

Coloured Petri Nets

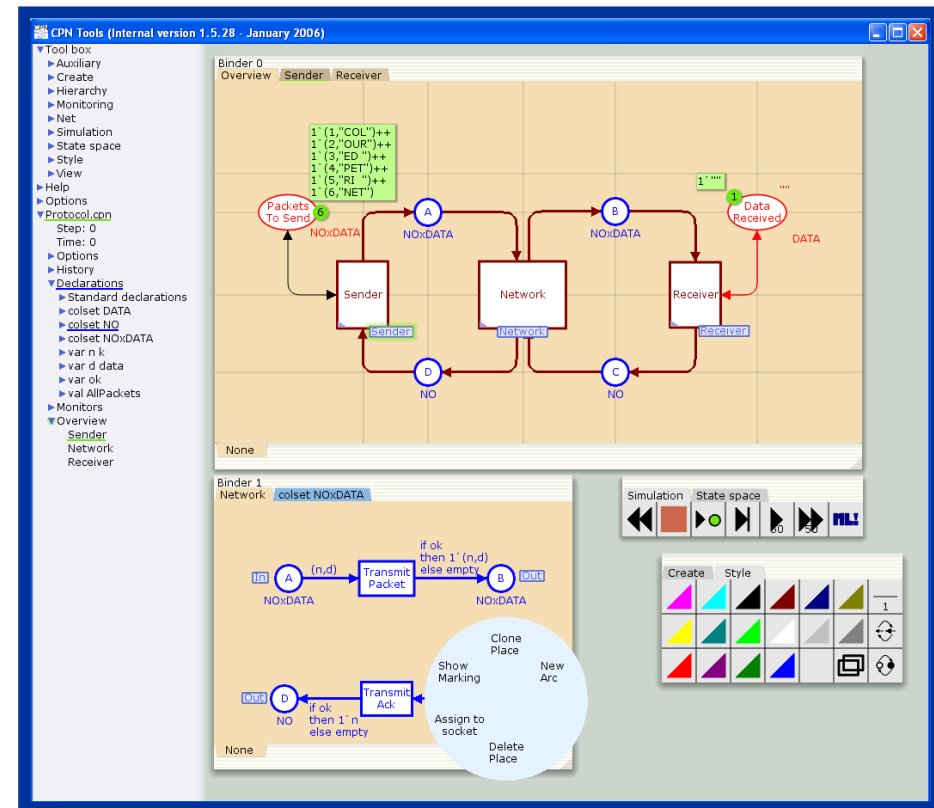
Modelling and Validation of Concurrent Systems

Course Introduction

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UNIVERSITY OF AARHUS

Modelling and Validation of Distributed Systems Group
Department of Computer Science

Kurt Jensen and Lars M. Kristensen
Coloured Petri Nets

Aim and Intended Learning Outcomes (Q3)

The participants will after the course have detailed knowledge of **Coloured Petri Nets**, and practical experience with modelling and validation of **concurrent systems**.

- *explain* constructs and concepts in the Coloured Petri Net modelling language.
- *define* and *explain* the syntax and semantics of Coloured Petri Nets.
- *define* and *explain* properties for characterising the behaviour of concurrent systems.
- *apply* Coloured Petri Nets and CPN Tools for modelling and validation of concurrent systems.
- *explain* the basic concepts and techniques underlying state space analysis.
- *judge* the practical application of Coloured Petri Nets for modelling and validation of concurrent systems.




Aim and Intended Learning Outcomes (Q4)

The participants will after the course have practical experience with the **application** of Coloured Petri Nets and CPN Tools for **modelling and validation of larger concurrent systems**. The working method of the course will also train the participants to plan and complete projects, and to communicate professional issues.

- **construct** and **structure** Coloured Petri Net models of larger concurrent systems.
- **apply** analysis methods for Coloured Petri Nets for validation of larger concurrent systems.
- **discuss** the application of Coloured Petri Nets for modelling and validation of larger concurrent systems.



Practical information

**Coloured Petri Nets 1+2**
A A R H U S U N I V E R S I T E T

CPN

DAIMI / Courses / CPN

■ Home

☐ Schedule
☐ Projects
☐ Material
☐ Participants
☐ Tools
☐ Links

Announcements

- 24/01/2008: Course web pages revised.

The [daimi.cpn](#) newsgroup is also available for announcements and technical discussions related to the course.

Description

To cope with the complexity of modern computing systems, it is crucial to be able to debug and test the central parts of system designs prior to implementation. One way to do this is to build a prototype. Another and often faster way is to build a model. This allows the designer to inspect the model and in this way learn and reason about the behaviour of the system prior to implementation. In this way many design problems and errors can be discovered early in the system development phase.

This course will focus on Coloured Petri Nets (CPN) which is a graphical modelling language used for communication protocols and other software for distributed systems. CPN allows system designers to build models that can be executed and analysed by a computer tool. Simulation of CPN models makes it possible to conduct a detailed investigation of the system behaviour, and reason about performance properties (such as delays and throughput). State space analysis makes it possible to verify functional properties of the system (such as absence of deadlocks).

www.daimi.au.dk/~kris/CPN and daimi.cpn newsgroup



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Lectures

- **Third quarter: Coloured Petri Nets 1**
 - Monday 10-12 in Shannon-157.
 - Friday 10-12 in Shannon-157.
- **Fourth quarter: Coloured Petri Nets 2**
 - Lectures/meetings/workshops.
 - Dates and time will be decided later.
- **It is possible to follow only Coloured Petri Nets 1.**
- **Preparing for lectures:**
 - We expect you to have read the material prior to the lectures.
 - We may skip the easier parts in the reading material and concrete on the more difficult parts.



Course material

K. Jensen and L.M. Kristensen:
*Coloured Petri Nets – Modelling
and Validation of Concurrent
Systems.*

**Hard copies of chapters will be
provided as we go.**

**Please provide your comments to
us. All kinds of comments are
extremely welcome - ranging
from conceptual issues to trivial
spelling and typographical errors.**

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Coloured Petri Nets

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DRAFT MANUSCRIPT

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Berlin Heidelberg New York
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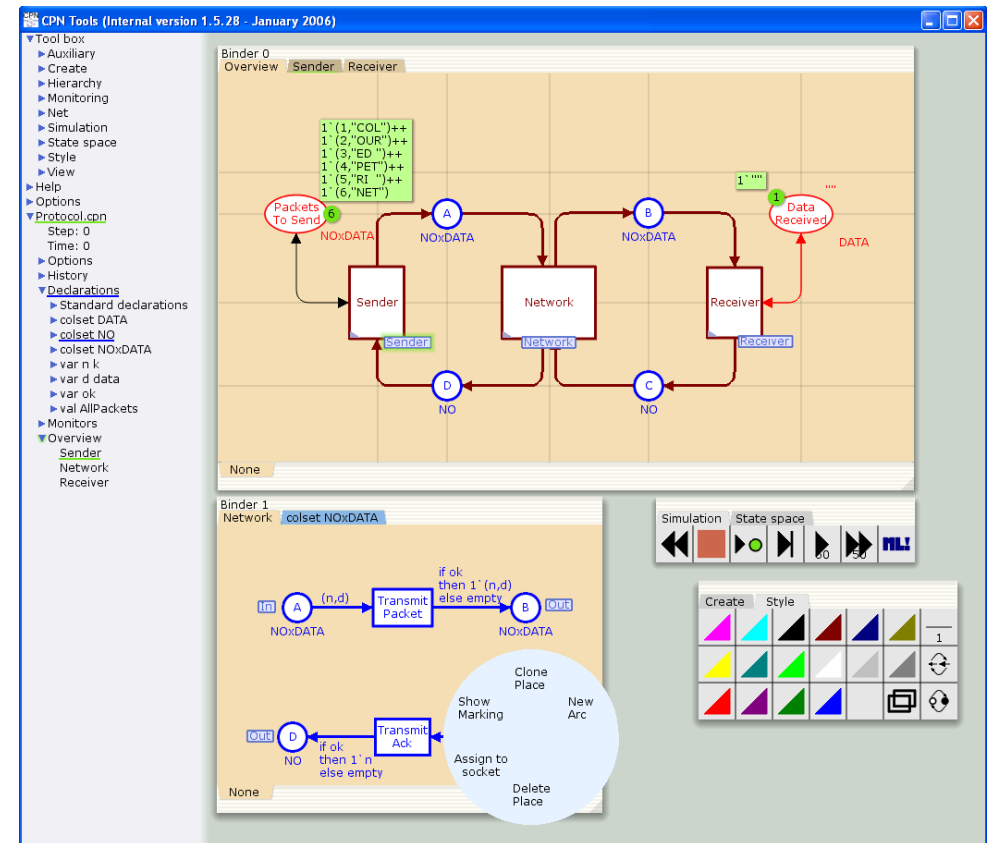
Mandatory projects

- **Third quarter: Coloured Petri Nets 1**
 - Project 1: **CPN modelling**.
 - Project 2: **State space analysis**.
 - Each documented in a **5-10 pages** project report.
- **Fourth quarter: Coloured Petri Nets 2**
 - **Larger project** on CPN modelling and validation.
 - 1-2 progress presentations.
 - Documented in a **15-20 pages** project report.
- **Conducted in groups of 2-3 persons.**
- **Start forming the groups now!**



CPN Tools

- **Developed at DAIMI:**
 - 6000+ licenses.
 - 130+ countries.
- **Homepage:**
 - www.daimi.au.dk/CPNTools
- **Download:**
 - username: %
 - password: EWR5646
- **Version:**
 - 2.3.5 Development.
- **Runs under MS Windows and Linux.**



Machines

- Required for running CPN Tools and conducting the project work.
- **Some laptops** are available for distribution to the projects groups (if required).
- DAIMI machines and private laptops/machines can also be used.



Course plan

www.daimi.au.dk/~kris/CPN/schedule.html

Participants

www.daimi.au.dk/~kris/CPN/participants.html



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Exam(s)

- **Coloured Petri Nets 1:**
 - Individual **oral examination** (20 minutes, no advance preparation).
 - Based on topics from the textbook material and the two projects.
- **Everyone is required to take the CPN1 exam.**
- **Coloured Petri Nets 2:**
 - Individual **oral examination** (20 minutes, no advance preparation).
 - Project and associated report will serve as a basis.



