UML in Practice

CSE 3311 & 5324
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One-Slide History of UML

http://commons.wikimedia.org/wiki/File:GradyBooch.gif

- Introduced in 1994
- UML = ***Unified*** Modeling Language
- Unifies 3 languages
  - Grady Booch: Object-Oriented Design (OOD)
  - James Rumbaugh: Object Modeling Technique (OMT)
  - Ivar Jacobson: Object-Oriented Software Engineering (OOSE)
- Developed at Rational (now part of IBM)
- Managed by Object Management Group (OMG)

UML in hindsight: Ivar Jacobson

- Invented use-cases (Ericsson), co-developed UML
- Q: What would you change in the future? What might change in UML?
- Ivar Jacobson:
  - **“The language is too complex.** We need to change that.
  - **Eighty percent of all applications can be designed with less than 20% of UML.**
  - In my company we have defined a pure subset of UML to become the Essential Unified Modeling Language. We also use a very different way of describing UML that is much more attractive to ordinary users. Traditional UML is designed for methodologists or tool vendors.”

    [Masterminds, page 328, formatted]

Quote continued:

- “[..] **The semantics of UML are poorly defined.**
- UML—in particular, UML 2.0—has included so many constructs from so many different methodological camps that it became impossible to define its semantics clearly. Like many other languages, UML became, as John Backus said about Ada, ‘fat and flabby’. [..]
- Having said that, even if UML is not formally defined, it was far better designed than most other popular OO modeling languages. Basically all competing languages were abandoned when UML became available. If used right, UML can really help developers to become successful.
- Friends of UML shouldn’t fear; there is a great future, **but UML should be given a better structure and it needs a formal definition**.”

[Masterminds, page 328, formatted]

Following Slides Summarize a Survey

- "UML in Practice" paper by Marian Petre
  - Presented at the 2013 International Conference on Software Engineering (ICSE)
    - » ICSE is the main academic software engineering conference
  - http://dl.acm.org/citation.cfm?id=2486883

Survey Details

- Interviews with 50 software developers over 2 years
  - From 50 different companies
  - Selected opportunistically via social networks
- Mix of company sizes, application areas, locations
  - Mostly Europe & North America

- Semi-structured interviews
  - “Do you use UML?” (in your current project)
  - “Can you tell me about how you use it?” / “Why not?”
  - “Is your usage typical of your organization?”
- Interviewees provided samples of UML use

Results: 70% Did Not Use UML (35/50)

- Many people have tried UML in past projects
  - But UML did not seem to offer benefits over other approaches

- “What was good about UML was not new, and what was new about UML was not good”

8% Used It, But Not As a Design Aid

- 2% only used it to retrofit
  - Create UML only after the fact to satisfy management or customers
  - Similar to students generating UML from code “since instructor asked for UML”
- 6% only used it for code generation
  - Use UML only to capture design once the design is stabilized, to generate code

Only 22% Used It As a Design Aid

- 22% used it, but only selectively
  - Personal, selective, informal use of UML
  - Throw away when no longer useful

- **Nobody used it wholeheartedly (0/50)**
  - Use deeply embedded in organization

- Careful: This was ***not a representative study***
  - Know of at least one large organization in which UML use is deeply embedded (Lockheed Martin)
  - Google for “Lockheed Martin UML” and you likely find several job openings

Selective Use (22%)

This CSE 3311 class aims for such selective use of UML

- Tool to help think about the problem
- Communication with technical stakeholders
  - Elicit requirements
  - Keep diagrams focused, simple, abstract, not a full detailed design
- Early in process to explore alternative design
  - Common language in and across teams
- Avoid complete models and their problems
  - Consistency across diagrams

Most Commonly Used Diagrams

- *Diagram (number of users)*
- **Class diagrams (7)**
  - See lecture on Domain Models
- **Sequence diagrams (6)**
  - See lecture on Dynamic Design Models
- Activity diagrams (6)
- State machine diagrams (3)
- Use case diagrams (1)
  - **“Use cases” mentioned frequently, but not use case diagrams**
  - See lecture on Use-Case Modeling

How “Selective Users” Used UML

- Manually
  - Pencil/paper, post-it, whiteboard, digital camera
- Tool support
  - Rational, Eclipse plug-in, etc.

Wholehearted UML Use

- None of interviewees did it currently
- But on previous projects or projects by others in same organization (secondary reports)

- Investments in UML tools, training
- Adapted UML to fit organization
- Had its own problems
  - Projects still failed, despite the investments in UML

Summary on UML in Practice

- De-facto standard modeling language

- Not universally adopted
  - Majority does not use it at all
  - Those who use UML mostly use it selectively