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Modelling techniques for spatial information using free and open source tools

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This presentation is concerned with the demonstration of specification and modelling techniques for the representation of geographic data. We will demonstrate two approaches to spatial modelling using freely available tools. We will use an extension to the Unified Modelling Language (UML) called ArgoCASEGEO[1] together with an OCL tool called USE[2]. Together these represent the object oriented paradigm. In contrast we also use an executable specification language called CafeOBJ [3]. Both of these techniques allow us to build executable prototypes. Heterogeneous geographic information consists of metric, topological, and thematic data. All this information is time varying. Further it is required that such information be stored, queried and updated, which entails the specification of a database schema. Geographic information has important economic, social, and legal roles which demand high quality data and high quality systems to maintain that data. We feel that modelling this data can contribute to our understanding of its inherent complexity. Given the complexity and diversity involved in modelling spatial and temporal data, it is entirely appropriate to tackle small sections of the overall problem one at a time using the most appropriate techniques. Equally, in order to present a coherent model it is important to combine the various models into a meaningful coherent whole. These tasks present a significant modelling challenge. In order to make our ideas more concrete we will present a motivating example, which consists of a simple map and two executable prototypes, which captures some of the complexity present even in a simple map.

[1]ArgoCASEGEO: <http://www.dpi.ufv.br/projetos/argocasegeo/>

[2]A UML-based Specification Environment:

<http://www.db.informatik.uni-bremen.de/projects/USE/>

[3]CafeOBJ: <http://www.ldr.jaist.ac.jp/cafeobj/>

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