UNIVERSITÉ DE LORRAINE

TELECOM Nancy
Ingénieurs du numérique • Inspiring your digital future

Cours MALG & MOVEX

Overview of the course

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Plan

Sommaire

Current Summary

Summary

Summary

Modelling, specification and verification

Summary

Modelling, specification and verification

- Set-theoretical notations using the Eevent-B modelling language
- Relational modelling of a program or an algorithm
- Program properties as safety, invariance, pre and post conditions
- Design by contract
- Method for proving invariance properties of programs and induction principles as Floyd's method, Hoar logics,
- Techniques for Model-Checking
- Tools : the toolset RODIN, the toolset TLAPS, the toolset PAT, the toolset Eiffel Studio, the toolset Frama-c, ...

Summary

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Logics

Summary

Logics

- Propositional Formulae and first order formulae
- Models
- Sequents Calculus
- Proofs and deduction
- Resolution
- Tools : the toolset Rodin

Summary

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Fixed-Point Theory

Summary

Fixed-Point Theory

- Complete Partiallly Ordered Sets (CPO) and Complete Lattices
- Fixed-Point Theorems : Kleene, Tarski, ...
- Abstract Interpretation
- Galois Lattices
- Static analysis of Programs by abstract interpretation.
- Semantics of programs

Summary

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Computability, Decidability, complexity, Undecidabiliy

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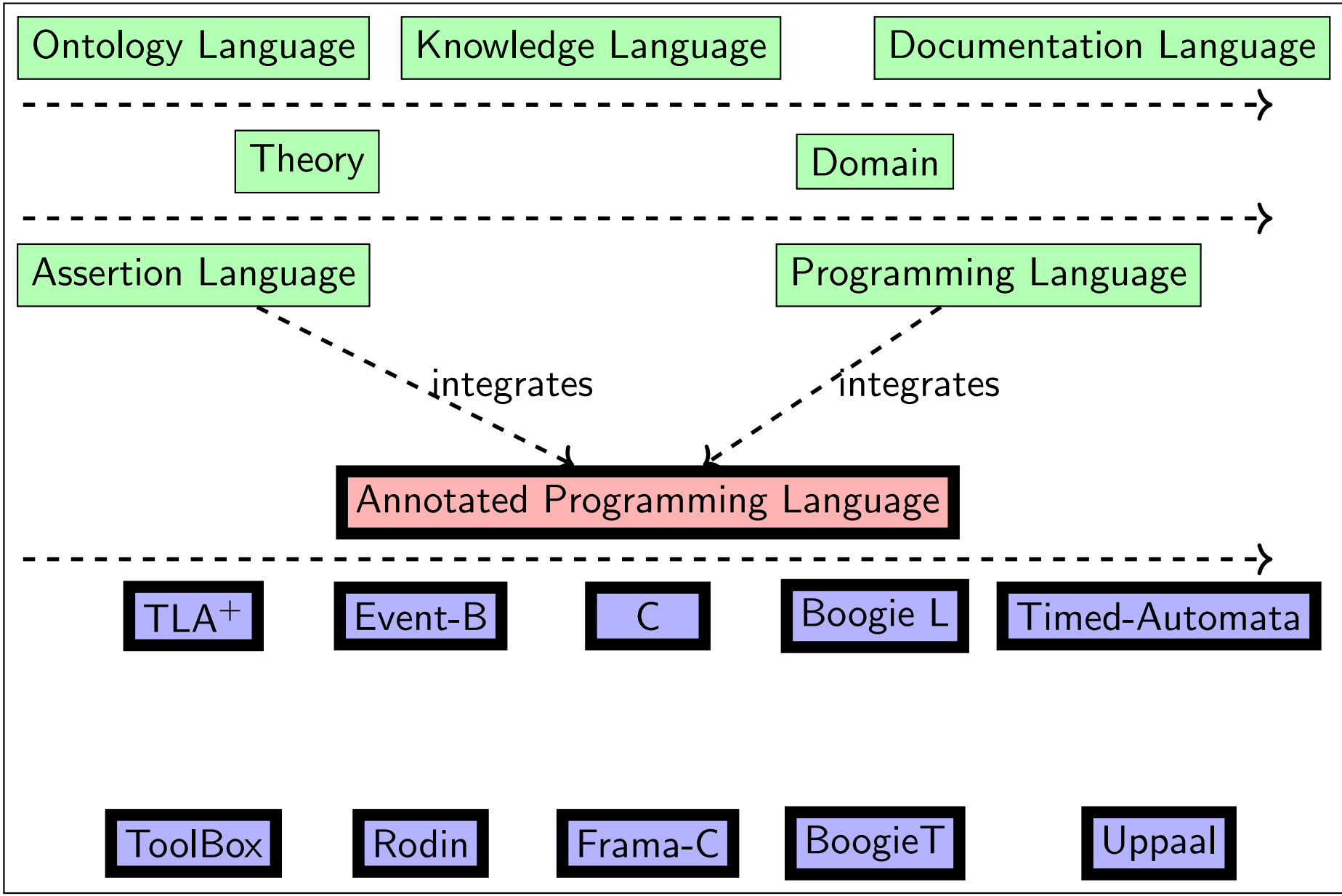
Computability, Decidability, complexity, Undecidabiliy

- Models of computing : Turing Machines, Partially Recursive Functions, URM, ...
- Church's Thesis
- Decidability
- Undecidability
- Complexity

Summry of concepts



Summary

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Tools

Summary

Tools

- The TLA$^+$ ToolBox
- The RODIN platform
- Frama-C
- Boogie and the Visual Studio Suite
- UPPAAL

Informations et méthodologie du cours

- Documents sur Arche Modèles et Algorithmes avec le mot de passe *mery2023*
- Alternance des cours et des TDs avec des séances sur machines.
- Intervention de Rosemary Monahan de NUI Maynooth en cours d'année pour un cours et un TD dupliqué pour IL.
- Deux groupes de TD
- Machine virtuelle et machines telecom avec les logiciels installés.