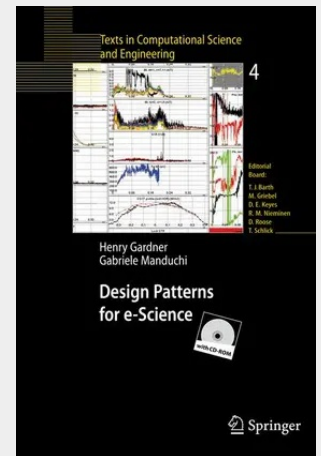


Design Patterns for e-Science

This book is for readers with backgrounds in science engineering who have experience in computer programming but who lack training in software engineering. It teaches object-oriented design patterns in a real-world context, which is relevant to computational science. Coverage is centered around a case study in software development in e-science using the Java™ programming language. A graphical front-end for browsing and visualizing scientific waveform data is progressively refactored using important design patterns for object-oriented software and the final product is ready for porting onto the Grid.

This is a book about a code and about coding. The code is a case study which has been used to teach courses in e-Science at the Australian National University since 2001. Students learn advanced programming skills and techniques in the Java language. Above all, they learn to apply useful object-oriented design patterns as they progressively refactor and enhance the software. We think our case study, EScope, is as close to real life as you can get! It is a smaller version of a networked, graphical, waveform browser which is used in the control rooms of fusion energy experiments around the world. It is quintessential e-Science in the sense of e-Science being computer science and information technology in the service of science. It is not, specifically, Grid-enabled, but we develop it in a way that will facilitate its deployment onto the Grid. The standard version of EScope interfaces with a specialised database for waveforms, and related data, known as MDSplus. On the accompanying CD, we have provided you with software which will enable you to install MDSplus, EScope and sample data files onto Windows or Linux computers. There is much additional software including many versions of the case study as it gets built up and progressively refactored using design patterns. There will be a home web-site for this book which will contain up-to-date information about the software and other aspects of the case study.



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