2011/2012 Seminar Series

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Model Driven Engineering and DPF

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Model-driven engineering (MDE) is a branch of software engineering which aims at improving productivity, quality, and cost-effectiveness of software development by shifting the paradigm from codecentric to model-centric activities. MDE promotes models and modelling languages as the main artefacts of the development process and model transformation as the primary technique to generate (parts of) software systems out of models. Models enable developers to reason at a higher level of abstraction, while model transformation helps developers to avoid repetitive and error-prone tasks.

Models can be specified using general-purpose languages such as the Unified Modeling Language (UML), but to fully realise the potential of MDE, models are often specified using domain-specific modelling languages (DSMLs) which are tailored to specific domains of concern. One way to define DSMLs in MDE is by specifying metamodels, which are models that describe the concepts and define the syntax of a DSML. A model is said to *conform to* a metamodel if each element in the model is typed by an element in the metamodel and, in addition, satisfies all constraints of the metamodel.

In this talk we will give a general introduction to MDE and specially focus on how the Diagram Predicate Framework (DPF) is tackling the challenges of MDE. DPF provides a formalisation of (meta)- modelling and model transformation based on category theory and graph transformations. DPF has a prototype implementation, the DPF Workbench, that supports the development of metamodelling hierarchies with an arbitrary number of metalevels. That is, each model at a metalevel can be used as a metamodel for the metalevel below. Moreover, the DPF Workbench checks the conformance of models to their metamodels by validating both typing and diagrammatic constraints. The DPFWorkbench comes with a code generation facility that is used to generate program code from DPF specifications.

Wednesday, May 30th @ 4:00pm
Information Technology Centre ITC317