

# Formalization of Software Behavioural Models

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## Abstract

Coloured Petri Nets (CPNs) was formulated by Jensen as a formally founded graphically oriented modelling language. In contrast to ordinary Petri nets, CPNs provide a very compact way of modelling and analysing industrial-sized systems. This is achieved by combining the strengths of Petri nets with the expressive power of high-level programming languages. Petri nets provides the constructions for specifying synchronisation of concurrent processes, and the programming language provides the constructions for specifying and manipulating data values.

The Unified Modeling Language (UML) is a standard multiple-view modeling language. UML's proponents give an enormous importance to use cases (one of the UML's diagrams), since it is based on them that they support all the system's development phases (analysis, design, implementation and test). Use case models are quite simple and intuitive. This is an essential property to permit the dialog between clients and designers. However, this is also a problem since use cases lack of formalization imply that there may appear ambiguities in reading a model and difficulties during the design and implementation of the system.

The goal of this thesis is to propose a methodology for developing workflow systems and to formalize its behavioural models in order to validate some of its critical properties. The meta-models that have been considered are the CPNs, and the use case diagrams.