Distributed/Asynchronous, Embedded/Synchronous system Development (DAESD)

Spring School

INRIA Sophia-Antipolis (France)

ECNU, April 27， April 29-30, 2013

Room 201, Mathematics Building(数学馆 201)

9:00-16:30

Abstract:

The advent of parallel computing resources is by now a well-established thing, as they are becoming more and more available in our daily environment. But the design of high-level and trusted methods for modeling and programming applications to be mapped onto such computing infrastructures is still, and will remain for a long time, the subject of open research.

The ***DAESD Spring School*** will show contributions in this direction, by considering quite general high-level modeling formalisms, combining formal models and methods with model-driven engineering approaches. Safety and correct-by-construction aspects will also by covered, as the relation between modeling formalisms and computation models on the one hand, implementing and programming models on the other hand.

Similar issues will be tackled either in the context of (microscopic) embedded parallelism and MPSoC (multi-processor systems-on-chip), and (macroscopic) distributed grid and cloud infrastructures. The split will be followed in the organization of the School in two inter-related halves:

Models of Computation and Communication for embedded applications and Adequation Algorithm-Architecture (Robert de Simone, Frédéric Mallet, Vania Joloboff):

- Model-Driven Engineering for platform-based design: MARTE UML profile and its Time Model
- A Clock Constraint Specification Language for Real-Time scheduling and its techniques of analysis
- Algorithm: DataFlow Process Network formal models and properties
- Algorithm: Synchronous reactive languages and explicit application scheduling
- Architecture: Virtual Prototyping, Hardware simulation.

Designing, programming, and verifying distributed systems (Ludovic Henrio, Eric Madelaine):

- A characterization of communications in distributed systems.
- Fault tolerance and recovery for distributed systems.
- Programming large-scale distributed applications with components.
- Specifying the architecture and behavior of component-based distributed software: the VerCors platform.
- Model-checking (large) distributed applications: methodology, scalability, tools.

Agenda proposal:

Saturday 27th:

Morning:

Asynchronous/Distributed (1): **Ludovic Henrio**

- A characterization of communications in distributed systems.
- Fault tolerance and recovery for distributed systems.
- Programming large-scale distributed applications with components.

Afternoon:

Asynchronous/Distributed (2): **Eric Madelaine**

- Specifying the architecture and behavior of component-based distributed software: the VerCors platform.
- Model-checking (large) distributed applications: methodology, scalability, tools.

Monday 29th:

Morning :

(Short) Introduction: **Robert de Simone**

Embedded/Synchronous (1) : **Robert de Simone**, **Frédéric Mallet**:

- Model-Driven Engineering for platform-based design: MARTE UML profile and its Time Model
- A Clock Constraint Specification Language for Real-Time scheduling and its techniques of analysis
- Algorithm: DataFlow Process Network formal models and properties
- Algorithm: Synchronous reactive languages and explicit application scheduling

Afternoon:

Embedded/Synchronous (2) : **Vania Joloboff**

- Virtual prototyping introduction
- Hardware simulation
    - Simulation speed
    - Performance prediction: simulation of time, simulation of particular hardware features

Tuesday 30th: (lab) :

Morning:

Embedded/Synchronous (3, TDs and exercices) : **Robert de Simone**, **Frédéric Mallet**

Afternoon

Asynchronous/Distributed (3, TDs and exercices): **Eric Madelaine**, **Ludovic Henrio**