Scenario Based Design

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Scenario Based System Design

- Development Jack Carroll and Mary-Beth Rosson in the early 1990s
- Evolved from the difficulties of using multi-disciplinary teams for system development His example is developing a virtual school system - you need teachers, curriculum experts (e.g. people who write textbooks), cognitive and educational psychologists, software engineers, networking experts etc
- How can all these people work together and understand each other’s visions and problems?

Narratives

- Story-telling or narratives is quite natural for humans, so much so that you see it in a lot of different things:
  - Theatre plays
  - Fiction or Non-Fiction books
  - Television, Film
  - User stories in agile software engineering
  - Help documentation

Scenarios

- Scenarios are specific for writing about complex interactions in a domain
- They can be about what happens “in the now” – current practice and what is good and bad about it
- For example, in a game of backgammon we can describe how players interact with tokens, dice, the board etc.

Scenarios (2)

- Scenarios might describe something that happens in the future
- In the case of the backgammon, we might describe an online system tokens are digital representations, or even 3D holograms or anything from science fiction and beyond

Scenario Based Design

- A family of techniques where scenarios are embedded in all aspects of the design lifecycle
- Shifts the focus from functional specifications (traditional approach) to how the product will be used
- It situations stakeholders as users of a system – moving to functional specifications much later
- Can be used as design artifacts that you carry through the lifecycle

Why do SBD?

Hazards of Solution Based Approach	How scenario-based design can help
Designers want to select a solution approach quickly, which may lead to premature commitment to their first design ideas	Because they are concrete but rough, scenarios support visible progress, but also relax commitment to the ideas expressed in the scenarios
Designers attempt to quickly simplify the problem space with external constraints, such as the reuse of familiar solutions	Because they emphasize people and their experiences, scenarios direct attention to the use- appropriateness of design ideas
Designers are intent on elaborating their current design proposal, resulting in inadequate analysis of other ideas or alternatives	Because they are evocative and by nature are incomplete, scenarios promote empathy and raise usage questions at many levels

Scenarios are “concrete but rough”

- Scenarios are concrete design solutions but can have many levels of detail
- Concrete material - discussions of tasks, actions, processes
- Flexible material – does not commit to ‘how’ those tasks, actions and processes should be done
- They let us explore the design space quickly and in common language

Example of “what not how”

What the user should do

- “Bob, a player in the game, can roll dice to determine how many spaces his tokens will move on the board.”

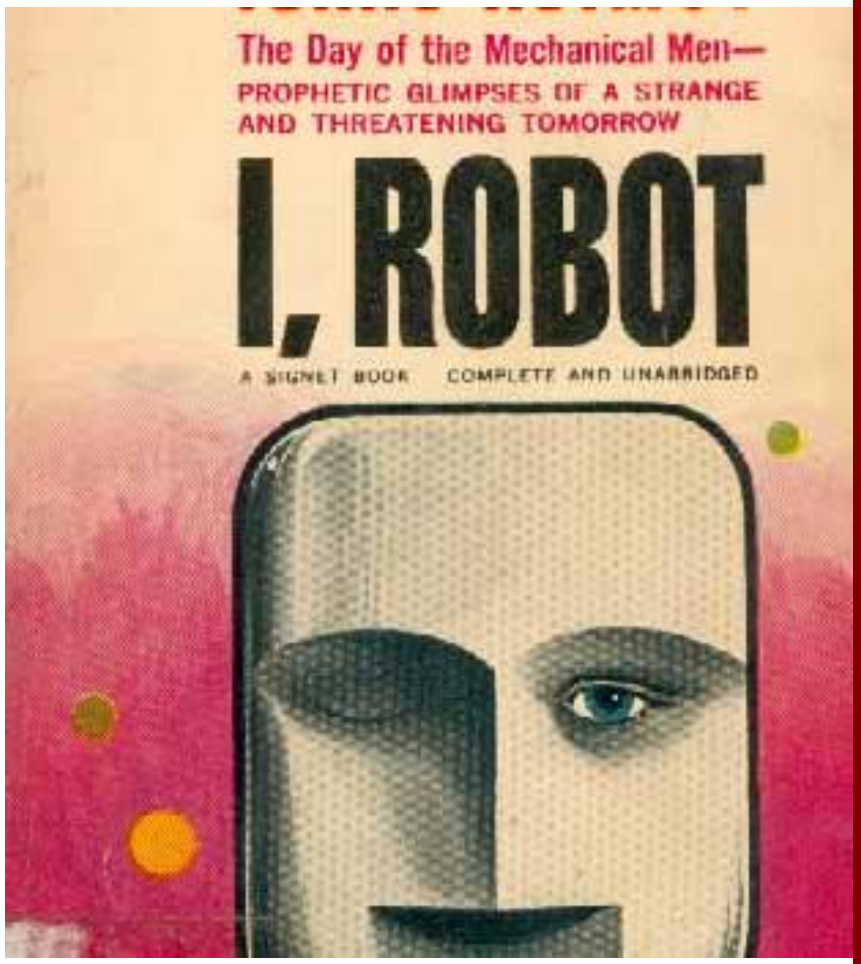
How it is accomplished

Scenarios are freedom but constrained

- Scenarios are very flexible – but they also provide a fixation for the designer on user needs -
- This focus on the user needs and tasks helps designers avoid constraints that may serve as distractions
  - Reaching for the familiar
  - Over precise specifications

Example of SBD: A Science Fiction Club

- Assume that there is a science fiction club on campus who regularly meet to talk about science fiction writing, films and television



Starting SBD: Root Concept

- High Level Vision – a description of the overall system
  - Example: Club members interact anytime, anywhere in an online environment and develop a pool of shared resources about sci-fi
- Basic Rationale – An overall reasoning as to why the high level vision makes sense
  - Example: Online environment overcomes the barriers of time and place. Digital media make it possible to create, organise and share resources easily.

Starting SBD: Stakeholders

- Part of the root concept are the *stakeholders* you are interested in focusing on
- *Direct stakeholders* are those who will be impacted by the system in some way, usually they are users of interactive systems in some way
- *Indirect stakeholders* have an interest in the system, but they do not directly use the system in any way

Science Fiction Club: Direct Stakeholders

- Direct Stakeholders:
  - Club Officer
    - Key Needs: Convenient scheduling of events. Posting of events and related resources to members.
  - Club Member:
    - Key Needs: Access to club activities. Access to club resources. Recognition of contributions.
  - Prospective Member:
    - Key Needs: Know that the club exists. Self-paced exploration of non-restricted resources. Self-exploration of membership criteria and process.

Requirements Stage: Problem Scenarios

- After collecting information from people through different techniques (see next lecture) – we can build ourselves some personas
- With those personas, we can begin to write scenarios about them as stakeholders in the current "system"
  - When I say system I mean it in the widest possible sense
  - Some people might say in the current "context" – but that can be equally confusing.

Problem Scenario: Sharon a Club Member

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her science fiction club meeting for several days, so she decides to go and stay up late to study when she gets back. She remembers that they were planning to talk about Asimov's Robots and Empire, and she has a new theory about the timeline for first detection of the Zeroth Law.

The meeting is scheduled for 7pm at their usual room in the town library. But she is late getting back from dinner with her room-mate, so she misses her regular bus and arrives 15 minutes late. The meeting is already underway; she notes that they have a relatively small group tonight, but is happy to see Bill and Sara, who are the real experts on Asimov. She is even more delighted to see that these two are already having a heated discussion about the Zeroth Law. But she cannot immediately tell what points have been made, so she sits back a while to catch the drift of the conversation. At a break, Bill greets her and asks her what she thinks about Faucian's insight. She replies that she isn't sure about how central he is to the plot, but that she has a new theory about the timeline. They promise to hear her proposal in a few minutes, then resume the argument.

Problem Scenario: Actors

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her science fiction club meeting for several days, so she decides to go and stay up late to study when she gets back. She remembers that they were planning to talk about Asimov's Robots and Empire, and she has a new theory about the timeline for first detection of the Zeroth Law.

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Problem Scenario: Setting

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her **science fiction club meeting** for several days, so she decides to go and stay up late to study when she gets back. She remembers that they were **planning to talk about Asimov's Robots** and Empire, and she has a new theory about the timeline for first detection of the Zeroth Law.

The **meeting is scheduled for 7pm at their usual room in the town library**. But she is late getting back from dinner with her room-mate, so she misses her regular bus and arrives 15 minutes late. The **meeting is already underway**; she notes that they have a **relatively small group** tonight, but is happy to see Bill and Sara, who are the real experts on Asimov. She is even more delighted to see that these two are already having a heated discussion about the Zeroth Law. But she cannot immediately tell what points have been made, so she sits back a while to catch the drift of the conversation. At a break, Bill greets her and asks her what she thinks about Faucian's insight. She replies that she isn't sure about how central he is to the plot, but that she has a new theory about the timeline. They promise to hear her proposal in a few minutes, then resume the argument.

Problem Scenario: Task Goals

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her science fiction club meeting for several days, so she decides to go and stay up late to study when she gets back. She remembers that they were planning to talk about Asimov's Robots and Empire, and **she has a new theory about the timeline for first detection of the Zeroth Law**.

The meeting is scheduled for 7pm at their usual room in the town library. But she is late getting back from dinner with her room-mate, so **she misses her regular bus** and arrives 15 minutes late. The meeting is already underway; she notes that they have a relatively small group tonight, but is happy to see Bill and Sara, who are the real experts on Asimov. She is even more delighted to see that these two are already having a heated discussion about the Zeroth Law. But **she cannot immediately tell what points** have been made, so she sits back a while to **catch the drift of the conversation**. At a break, Bill greets her and asks her what she thinks about Faucian's insight. She replies that she isn't sure about how central he is to the plot, but that she has a new theory about the timeline. They promise to **hear her proposal in a few minutes**, then resume the argument.

Problem Scenario: Plans

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her science fiction club meeting for several days, so she decides to go and stay up late to study when she gets back. She remembers that they were planning to talk about Asimov's Robots and Empire, and she has a new theory about the timeline for first detection of the Zeroth Law.

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Problem Scenario: Mental Evaluation

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her science fiction club meeting for several days, so she decides to go and stay up late to study when she gets back. **She remembers that they were planning to talk about Asimov's Robots and Empire**, and she has a new theory about the timeline for first detection of the Zeroth Law.

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Problem Scenario: Actions

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, she has been looking forward to her science fiction club meeting for several days, so she decides to go and stay up late to study when she gets back. She remembers that they were planning to talk about Asimov's Robots and Empire, and she has a new theory about the timeline for first detection of the Zeroth Law.

The meeting is scheduled for 7pm at their usual room in the town library. But she is late getting back from dinner with her room-mate, so *she misses her regular bus* and arrives 15 minutes late. The meeting is already underway; **she notes** that they have a relatively small group tonight, but is happy to see Bill and Sara, who are the real experts on Asimov. She is even more delighted **to see** that these two are already having a heated discussion about the Zeroth Law. But **she cannot immediately tell** what points have been made, so **she sits back a while** to catch the drift of the conversation. At a break, **Bill greets her** and **asks her what she thinks** about Faucian's insight. **She replies that she isn't sure** about how central he is to the plot, but **that she has a new theory** about the timeline. **They promise** to hear her proposal in a few minutes, **then resume the argument**.

Claims Analysis

- We now have a reasonably detailed scenario that contains most of the types of things that we are interested in
- It describes the current setting – that means it describes
  - Good things that are currently happening
  - Things where there are improvements that can be made
- Our goal as interaction designers is to try to maximize the good things while minimizing the bad
- We read through the scenario and identify claims about the current scenario and then list the positive and negative aspects of that claim
- Specifically looking at technology, processes, communication, information, that support the users' tasks or detracts from successful completion

Problem Scenario: Sharon a Club Member

Sharon is a busy third-year psychology student at Virginia Tech. Even though she has a biology exam tomorrow morning, **she has been looking forward to her science fiction club meeting for several days**, so she decides to go and stay up late to study when she gets back. She remembers that they were planning to talk about Asimov's Robots and Empire, and she has a new theory about the timeline for first detection of the Zeroth Law.

The meeting is scheduled for 7pm **at their usual room in the town library**. But she is late getting back from dinner with her room-mate, so she misses her regular bus and arrives 15 minutes late. The meeting is already underway; she notes that they have a relatively small group tonight, but is happy to see Bill and Sara, who are the real experts on Asimov. She is even more delighted to see that these two are already having a heated discussion about the Zeroth Law. But she cannot immediately tell what points have been made, so she sits back a while to catch the drift of the conversation. At a break, Bill greets her and asks her what she thinks about Faucian's insight. She replies that she isn't sure about how central he is to the plot, but that she has a new theory about the timeline. They promise to hear her proposal in a few minutes, then resume the argument.

Claims about Current Practice

Face-to-face interaction with club members at a meeting

+ ensures that both nonverbal and verbal communication contribute to the interaction
+ leverages many years of experience with communication protocols and conventions
− but may introduce distracting or irrelevant personal information about partners
− but inhibits parallel communication activities (i.e., among multiple parties at once)

A regular physical space used for club meetings

+ promotes a feeling of familiarity and intimacy among established members
+ simplifies the planning and execution process for arriving at meetings
− but requires members to travel to the site for interaction
− but physical locations are valuable resources that must be shared among organizations

Activity Scenario

- Activity Scenarios explain the system that might be
- We focus on trying to replicate the key activities that someone wants to accomplish
- We use our analysis of the problem scenarios to try to inform the design of things to support the activity well

How do we do the Activity Scenarios?

- From the claims analysis of the problem scenarios, we know what some of the key features are
- With that information, we can search for other contexts that share similar features

Key Features of the Science Fiction Club

- Interaction with club members at a meeting
- Interaction in a group or a more personal dialogue
- Regular physical space used for club meetings
- Creation and sharing of resources
- Able to identify who created or shared ideas
- Common shared interest between attendees

What other things in the real world have some of these features?

- Interaction with club members at a meeting
- Interaction in a group or a more personal dialogue
- Regular physical space used for club meetings
- Creation and sharing of resources
- Able to identify who created or shared ideas
- Common shared interest between attendees
- Able to learn about new theories and concepts

- Reading at the library
- Hearing a lecture
- Visiting a museum
- Going to a cocktail party

Different types of meetings have different features

- Reading at the library
  - Self-paced, individual access to structured information
- Hearing a lecture
  - Large audience; prepared materials; one-way communication
- Visiting a museum
  - Array of artifacts, small groups or individuals examine, discuss
- Going to a cocktail party
  - Friends forming subgroups; social exchange and mingling

What types of online interaction might be suggested by the features?

- A hierarchy of Web pages
- An email distribution list (listserv)
- A shared whiteboard
- Meeting groupware

- Each of these have advantages and disadvantages – there might be lessons we can learn from each of these

Activity Scenario 1: Sharon visits the Science Fiction Club online forum

Sharon is a third-year psychology student at Virginia Tech, and after three years she has learned to take advantage of her free time between classes. In her hour between her morning classes, she stops by the computer lab to visit the science fiction club, because she heard from a friend that they are discussing her favorite book, Asimov's Robots and Empire, and she wants to share her new theory about the timeline for the Zeroth Law.

When she logs onto a computer, she first checks her email, and sees that as she hoped there are several emails from club members proposing and responding to views on this book. But rather than read each email, she follows the convenient link to the Club's Web site, which takes her right to the ongoing discussion. As always, the reviews are first, then the discussion topics, where she finds the new discussion thread started by Sara and Bill. She reads the new thread before adding her theory about the Zeroth Law, and notes that Bill is also fascinated by this piece of the story. She summarizes her theory, and because she wants the group to focus on this issue she makes it a first-level topic but links it to Bill's post to acknowledge the relation. When she submits it she is reminded that an email has been sent to the club listserv with her contribution.

Before leaving, Sharon backs up to the homepage and browses the book categories to look for new books and discussions. Right underneath her favorite category of "Artificial Intelligence" (where the Asimov series is placed), she discovers an intriguing new entry, "Brain Evolution". She doesn't recognize any of the authors in this category, so sends herself a reminder to track down a couple of books from the category later that day.

Claims Analysis for Activity Scenarios

- For Activity Scenarios, we are looking for the same kinds of features of the scenario – however this time we are paying close attention to suggested solutions regarding how they have improved or worsened the previous situation

Example Claim for Activity Scenario 1

Discussion archives organized by topic and content submitters
+ leverages people's familiarity with categorical hierarchies + emphasizes the central and permanent recognition of individuals' contributions to the archive − but browsing extensive stored archives may be tedious or complex − but people may be disinclined to contribute more transient and informal content to an organized archive

Activity Scenario 2: Sharon goes to the Science Fiction Club's online room

Sharon is a busy third-year psychology student at Virginia Tech. But after three years she has learned to take advantage of her free time between classes. In her hour between her morning classes, she stops by the computer lab to visit the science fiction club because she heard from her friend that they are discussing her favorite book, Asimov's Robots and Empire, and she wants to share her new theory about the timeline for the Zeroth Law.

When she logs onto a computer, she first checks her email, and sees that as she hoped there are several emails from club members proposing and responding to views on this book. But rather than read each email, she follows the convenient link to the Club's online room. She is taken to their regular discussion spot, the bar of a local pub. As she arrives, she sees that Sara, Bill, and Jennifer are already there. She reviews their conversation, and notes that they are discussing Jennifer's new review of Asimov's Robots and Empire. Before she joins in, she quickly opens and browses Jennifer's review. She agrees with Jennifer, so she eagerly jumps in to take her side against Bill and Sara. In a few minutes, the chat moves on to plan a group outing that night. She has to study, so she drops out of the conversation to create a new discussion with her theory about the Zeroth Law. She sees that an announcement is sent to all the club members when she has finished creating the object.

Sara keeps an eye on the others' conversation, and when there is a break, she invites them to visit her new topic. They discuss the Zeroth Law for a while, but leave it open for others to visit. On her way out, Bill tells her he has a new "Brain Evolution" grouping he is working on. She hasn't heard of the titles he mentions, so she sends herself a reminder to track down a couple of books from the category later that day.

Example Claim for Activity Scenario 1

Real-time conversation organized by the people present in a space
+ leverages people's familiarity with real world conversational strategies + encourages a combination of topic-specific and ad hoc informal exchange − but requires that conversation participants be present at the same time − but newcomers may find it hard to interrupt an ongoing conversation

Further iterations

- There are several other places that scenarios can be inserted into the design process
- As you move forward in design, you can include scenarios for information design and for interaction design
- The same types of claims analyses can be applied to those different scenarios
- Usually we are building up a library of more and more complex scenarios that we can draw from in all of our activities

Summary

- Scenario based design is a collection of methodologies that are driven around narratives that describe activities that users undertake in the world
- Scenarios represent the cycle of action that people undertake in different contexts; they should represent both the plans and actions of users as well as their internal evaluation of the responses the system has to their actions

Readings

- Cooper et all About Face 3 – Chapter 6 – The Foundations of Design: Scenarios and Requirements
- Scenario Based Design – Chapter of the Handbook of HCI – posted on website

Key Elements of Scenarios

Element	Definition	Example
Setting	Situation elements that motivate or explain goals, actions, and reactions to the actor(s)	Office within an accounting organization, state of work area, tools etc at the beginning of the scenario
Actors	Humans interacting with the technology or other setting elements, personal characteristics relevant to the scenario	Accountant using a spreadsheet package
Task goals	Effects on the situation that motivate actions carried out by the actor(s)	Need to compare budget data with values questioned in a memo

Key Elements of Scenarios

Element	Definition	Example
Plans	Mental activity directed at converting a goal into a behaviour	Opening the memo document will give access to memo information, re-sizing windows to allow viewing of memo and spreadsheet
(User) Evaluation	Mental activity directed at interpreting features of the situation	A window that is too large can be hiding the window underneath; dark borders indicate a window is active

Key Elements of Scenarios

Element	Definition	Example
Actions	Observable user behaviour	Opening memo document; resizing and repositioning windows
Events	External actions or reactions produced by the computer or other features of the setting; some of these may be hidden to the actor(s) but important to the scenario	Window selection feedback; auditory or haptic feedback from keyboard or mouse; updated appearance of window (perhaps unnoticed by user)