ABSTRACT

Model-based design is easy to praise, but non-trivial to follow, especially when designing from scratch. We describe a paradigm for instructing students in the art and science of Model-Integrated Computing (MIC), as well as a motivating example which demonstrates the phases of the design of a modeling environment.

1. Domain Knowledge

Before creating a modeling environment, the domain concepts must be understood.

Example: Kinds of Publications

- Domain knowledge: There are many kinds of publications, but they all have certain common characteristics. Use domain knowledge obtained from years of thinking and best-practices in "so what?".

Example: Authors of publications

- Domain knowledge: Authors have authors, and authors are typically associated with more than one publication. Consider how to reuse authors across publications, and avoid re-entering information.

2. Concepts Encoding

Once the concepts are understood, the domain concepts are mapped using the basic concepts of modeling.

Example: Kinds of Publications

- Concepts used: Specialization

Example: Authors of publications

- Concepts used: Hierarchy

3. Translators & 4. Artifacts

Models are only useful if they can be translated or interpreted into some other useful form.

Example: Generate database

Example: Generate HTML version of bibliography

"SO WHAT?"

The designer learns that there is a difference between a useful modeling environment, and one for the sake of having one. Designs evolve, and a "fixed-point" of usability vs. overhead is reached. Metamodelling reduces the overhead of creating the GUI and syntax parser.

FOR MORE INFORMATION

Download the tool: http://www.eecs.berkeley.edu/~sprinkle/oopsla/

GME Information: http://www.isis.vanderbilt.edu/

Chess website: http://chess.eecs.berkeley.edu/

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PublicationRef

Example: Generate BibTeX database

- Year : field
- Title : field
- URL : field
- AddressOptional : field
- Author
- PublicationName : field
- Publisher : field
- SeriesOptional : field
- VolumeOptional : field
- NumberOptional : field
- PagesOptional : field
- NotesOptional : field
- PublisherOptional : field
- Month : enum
- NumberOptional : field
- OrganizationOptional : field
- AddressOptional : field
- PublicationRef

Example: Generate HTML version of bibliography

- Title : field
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- PagesOptional : field
- NotesOptional : field
- PublisherOptional : field
- Month : enum
- NumberOptional : field
- OrganizationOptional : field
- AddressOptional : field

Evolution

Cut 1: Clunky

Cut 2: Uses some specialization

Cut 3: Uses significant specialization, but increased complexity

"So What?"