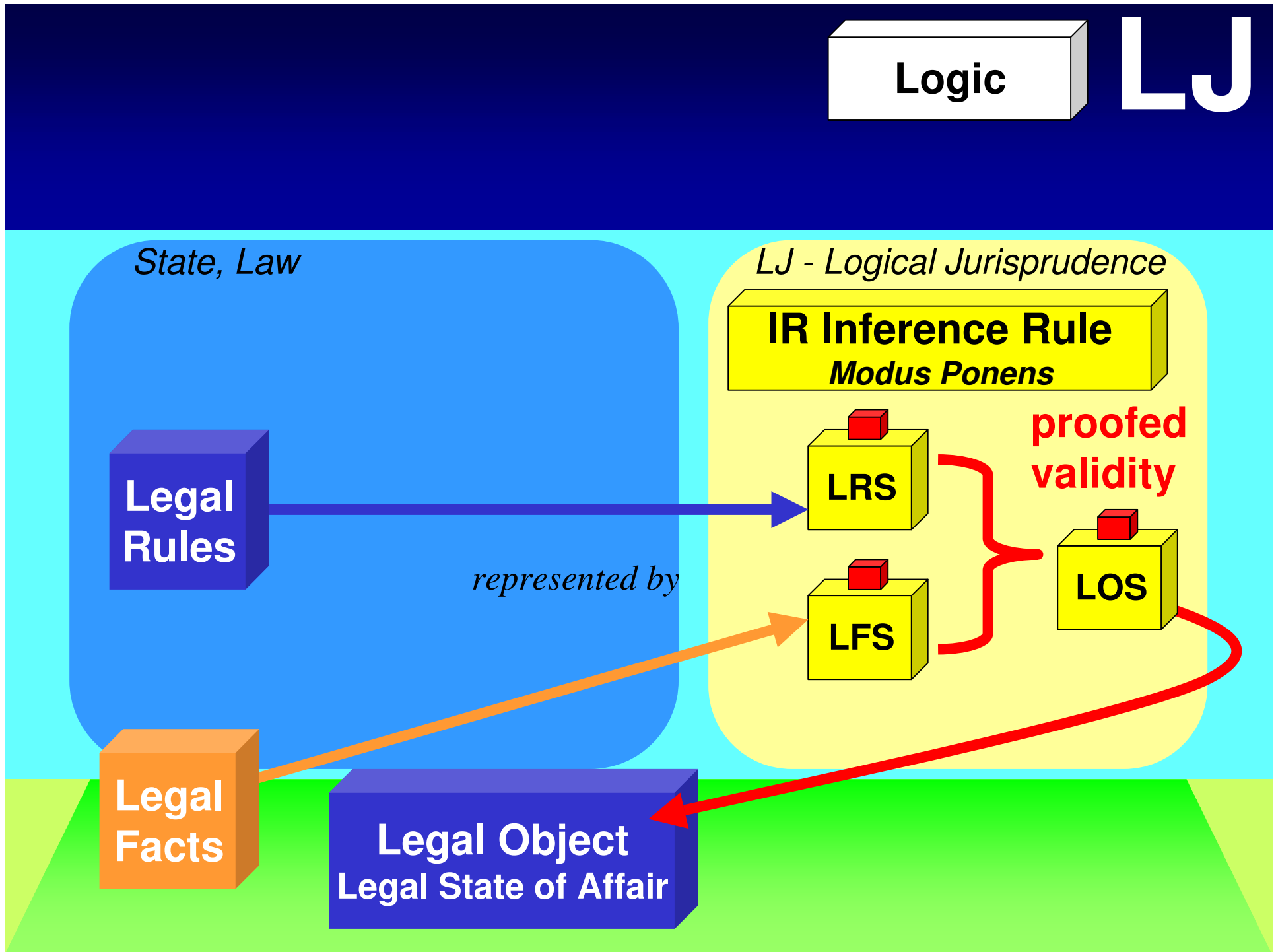
proved
validity

LFS

LOS

Legal Facts

Legal Object
Legal State of Affair



Logic

LJ

State, Law

LJ - Logical Jurisprudence

IR Inference Rule
Modus Ponens

Legal Rules

represented by

LRS

proved
validity

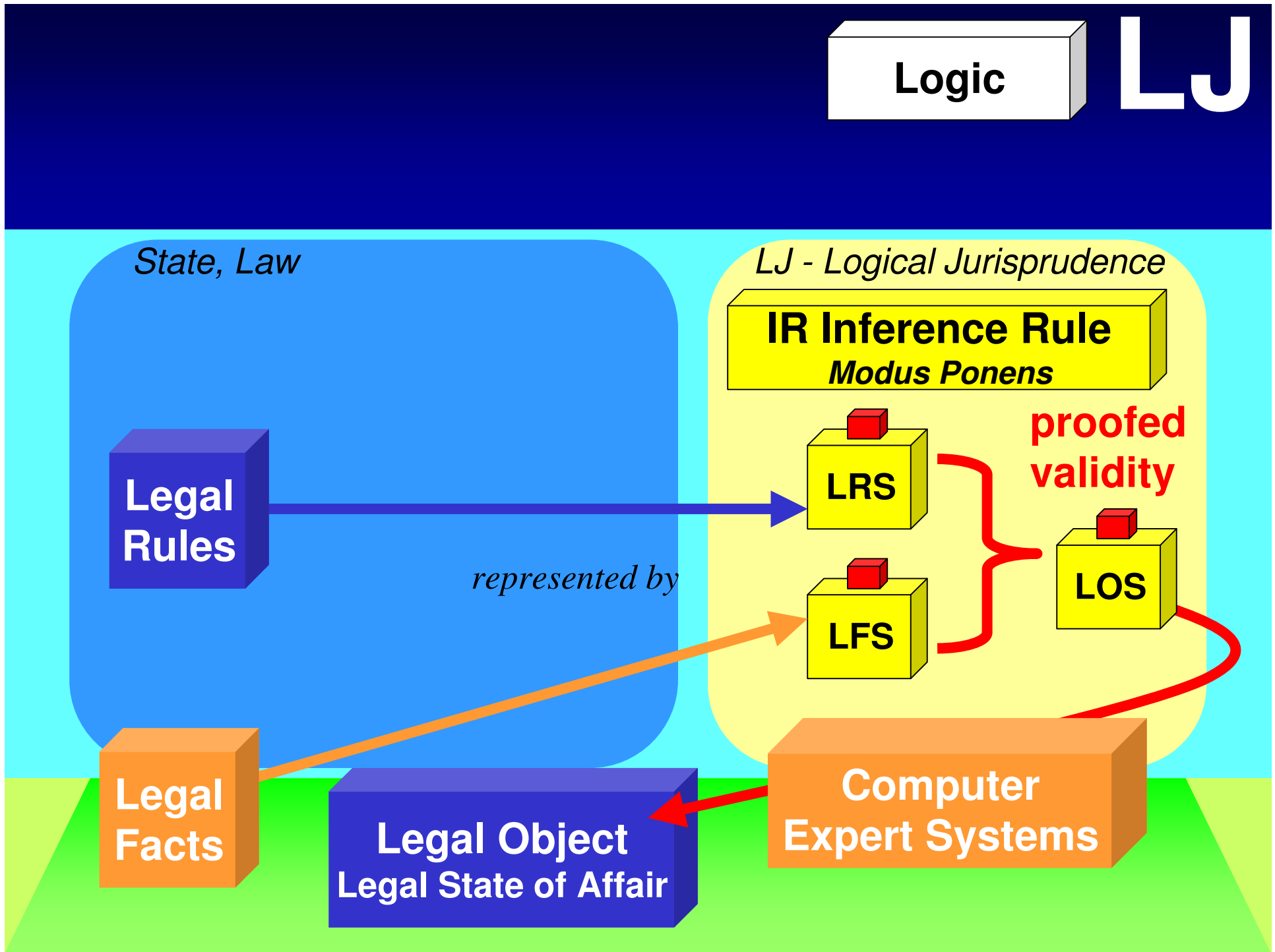
LFS

LOS

Legal Facts

Legal Object
Legal State of Affair

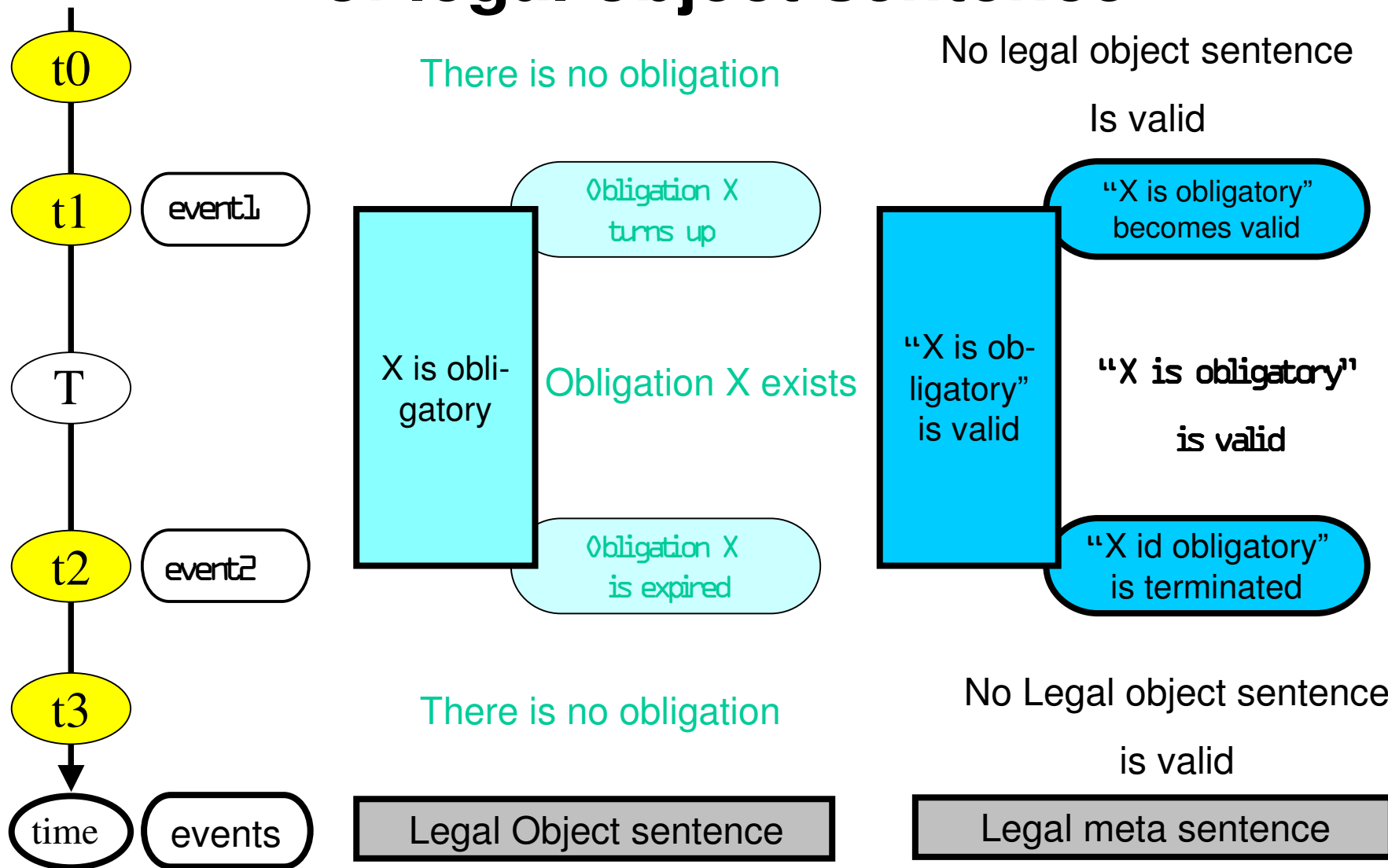
Computer
Expert Systems



LJ

Time-Structure of Legal Objects

The existence of obligation and the validity of legal object sentence



*Comparison
of the results
of LJ with PL*

„Purity“

Logic

Kelsen

Yoshino

PL - Pure Theory

State, Law

LJ - Logical Jurisprudence

Basic Norm

Basic LRS

**Fundamental
LMRS**

similar solutions at the top of the system

„Purity“

Logic

Kelsen

Yoshino

PL- Pure Theory

State, Law

LJ - Logical Jurisprudence

Legal Sentence

Legal Norm

LMS
LRS
LFS
LOS

Norm as a special Meaning

differentiation of juridical sentences

„Purity“

Logic

Kelsen

Yoshino

PL- Pure Theory

State, Law

LJ - Logical Jurisprudence

**LJ → Modelling
Legal Cases**

LMS

LRS

LFS

LOS

Leg. Objects

Stage of Rights and Duties

„Purity“

Logic

Kelsen

Yoshino

PL- Pure Theory

State, Law

LJ - Logical Jurisprudence

**LJ → Modelling
Legal Cases**

LMS

LRS

LFS

LOS

Computer
Expert Systems

Leg. Objects

Stage of Rights and Duties

„Purity“

Logic

Kelsen

Yoshino

PL- Pure Theory

State, Law

LJ - Logical Jurisprudence

*My suggestion for
the development of LJ:
→ Legal Ontologies*

LMS

LRS

LFS

LOS

Computer
Expert Systems

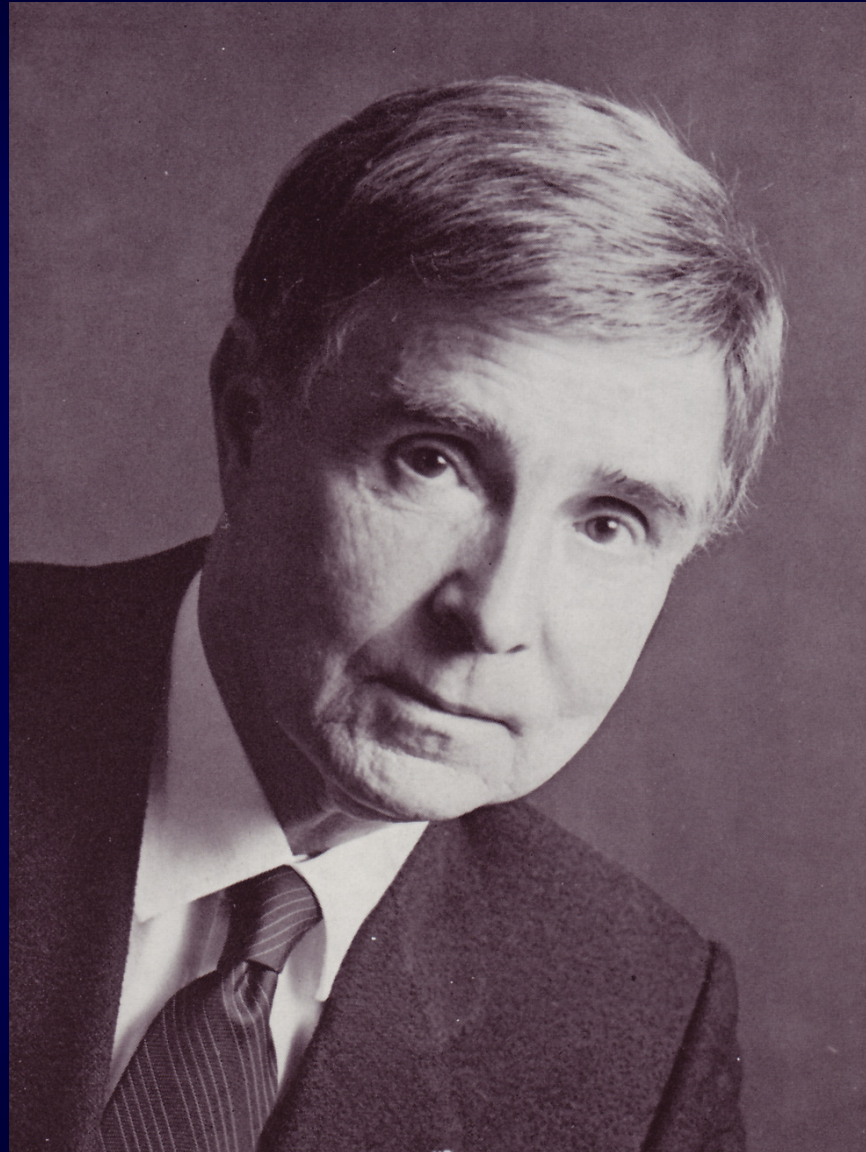
Leg. Objects

Stage of Rights and Duties

This lecture is dedicated to the memory of

This lecture is dedicated to the memory of

Ilmar
TAMMELO



the famous Estonian Legal Philosopher

*Thank you
for your
Attention!*

Lachmayer @ chello.at

Conclusion: Summary

LJ starts from three primitives (legal sentence, validity, inference rule) and analyze and construct a legal system in terms of thee types of alternative basic concept of legal sentence.

LJ insists that the systemicity of law is constituted through legal reasoning.

LJ provided a logical model according to which legal system is actually explained as a deductive system.

Conclusion: Summary

LJ clarified thereby not only 'basic rule sentences' but also fundamental legal meta rules sentences.

LJ make it enable to realize inference of validity relationship between legal sentences in terms of meta rule sentences and meta inference.

LJ contributes to develop a deductive legal knowledge base.

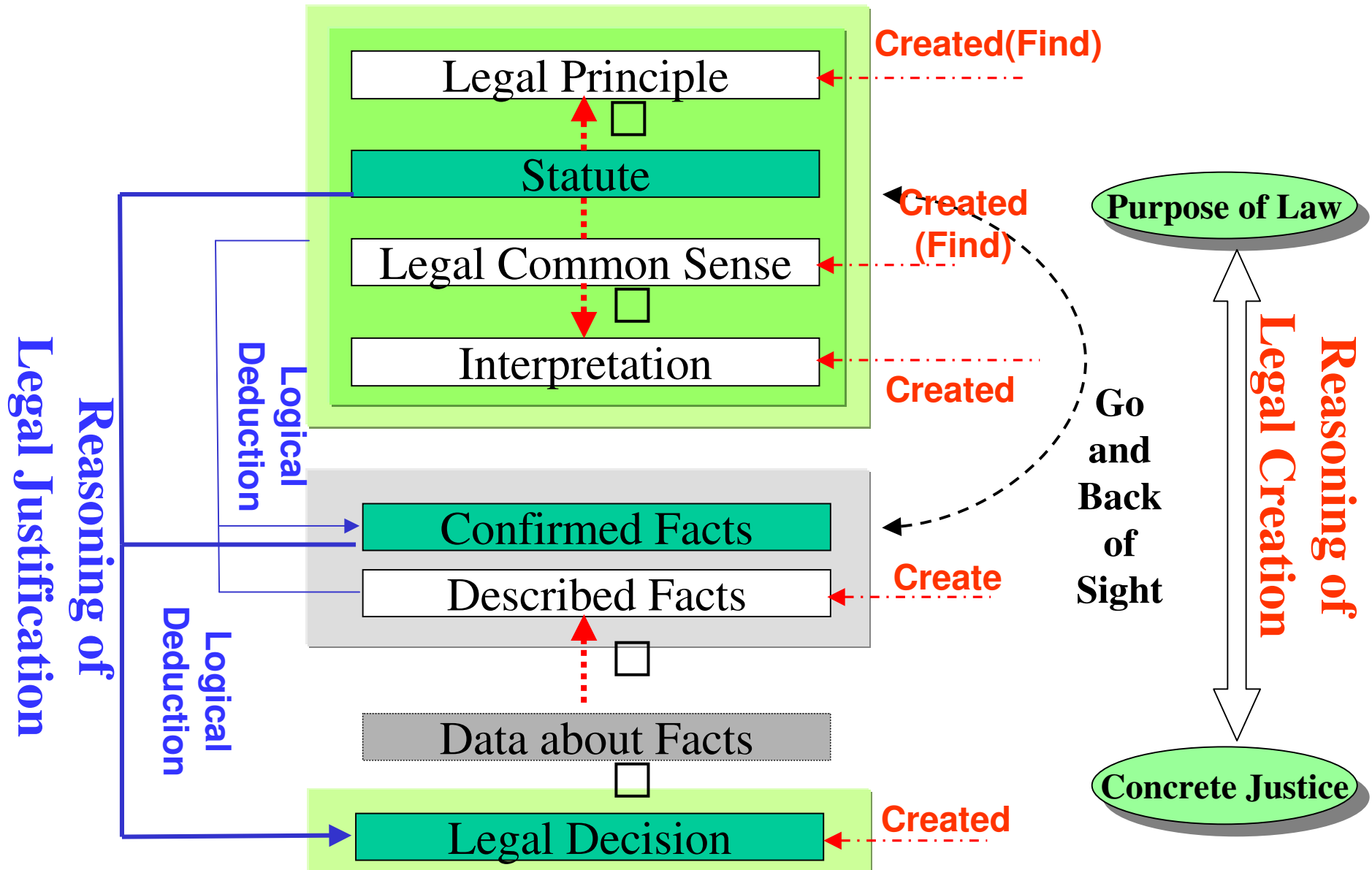
LJ may contribute to develop a true science of
law

LJ

**Legal
Reasoning**

Annex: The Structure of Legal Reasoning as Developing Process of Legal Sentences

(This scheme could also be visualized in the mentioned manner)



**LN =
Legal Language**

***The driver (= Role!)
must drive a car
under 100 km /hour
on a highway***

**LRS =
Scientific
Language
about
Legal Language**

Reference
←

“
One must
drive a car
under 100 km /hour
on a highway”

***external
Citizens***

internal

statical



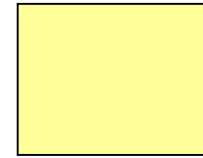
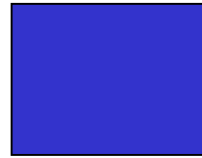
dynamical



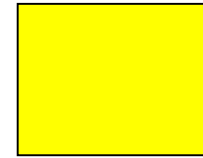
Rechtsnorm

Rechtssatz
LRS

internal
Officials



external
Scholars



PTL, LJ

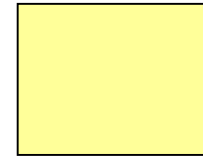
external
Citizens



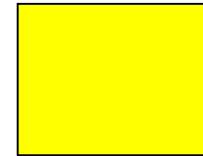
***formal Legal Speech Act
Rechtsnorm***

***Rechtssatz
LRS***

***internal
Officials***



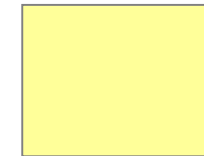
***external
Scholars***



***external
Citizens***



legal Awareness



help.gv

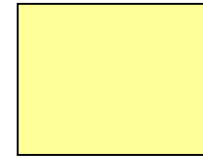
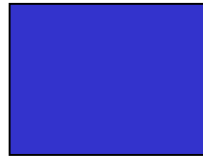
private Treaty

Consciousness

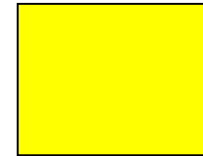
***formal Legal Speech Act
Rechtsnorm***

***Rechtssatz
LRS***

***internal
Officials***



***external
Scholars***



LRS

***SPONSIO, STIPULATIO
external
Citizens***

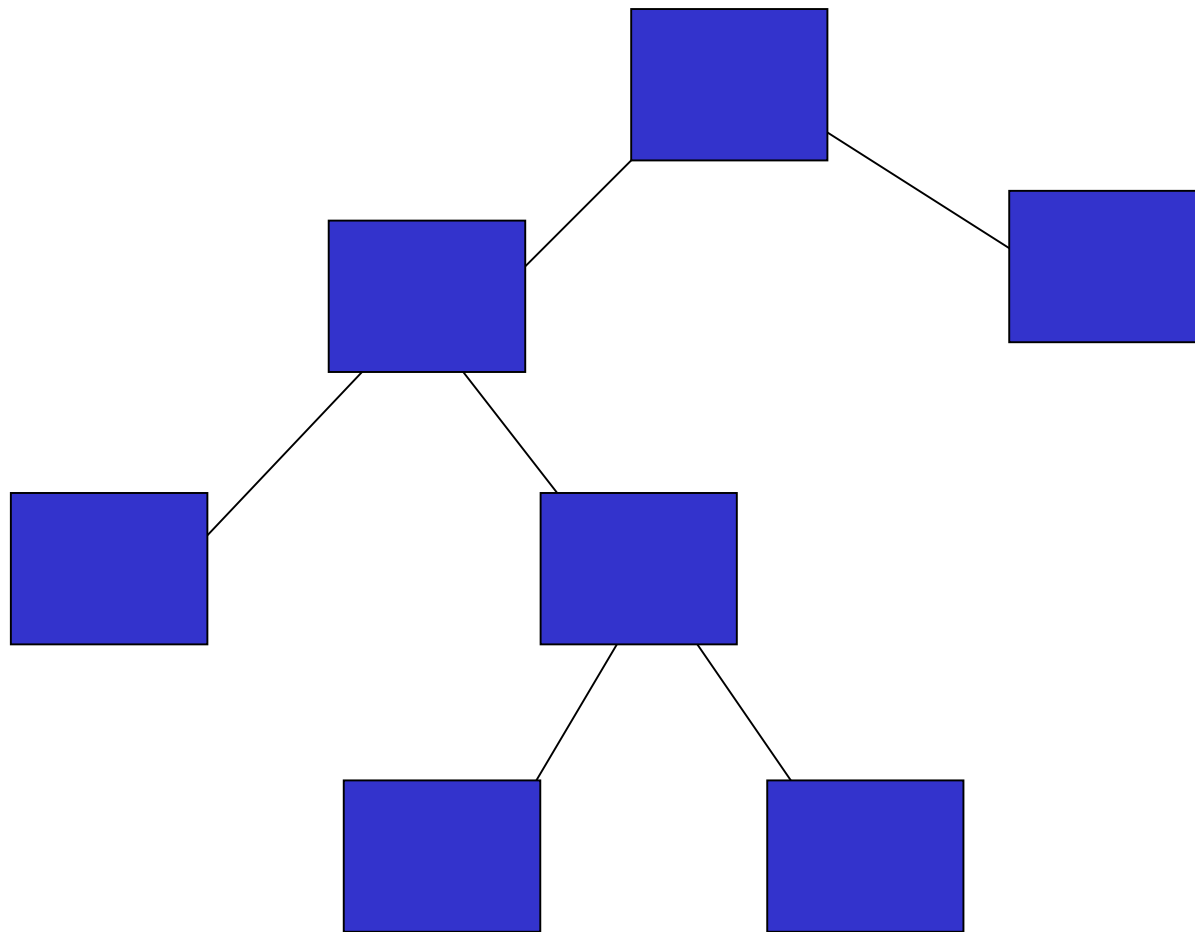


lrs
help.gv

private Treaty

Consciousness

Dichotomy



**Formalization
Logic**

HY

**Virtualization
3D, nD**

**Visualization
2D**

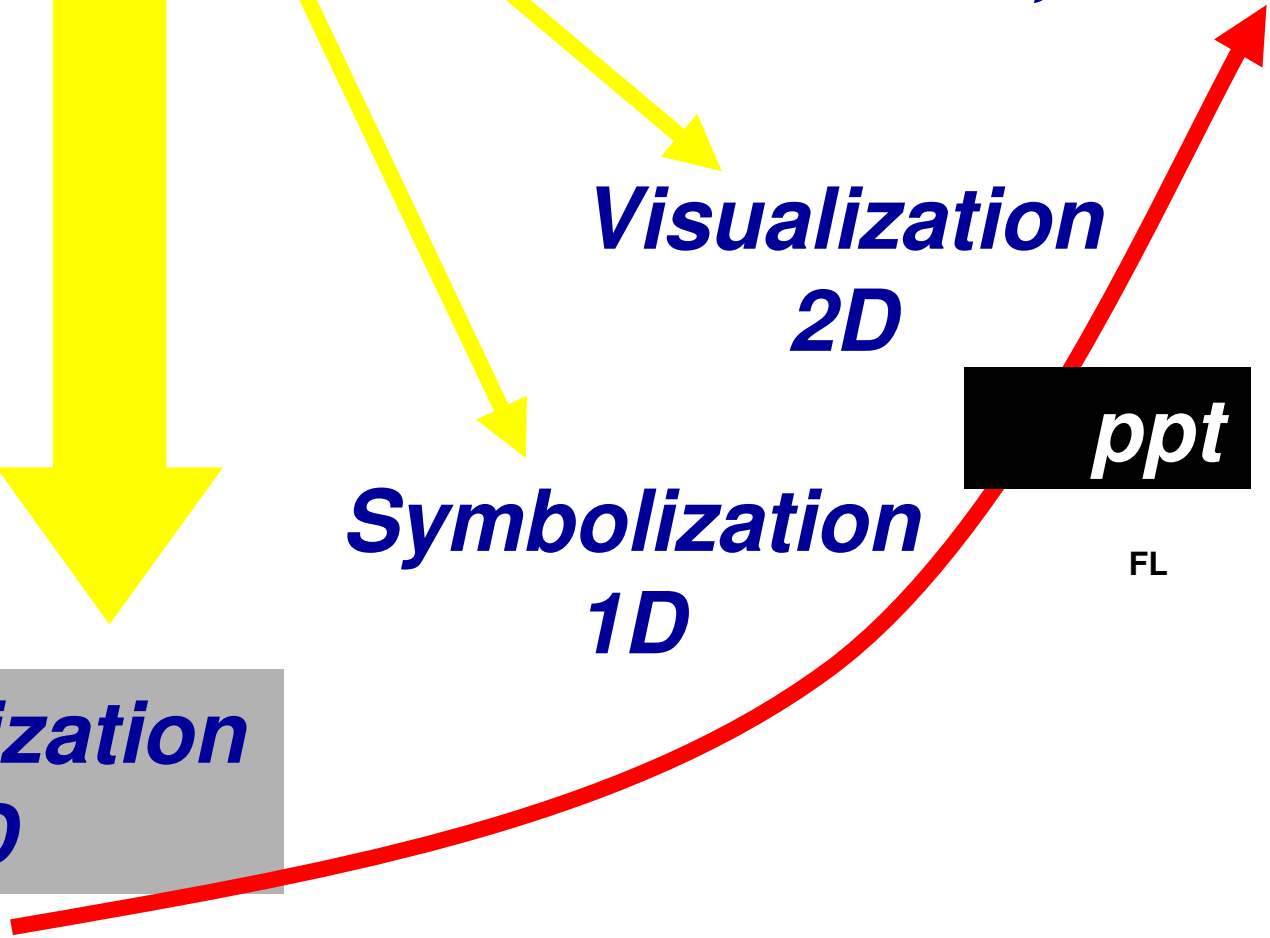
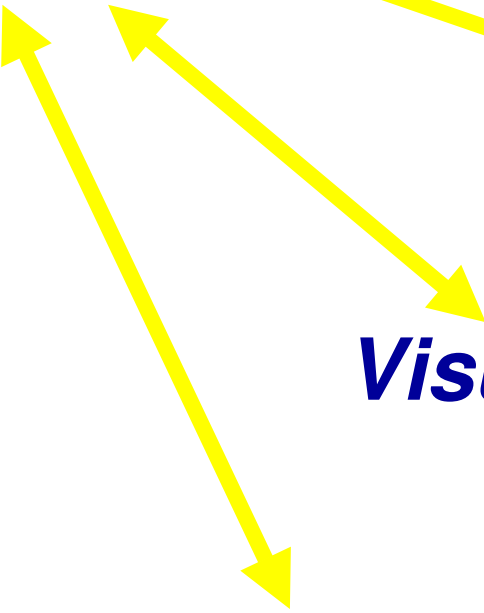
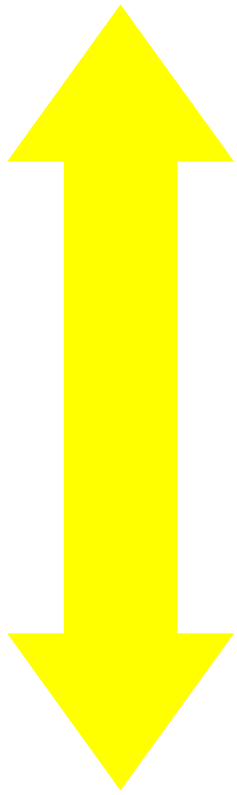
**Symbolization
1D**

ppt

FL

HK

**Textualization
1D**



?!

natural law

normative Konsequenzen

nicht aus den Fakten

sondern aus den

interpretierten oder projizierten

Essenzen

HY:

**law as a meaning
law as a sentence**

**human is an animal
who uses instruments
and languages**

HY:

law is fictional

Guido Tsuno:

semiotic triangle

Begriff, Satz, Objekt

Takahashi:

What means „sentence“

Language

Syntax – Semantik