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Chapter VII

Supporting Object Oriented Modeling Techniques

This chapter focuses on exploring the capability of the CAME environment, to support a problem area that requires a design approach that uses the modeling techniques of an object oriented method. The problem presented lies in the design and development of a computerized automobile map system using the modeling techniques prescribed by the OMT method (Rumbaugh et al., 1990). As this problem area requires an object modeling technique, the need to advocate UML was not necessary.

The case study is concerned with the introduction of computerized display systems in automobiles, and one of the potential applications for these systems is automated map display. The map system should provide access to a collection of maps for a region. Within this region, the maps should show cities, towns, and the routes between them. The maps should also display restaurants, hotels, and other points of interest to travelers. Within large cities, enough roads will be shown to give an efficient route between any two points. The system should automate as much of the access and displaying of the maps as possible. Simple function buttons will be provided to allow the user to zoom in or out, or pan across the map in any direction. The system should control display clutter automatically by showing only the most important features at the selected zoom level. In the default mode, a region surrounding the cars' current position will be shown, and the display should scroll automatically to reveal new map features as the car moves. The automobile's position will be determined using a global positioning device that computes position based on satellite signals. The above outlines the functionality required from a computerized automobile map system.

The problems of present interest require, in particular, an object oriented

approach to the design and development of an information system. The automobile map system is a typical candidate for an object oriented design and development strategy. OMT is one of the frequently preferred methods for use with object oriented information systems design and development approaches. The decision to use the method OMT for this particular problem is based on the tutorial notes of Blaha and Eddy (1992), where the same problem is used as an example in modeling according to the OMT approach, and they are also the co-authors of the OMT method.

The OMT method contains three modeling techniques namely, OM (Object Model), DM (Dynamic Model), and FM (Functional Model), which are normally interpreted as given in the method. Dynamic modeling can be compared to the State Transition Diagram (STD) technique, and functional modeling is similar to the Data Flow Diagram (DFD) technique in a structured design approach.

The automated support required for the OMT method at the analysis and design stage comes in a number of forms in conventional object oriented CASE tools such as OMTool, as well as in MetaCASE tools such as MetaEdit+. Conventional tools give only modules of the above-mentioned UpperCASE tools combined with a program interface, and do not provide support to represent attributes and operations or constraints as required for object modeling. MetaCASE can be used to generate the above-mentioned tools using the components of the techniques, similar to the conventional approach. It provides a small set of modeling concepts for the method description and does not provide a means to adopt the modeling concepts to shape the UpperCASE tool to the problem area. Therefore, the two main groups, conventional tools and MetaCASE tools of automated modeling support offered to OMT's way of modeling, are not satisfactory with regards to required flexibility levels.

The previous chapter stated that the design approach chosen had to be tested over a number of experiments, and evaluated the proposed theory and supporting technology over the tests which included the extension of modeling concepts, constraints, and tool set integration. As a result it is not necessary to repeat similar tests for the case study presented here. The goal of this experiment is to test how far we could support the object oriented modeling tools required for the expert approach as described in the tutorial notes of Blaha et al. (1992) using the CAME environment. The three modeling techniques are generated according to the method specification in Blaha et al. (1992). Therefore, within