Lecture 3

Human-Centered Development and
the Scenario-Based Approach

Part 1: Human-Centered Development
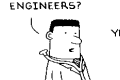
Three Approaches to UI Design

- Attitude of technology-centered development
  - Progress made by technological advances
  - The more bells & whistles the better
- Attitude of designer-centered development
  - Progress made by considering the intuitions of the designer
  - Imagining what the user will do and feel
- Attitude of human-centered development
  - Progress made by incorporating the users into the design process
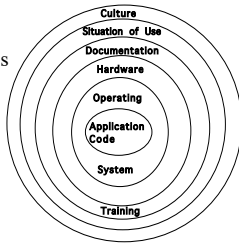 - Empirical studies integrated early into the design

The User "Interface" as Human-Computer Interaction
Definition

- Any part of the computer system that the user comes in contact with either physically, perceptually, or conceptually.

Culture
Situation of Use
Documentation
Hardware
Operating System
Application Code
Training

Human-centered software development

- Definition
  - Early and Continual Focus on Users
    - Direct contact through interviews, observations, surveys, participative design in order to understand characteristics of users and their jobs
  - Integrated Design
    - All aspects of usability evolve in parallel; All aspects of usability under one focus or person
  - Early and Continual User Testing
    - Throughout development, intended users do real work with simulations and prototypes; their performance and reactions are measured qualitatively and quantitatively
  - Iterative Design
    - The system (functions, user interface, help system, reading material, training approach) is modified based upon results of user testing; testing cycle is repeated

Iterative Model of Development
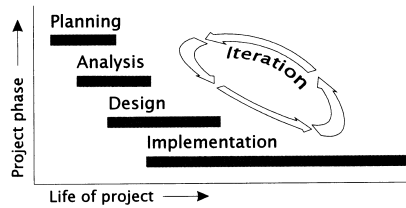
- Describe steps in method

Compare to the Waterfall Model

Steps in method (note: iterative!)

- Planning
  - Scope of project, investigate user population (document analysis, interviews, surveys, observation) & related systems
- Analysis (R&C Requirements Analysis)
  - Task analysis, problem scenario development, requirements for usefulness and usability
- Design (R&C Activity, Information & Interaction Design)
  - Specifications (yes!) for the human-computer interaction (UI?)
- Implementation (R&C Prototyping)
  - Storyboards, mock-ups, software prototypes
- Usability Evaluation (R&C Evaluation)
  - Evaluation without users: cognitive walkthrough, heuristic evaluation (guidelines), GOMS, Keystroke Level Model (KLM)
  - Evaluation with users (usability testing, interviews, questionnaires)

Purpose of Human-Centered Development

- Usefulness (Functionality)
- Usability for skilled users
  - Performance time
  - Failure (Errors)
  - Enjoyment
  - Robustness
  - Fatigue/Stress
  - Safety
- Learnability
  - Learning time
  - Misconceptions

Part 2: Scenario-Based Design

Chapters 1 & 2
Rosson & Carroll
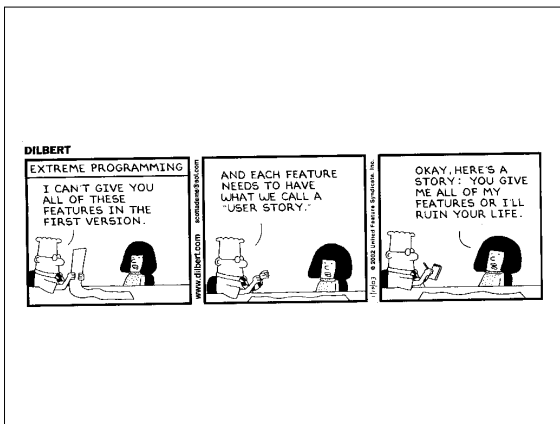
What is a scenario?

- A story about people and their activities containing the five "W's"
  - When
  - Where
  - Who
  - What (and How)
  - Why

Matching the W's to Scenario Components

- When: Setting
- Where: Setting
- Who: Actors/Stakeholders
- What (and How): Tasks, activities, plans, resources, events
- Why: Goals, rationale, claims, expectations, benefits

Why scenarios?

- Context-sensitive: bring out the situation of use
- Vivid descriptions: Easy to create and remember
- Can be used in many ways during development
  - Current work practices scenario
  - Proposed system problem scenario
  - Activity scenario
  - Usability testing task scenario

Requirements Analysis

- Definition: Early phase of software development in which needs of clients with respect to a proposed system are analyzed
- Evolving detailed description of *what* the system should do and why
- Does not describe *how* the system should do it such as the detailed UI design

Phases of Requirements Analysis

- Existing system
- Proposed system

Products of Requirements Analysis

- Root Concept
- Stakeholder profiles
- Tasks carried out by stakeholders
- Problem Scenarios

Root Concept

- high-level vision: problem statement and proposed solution
- basic rationale
- stakeholder groups & how they will benefit
- starting assumptions

Stakeholder Profiles

- Background
- Expectations
- Preferences
- Relationships

Task Descriptions

- Tasks carried out by stakeholders

- Hierarchical task analysis

Problem Scenarios

- the setting
- the people involved
- task goals, expectations, plans and actions of the people
- events created by the environment
- artifacts, technology, and systems involved (resources)

How do you get this information?

- Artifact analysis
- Interviews
- Observation
- Participation
- Survey/Questionnaire

Artifact Analysis

- Collect and examine the documents, objects and other resources that people use in their activities
- Try to understand the content of the information and the role it plays in activities

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Interviews

- Advantages
  - Gathers opinion, Creates rapport
- Disadvantages
  - Must be well-planned
  - Bias: Information often filtered
- Types
  - Structured
    - Fixed set of questions with simple answers
  - Unstructured
    - More open questions

Observation

- Advantages
  - Not an opinion, but an objective record
  - Captures detail
- Disadvantages
  - Intrusive, Time consuming
- Types
  - Passive: "Hanging out"
    - Used in very early design when don't have much information about user's activities
  - Active
    - Provide users with problems to solve or tasks

Participation

- When the observer learns and participates in the work activities

- Overcomes the Hawthorne effect
  - Bias of being observed

- Obtain otherwise privileged information

- Creates first-hand domain knowledge

Survey/Questionnaire

- Purpose
  - Reaches lots of people
  - Perform statistical analysis on data
  - Avoids bias by anonymity
  - Consistent questions
- Design Issues
  - Must be carefully designed, do pilot
  - Must not be time-consuming & easy to reply
  - Must make sense
  - Must gather precise answers, not vague ones
  - Ask only questions which support the design
  - Sample vs. population