Comparison of Pellets, Fa | Reasoning | Pellets-based reasoning II | Comparison of Pellets, Fa

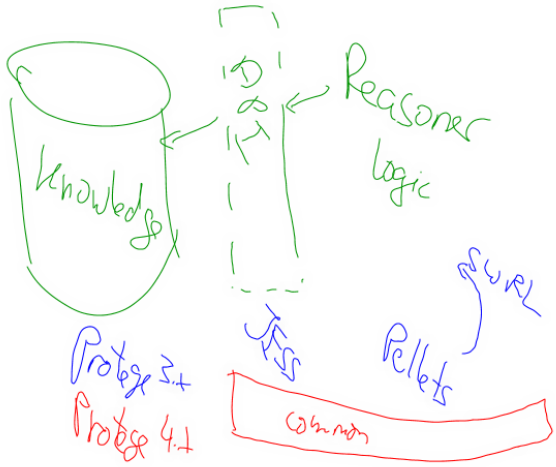
cwi.unik.no/index.php?title=Comparison_of_Pellets,_FaCT_and_HermiT&action=slide

UNIK
UNIVERSITY GRADUATE CENTER

Reasoner

The goal of a reasoner is to derive information from a knowledge base. The reasoner is involved through an inference engine, e.g. the Jess engine involves a Pellet reasoner.

W3 (World wide web consortium) has published a list of reasoners <ref>http://www.w3.org/2007/OWL/wiki/Implementations</ref>



Commercial software

- Bossam (software), an RETE-based r
- DLog, Resolution based Description L
- OntoBroker, highly scalable Semantic
- OWLIM, a high-performance semantic OWLIM-enterprise. Supports OWL2-rl
- RacerPro, a semantic web reasoning
- TopSPIN, rule-based reasoner embed
- SHER, a scalable Pellet-backed OWL

Free to use (Closed Source)

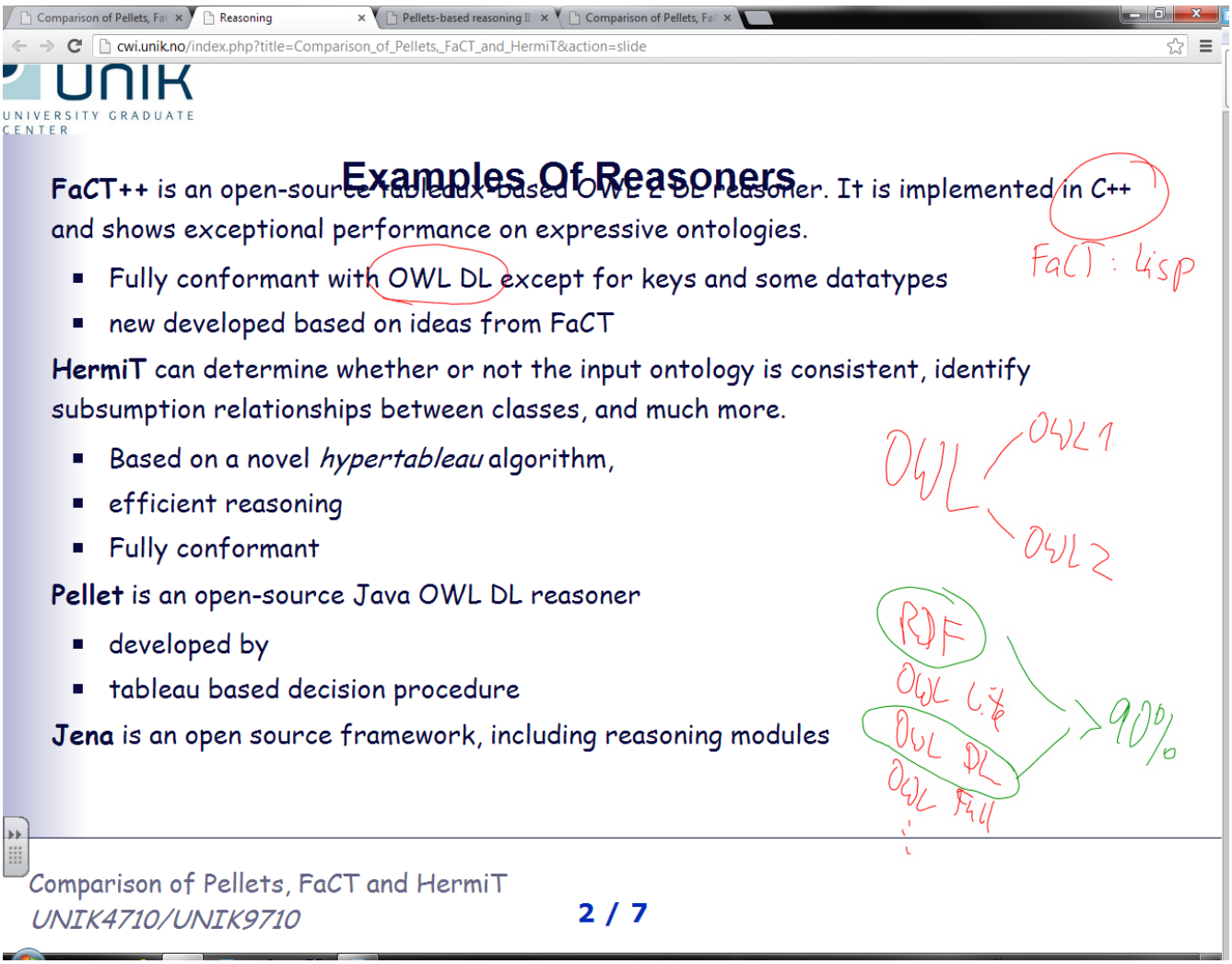
- BaseVISor, a versatile forward chaini
- Cyc inference engine, a forward and b
- KAON2 is an infrastructure for manag
- Hoolet, reasons over OWL-DL ontolog

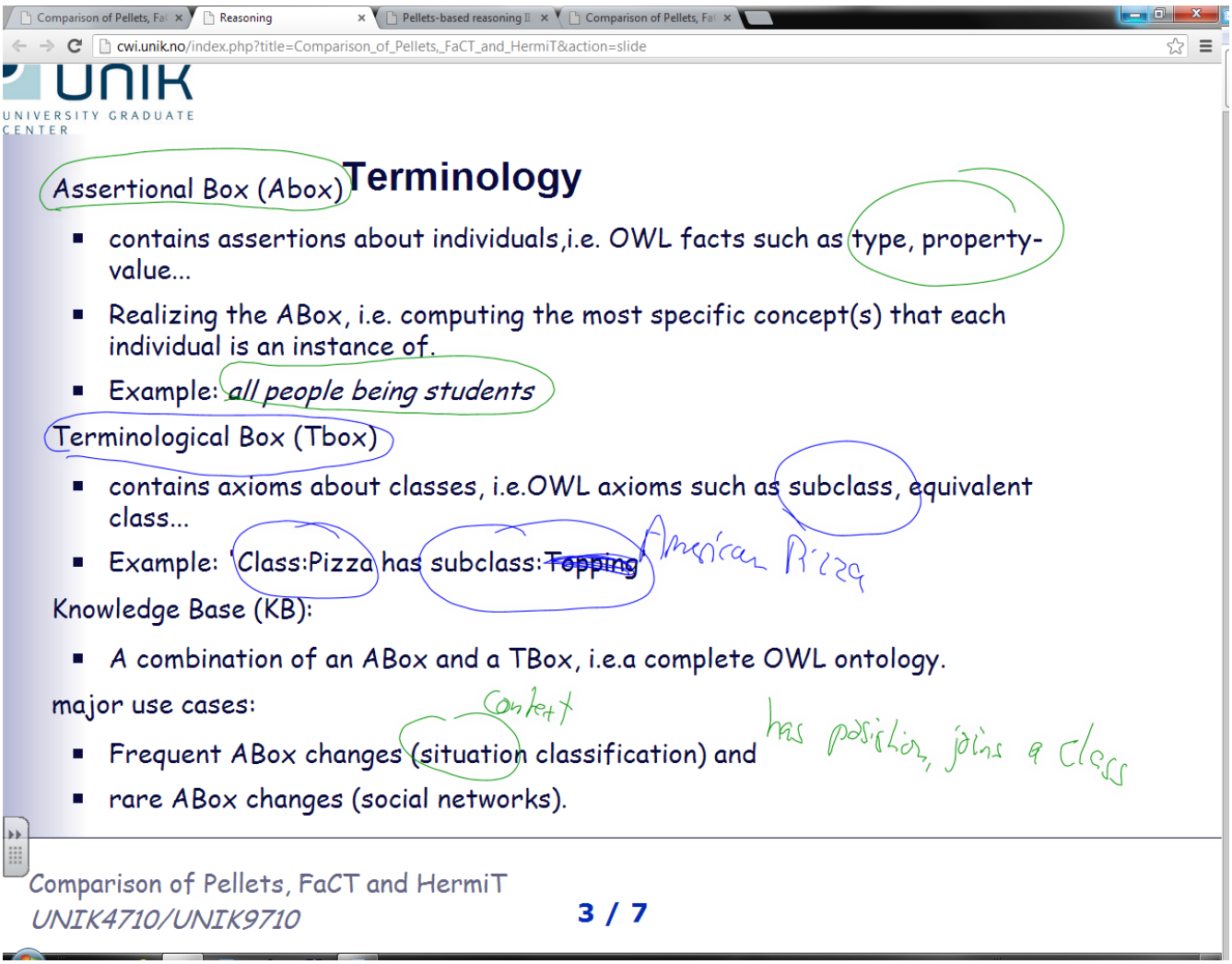
Free Software (Open Source)

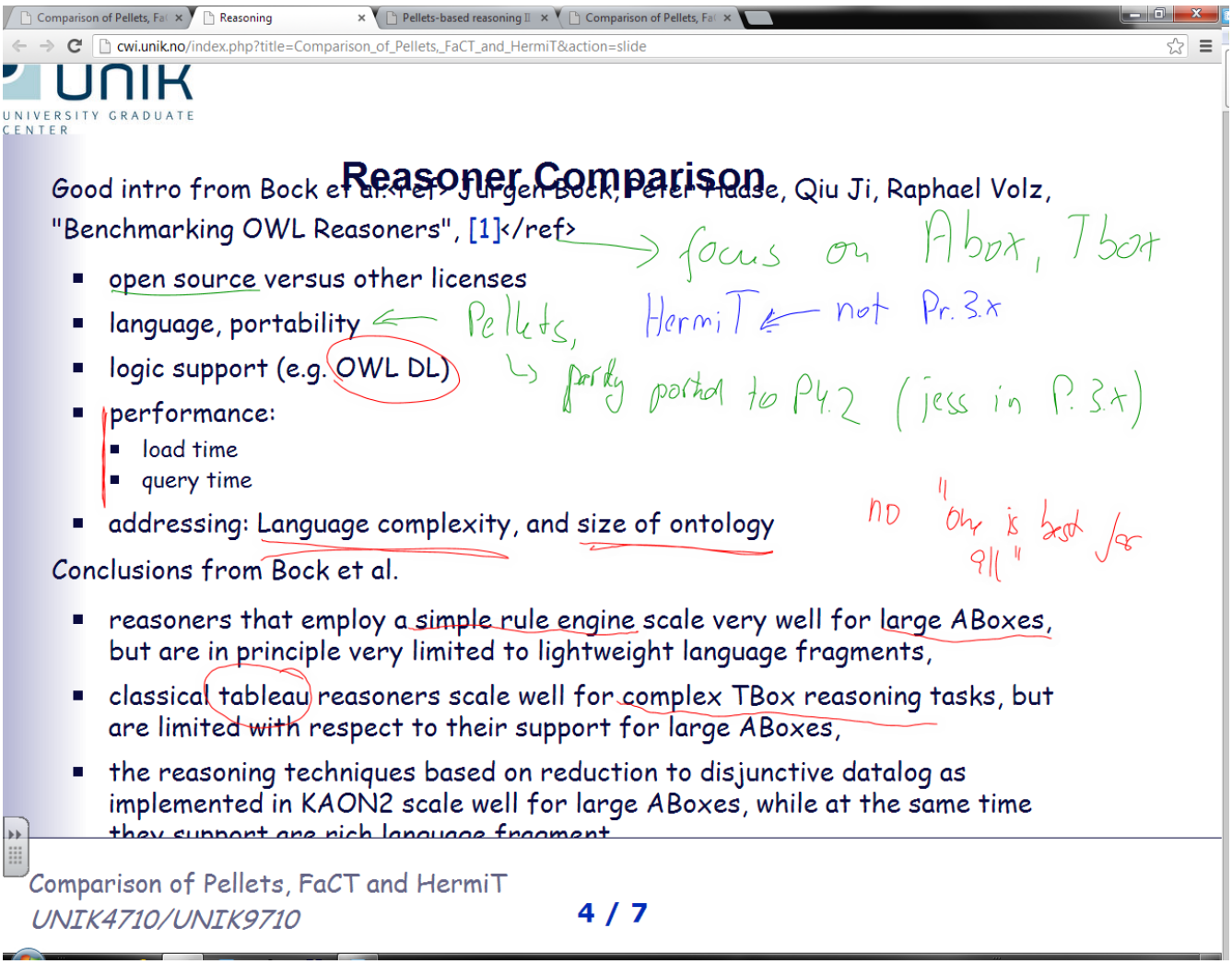
- Cwm, a forward-chaining reasoner wh or N3 serializations as required. (CW
- Drools, a forward chaining inference b
- Euler (EYE), a RIF-compatible backw
- FaCT, a Lisp-based description logic
- FaCT++, the new generation of FaCT
- Jena (framework), an open source se
- Large Knowledge Collider or LarKC is
- Pellet, an open-source Java OWL DL
- Prova, an open-source Semantic Wet commercial option available)
- SweetRules, an integrated set of tool
- TopBraid SPIN API, API for SPIN, GNU AGPL)
- HermiT, the first publicly available OV GNU Lesser GPL)

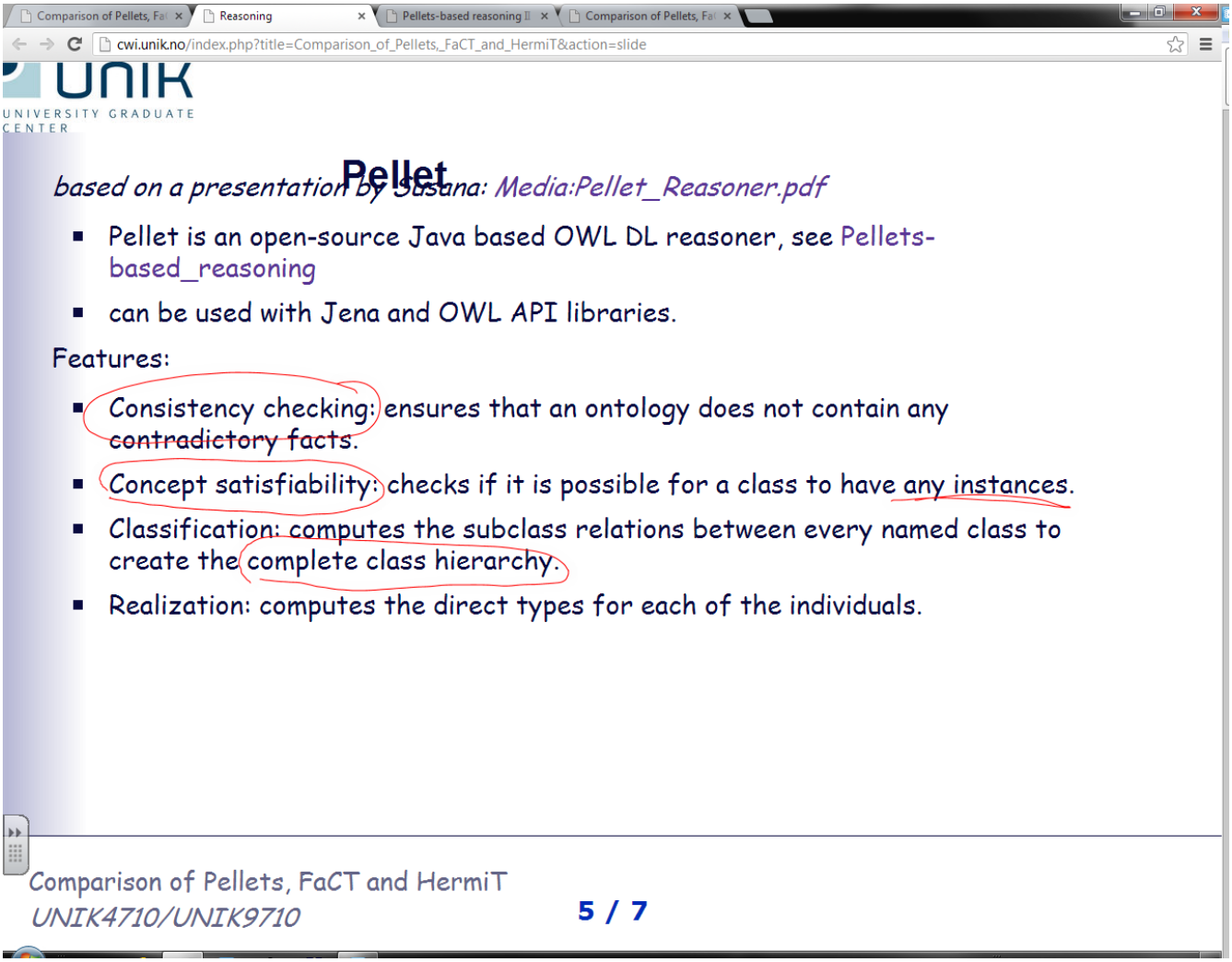
Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710

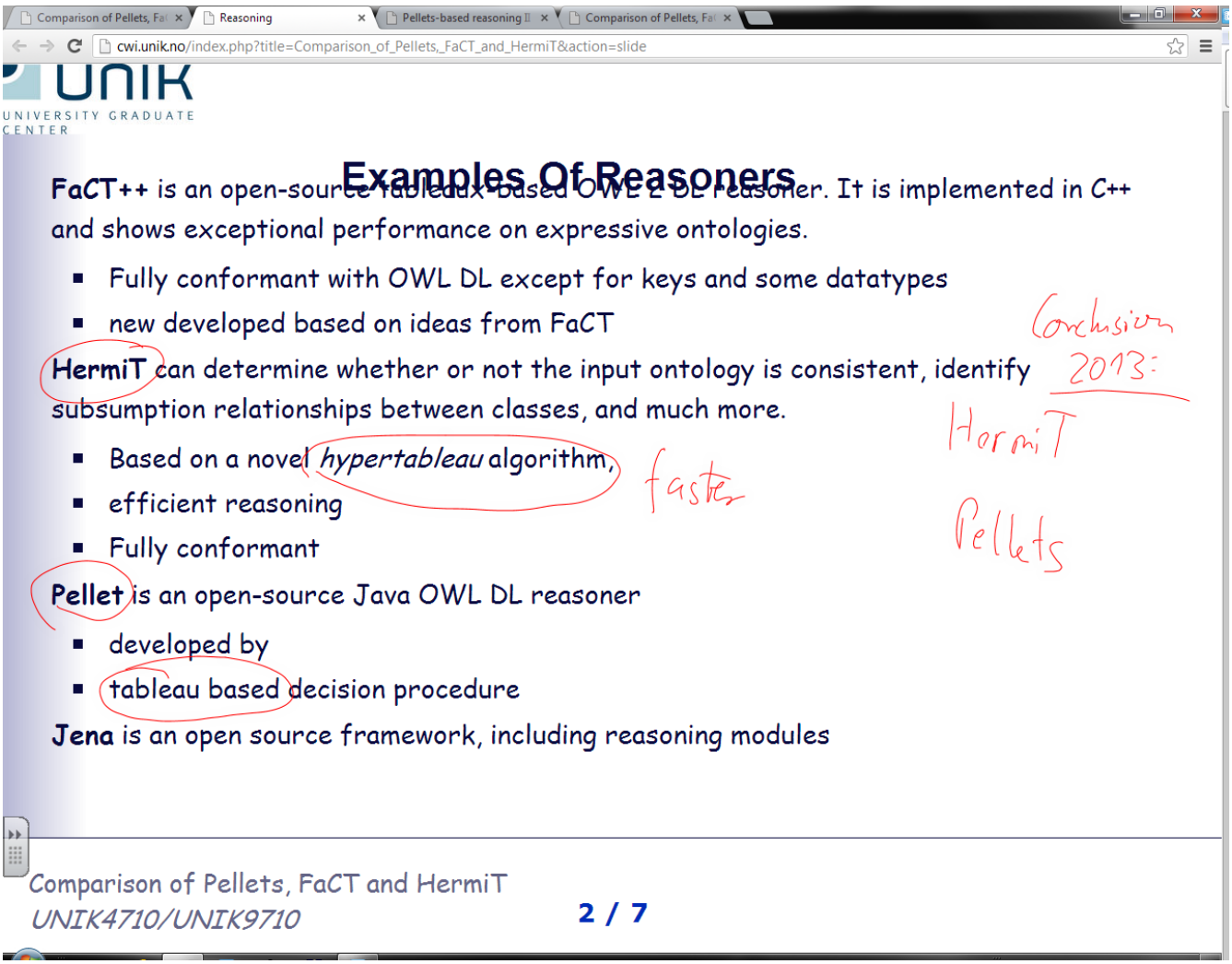
1 / 7

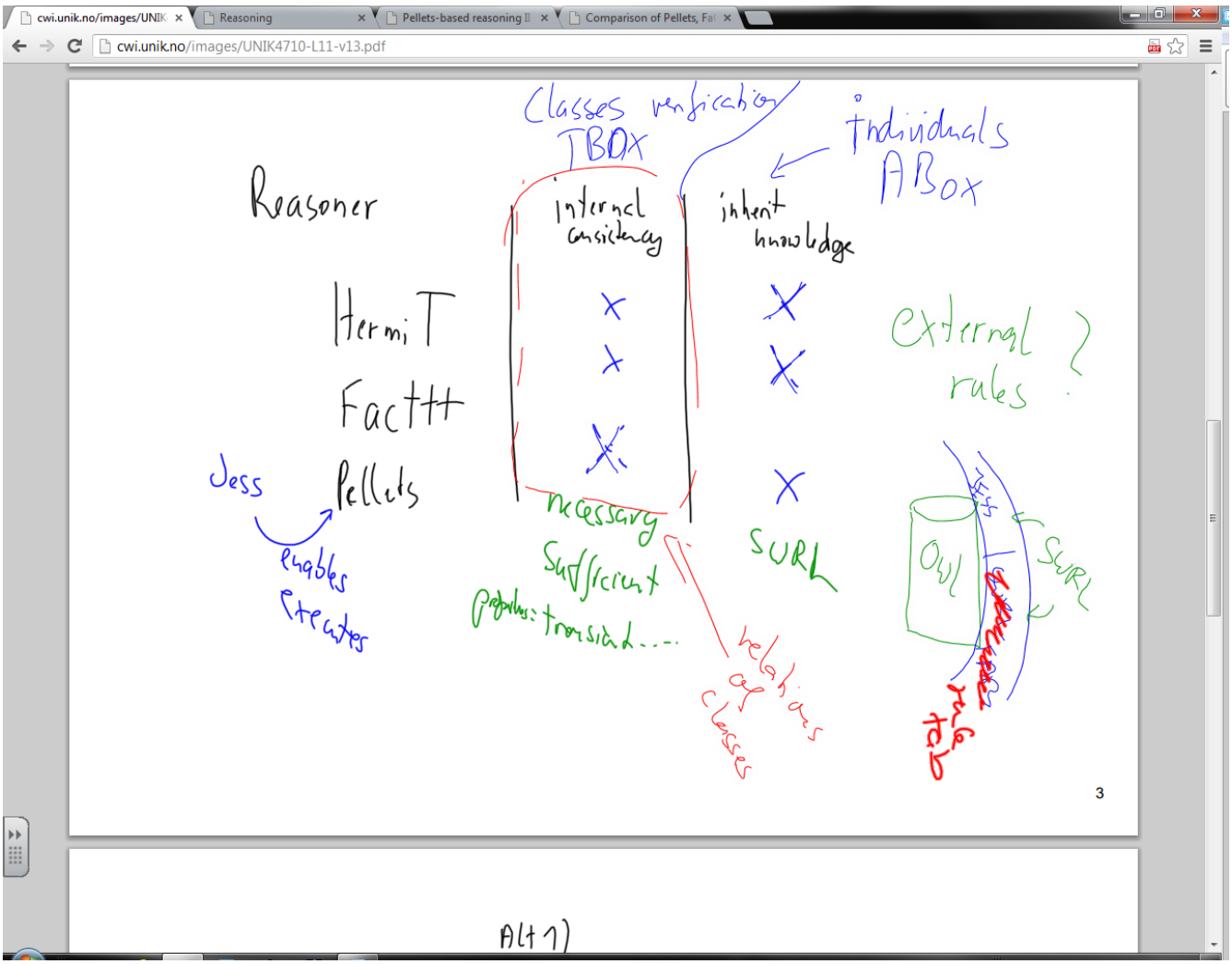

Comparison of Pellets, Fa
Reasoning
Pellets-based reasoning II
Comparison of Pellets, Fa
cwi.unik.no/index.php?title=Comparison_of_Pellets,_FaCT_and_HermiT&action=slide
UNIK
UNIVERSITY GRADUATE CENTER
Examples Of Reasoners
FaCT++ is an open-source tableaux based OWL 2 DL reasoner. It is implemented in C++ and shows exceptional performance on expressive ontologies.
Fully conformant with OWL DL except for keys and some datatypes
new developed based on ideas from FaCT
FaCT : Lisp
HermiT can determine whether or not the input ontology is consistent, identify subsumption relationships between classes, and much more.
Based on a novel hypertableau algorithm,
efficient reasoning
Fully conformant
OWL
OWL 1
OWL 2
Pellet is an open-source Java OWL DL reasoner
developed by
tableau based decision procedure
RDF
OWL Lite
OWL DL
OWL Full
90%
Jena is an open source framework, including reasoning modules
Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710
2 / 7

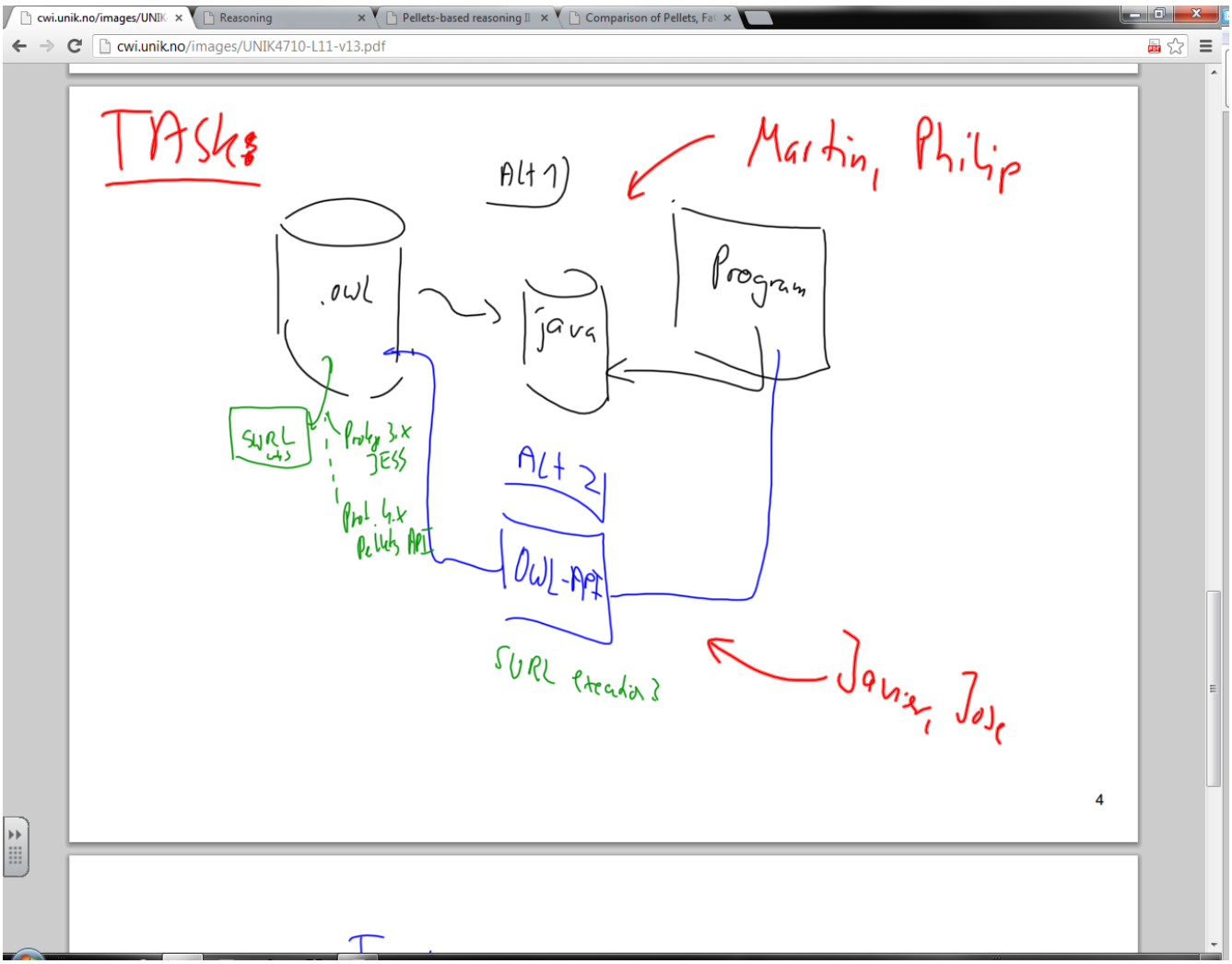

Comparison of Pellets, Fa
Reasoning
Pellets-based reasoning II
Comparison of Pellets, Fa
cwi.unik.no/index.php?title=Comparison_of_Pellets,_FaCT_and_HermiT&action=slide
UNIK
UNIVERSITY GRADUATE CENTER
Terminology
Assertional Box (Abox)
contains assertions about individuals,i.e. OWL facts such as type, property-value...
Realizing the ABox, i.e. computing the most specific concept(s) that each individual is an instance of.
Example: all people being students
Terminological Box (Tbox)
contains axioms about classes, i.e.OWL axioms such as subclass, equivalent class...
Example: 'Class:Pizza has subclass:Topping
American Pizza
Knowledge Base (KB):
A combination of an ABox and a TBox, i.e.a complete OWL ontology.
major use cases:
Context
has position, joins a class
Frequent ABox changes (situation classification) and
rare ABox changes (social networks).
Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710
3 / 7

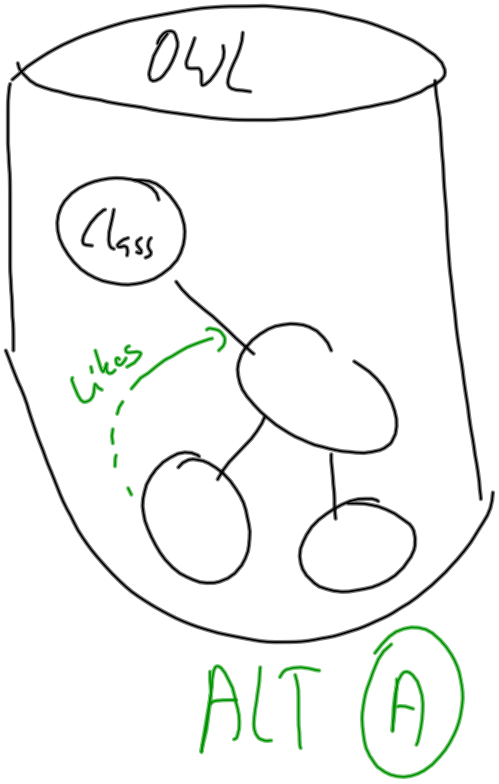

Comparison of Pellets, Fa
Reasoning
Pellets-based reasoning II
Comparison of Pellets, Fa
cwi.unik.no/index.php?title=Comparison_of_Pellets,_FaCT_and_HermiT&action=slide
UNIK
UNIVERSITY GRADUATE CENTER
Reasoner Comparison
Good intro from Bock et al.<ref>Jürgen Bock, Peter Haase, Qiu Ji, Raphael Volz, "Benchmarking OWL Reasoners", [1]</ref>
focus on Abox, Tbox
open source versus other licenses
language, portability
Pellets, HermiT not Pr. 3.x
logic support (e.g. OWL DL)
partly ported to P4.2 (jess in P. 3.x)
performance:
load time
query time
addressing: Language complexity, and size of ontology
no "OWL is bad for all"
Conclusions from Bock et al.
reasoners that employ a simple rule engine scale very well for large ABoxes, but are in principle very limited to lightweight language fragments,
classical tableau reasoners scale well for complex TBox reasoning tasks, but are limited with respect to their support for large ABoxes,
the reasoning techniques based on reduction to disjunctive datalog as implemented in KAON2 scale well for large ABoxes, while at the same time
Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710
4 / 7


Comparison of Pellets, Fa
Reasoning
Pellets-based reasoning II
Comparison of Pellets, Fa
cwi.unik.no/index.php?title=Comparison_of_Pellets,_FaCT_and_HermiT&action=slide
UNIK
UNIVERSITY GRADUATE CENTER
Pellet
based on a presentation by Susana: Media:Pellet_Reasoner.pdf
Pellet is an open-source Java based OWL DL reasoner, see Pellets-based_reasoning
can be used with Jena and OWL API libraries.
Features:
Consistency checking: ensures that an ontology does not contain any contradictory facts.
Concept satisfiability: checks if it is possible for a class to have any instances.
Classification: computes the subclass relations between every named class to create the complete class hierarchy.
Realization: computes the direct types for each of the individuals.
Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710
5 / 7


Comparison of Pellets, Fa
Reasoning
Pellets-based reasoning II
Comparison of Pellets, Fa
cwi.unik.no/index.php?title=Comparison_of_Pellets,_FaCT_and_HermiT&action=slide
UNIK
UNIVERSITY GRADUATE CENTER
Examples Of Reasoners
FaCT++ is an open-source tableaux based OWL 2 DL reasoner. It is implemented in C++ and shows exceptional performance on expressive ontologies.
Fully conformant with OWL DL except for keys and some datatypes
new developed based on ideas from FaCT
HermiT can determine whether or not the input ontology is consistent, identify subsumption relationships between classes, and much more.
Based on a novel hypertableau algorithm,
efficient reasoning
Fully conformant
Pellet is an open-source Java OWL DL reasoner
developed by
tableau based decision procedure
Jena is an open source framework, including reasoning modules
Conclusion 2013:
HermiT
faster
Pellets
Comparison of Pellets, FaCT and HermiT
UNIK4710/UNIK9710
2 / 7


cwi.unik.no/images/UNIK4710-L11-v13.pdf
Classes verification
TBOX
Individuals
ABox
Reasoner
internal consistency
inherit knowledge
HermiT
Fact++
Pellets
Jess
enables
Creates
external ?
rules
OWL
SWRL
necessary
Sufficient
Properties: transitive....
SWRL
relations of classes
3
Alt 1)


cwi.unik.no/images/UNIK4710-L11-v13.pdf
Reasoning
Pellets-based reasoning II
Comparison of Pellets, Fa
TASKS
Martin, Philip
Alt 1)
.owl
java
Program
SWRL
Prolog 3.x
JESS
Prol. 4.x
Pellets API
Alt 2)
OWL-API
SWRL reading
Jamie, Jos
4



ALT (A)

SWRL rule
Likes

ALT (B)

Requires interfacing
- Access Protégé
- Rule tab Protégé