CS2062 Object Oriented Software Development

Lecture 2

Requirements

Gather Detailed Information

- Dialog with users of new system
- Dialog with users of similar systems
- Read documentation on existing system
- Develop expertise in business area system will support
- Other technical information should be collected
  - Computer usage, work locations, system interfaces, and software packages

Define Requirements

- Models record/communicate functional requirements
- Modeling continues while information is gathered
- Process of refining is source of learning for analyst
- Specific models built depend on developing system

Prioritize Requirements

- Users tend to request sizeable number of functions
- Scarcity of resources limit function implementation
- Scope creep: tendency of function list to grow
- Scope creep adversely impacts project
  - Leads to cost overruns
  - May also cause implementation delays
- Prioritization of functions antidote to scope creep

Evaluate Requirements with Users

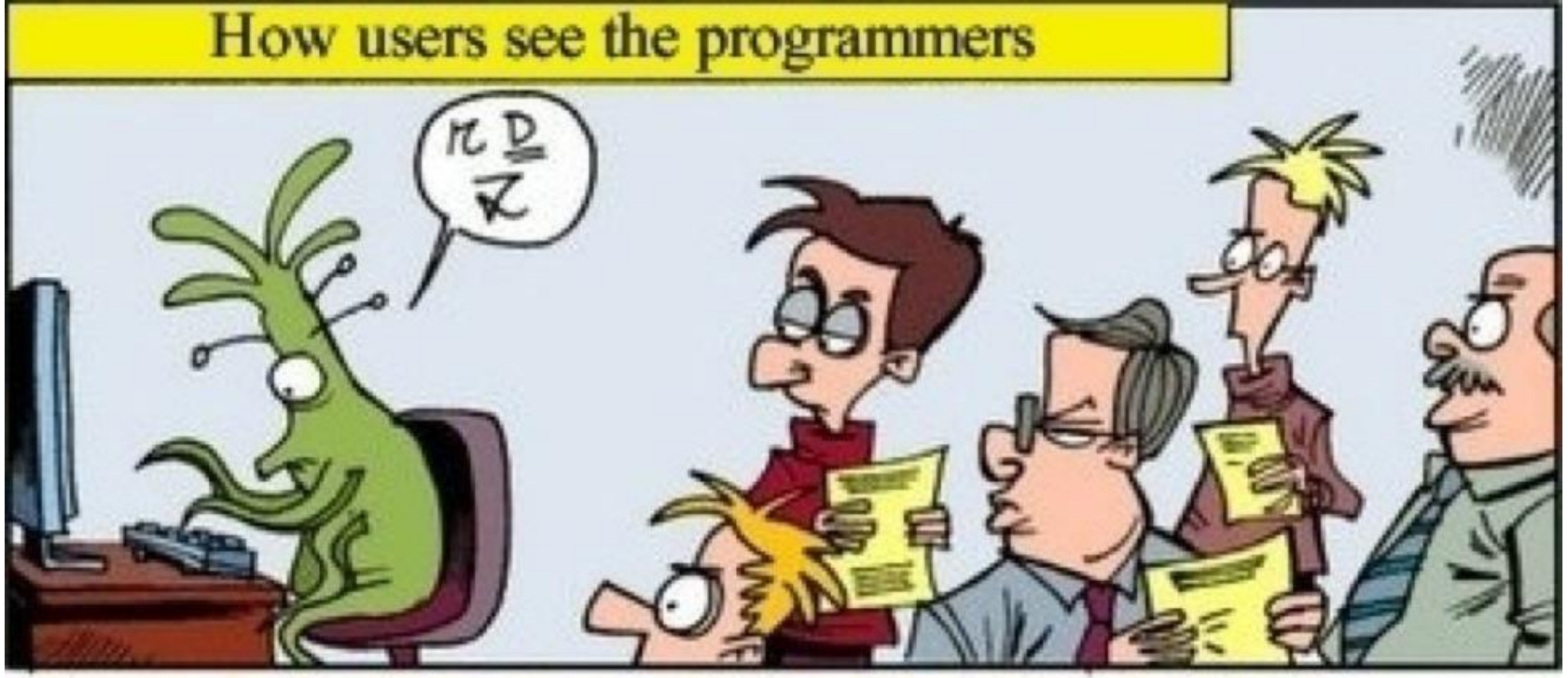
- Models built and validated as per user requirements
- Process is iterative
- Alternative models developed and continually revised

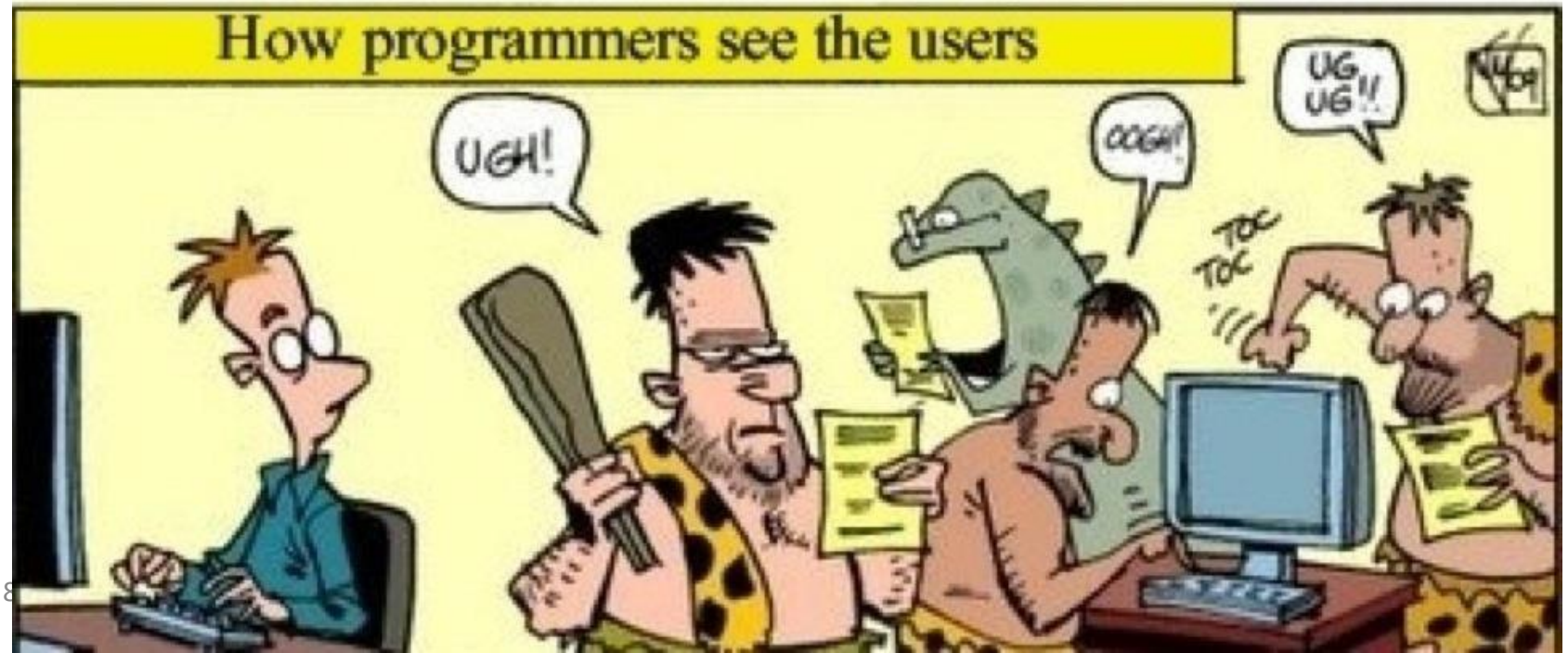
Develop User Interface Dialogs

- Interface as a sensory bridge to physical machine
- Users familiar with functionality of interface
- User feedback on new interface is reliable
- Interface dialogs
  - Model elicits and validate interface requirements
  - May be paper storyboards or prototype

System Requirements

- System requirements consist of capabilities and constraints
- System requirements fall into two categories
  - Functional
    - Directly related to use cases
    - Documented in graphical and textual models
  - Nonfunctional
    - Performance, usability, reliability, and security
    - Documented in narrative descriptions to models


How users see the programmers


How programmers see the users
UGH!
OOGH!
UG UG!!
TOC TOC

The Purpose of Models

- Modeling is a dynamic process
  - Draws together various team members and users
  - Simulates electronic execution of tasks
  - Spurs refinement and expansion of requirements
  - Promotes informal training
- Model development tools
  - Simple implements such as pencil and paper
  - Sophisticated tools such as CASE

- Learning from the modeling process
- Reducing complexity by abstraction
- Remembering all of the details
- Communicating with other development team members
- Communication with a variety of users and stakeholders
- Documenting what was done for future maintenance/enhancement

Reasons for Modeling

Types of Models

- There are no universal models
- Models chosen based on nature of information
- Selection process begins with categorization
  - Mathematical models
  - Descriptive models
  - Graphical models

Mathematical Models

- Series of formulas describing technical aspects
- Scientific, engineering, and business applications depend on mathematical models
- Specific examples
  - Equations representing network throughput
  - Function expressing query response time

Graphical Models

- Graphical models provide instant information
- Supplement abstract language of data processing
- Unified Modeling Language (UML)
  - Provides standards for object-oriented models

Descriptive Models

- Narrative memos, reports, or lists
- Provide high-level views
- Information not reflected in mathematical models
- Usually incorporated into graphical schemes

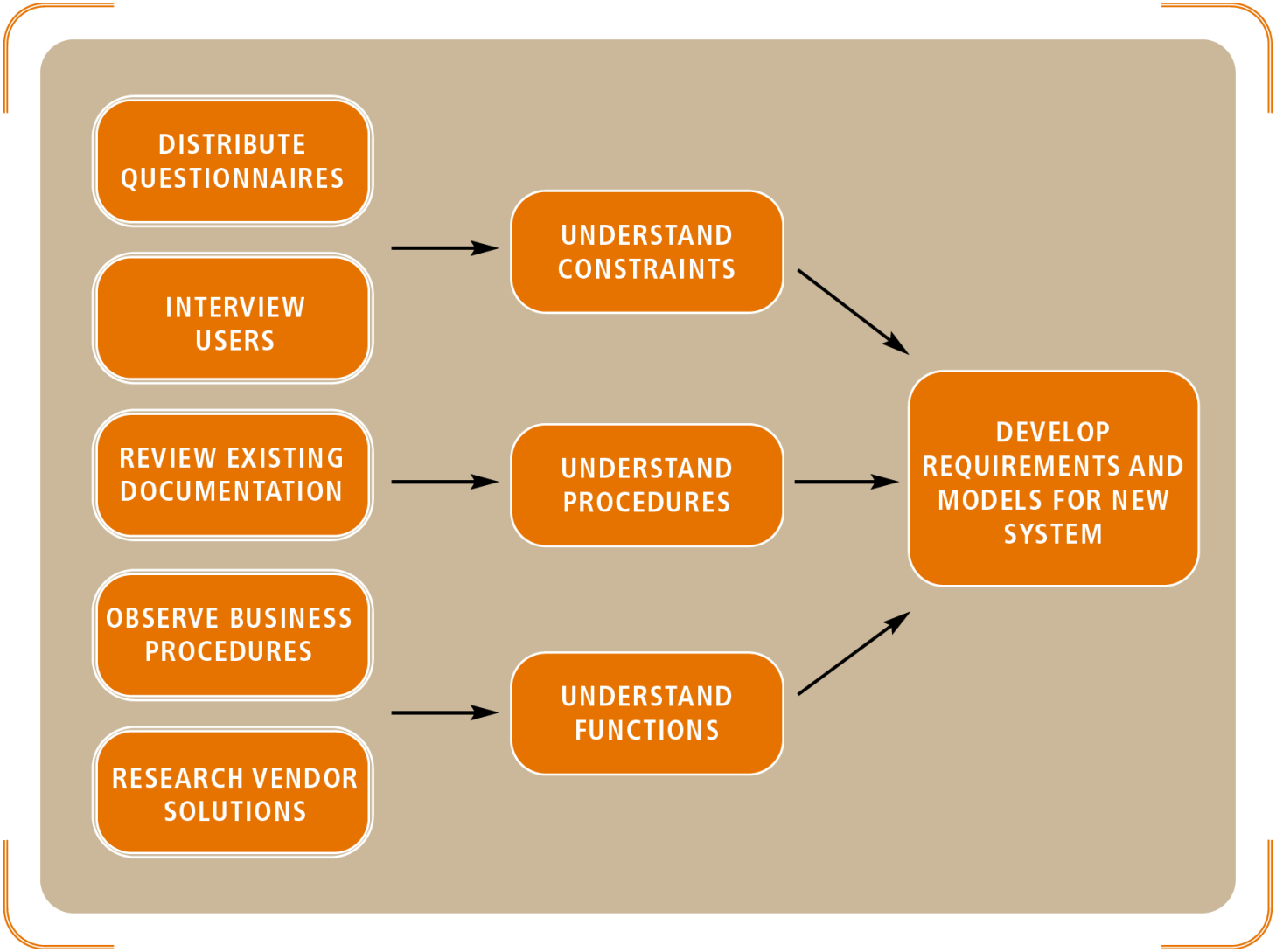
A narrative description of processing requirements as verbalized by an RMO phone-order representative:

"When customers call in, I first ask if they have ordered by phone with us before, and I try to get them to tell me their customer ID number that they can find on the mailing label on the catalog. Or, if they seem puzzled about the customer number, I need to look them up by name and go through a process of elimination, looking at all of the Smiths in Dayton, for example, until I get the right one. Next, I ask what catalog they are looking at, which sometimes is out of date. If that is the case, then I explain that many items are still offered, but that the prices might be different. Naturally, they point to a page number, which doesn't help me because of the different catalogs, but I get them to tell me the product ID somehow...."

Some Descriptive Models

Techniques for Information Gathering

- Questioning, observing, researching, modeling
- Good questions initiate process
- Questions center around three themes
  - What are business processes?
  - How is the business process performed?
  - What information is required?



The Relationship between Information Gathering and Model Building

THEME	QUESTIONS TO USERS
What are the business operations and processes?	What do you do?
How should those operations be performed?	How do you do it? What steps do you follow?
What information is needed to perform those operations?	What information do you use? What forms or reports do you use?

Sample Themes for Defining Requirements

Validating the Requirements

- Two basic approaches to validating requirements
  - Predictive development
    - Requirements assumed stable and feasible
    - Requirements specified and validated beforehand
  - Adaptive development
    - Requirements are assumed difficult to document
    - Requirements subject to change
    - System prototypes used in validation process