Analysis Modeling

Week 5

Announcement

- Midterm I
  - Monday March, 7th
- Scope
  - Ch. 1, 2, 3, 4 and Ch. 6 of the text book
  - Ch. 1, 2 and 3 of the lab book

Agenda (Lecture)

- Analysis modeling

Agenda (Lab)

- Weekly progress report
- Homework/Lab assignments

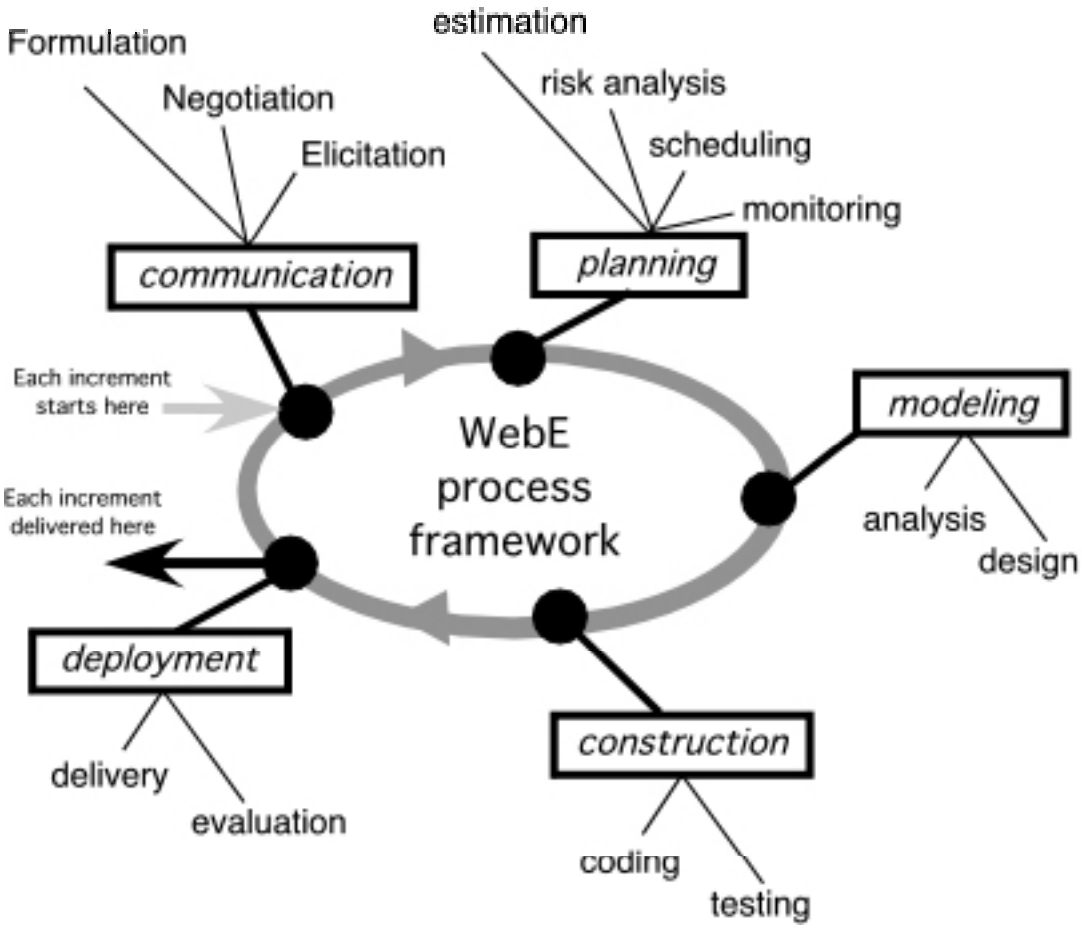
Team Homework Assignment #6

- Study the design modeling for WebApps (Ch 8 or related materials) and prepare for presentation slides.
- Due date is 7:00 pm, February 28th

Team Lab Assignment #5

- Submit the first version of design modeling diagrams for your group project
  - Make slides for presentation
- Due date
  - The beginning of the 2/28 lab session

WebE Process Activities & Actions



Chapter 7 Analysis Modeling

- Analysis modeling helps you to understand the detailed requirements that will allow you to satisfy user needs
- Analysis models look at content, interaction, function and behavior, and the WebApp configuration
- To determine the how much analysis modeling to do, examine the:
  - Size and complexity of the WebApp increment
  - Number of stakeholders (analysis can help to identify conflicting requirements coming from different sources)
  - Size of the WebE team
  - Degree to which members of the WebE team have worked together before (analysis can help develop a common understanding of the project)
  - Degree to which the organization's success is directly dependent on the success of the WebApp

Analysis Outputs

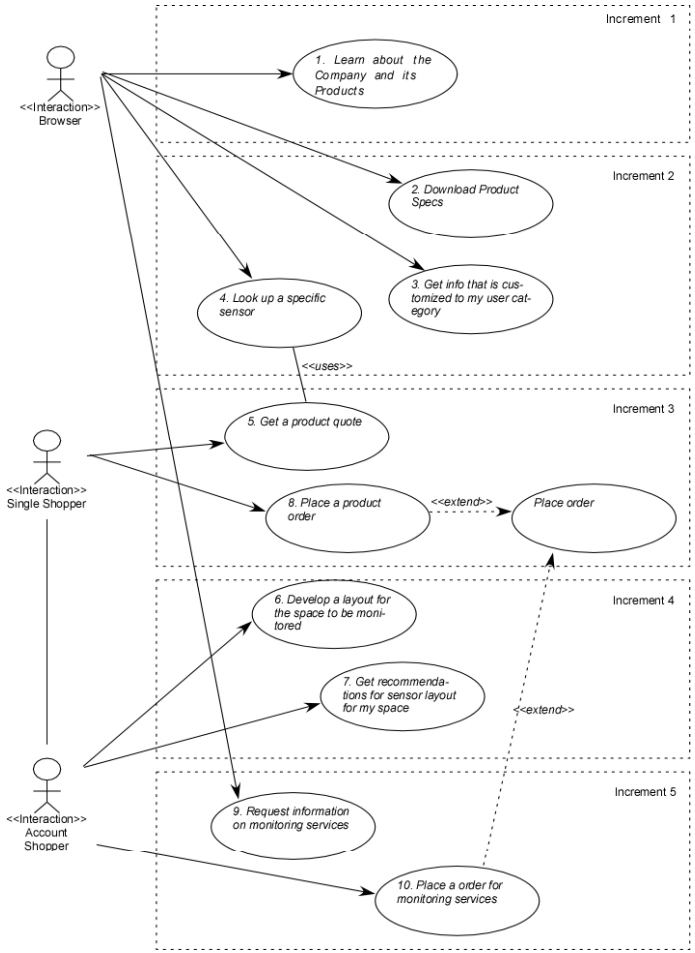
- **Interaction model**. Describes the manner in which users interact with the WebApp.
- **Information model.** Identifies the full spectrum of content to be provided by the WebApp. Content includes text, graphics and images, and video and audio data.
- **Functional model**. Defines the operations that will be applied to WebApp content and describes other processing functions that are independent of content but necessary to the end user.
- **Configuration model**. Describes the environment and infrastructure in which the WebApp resides.

Understanding Users

- Crucial to understand your users!
- For each user class:
  - What is the user's overall objective?
  - What is the user's background?
  - How will the user arrive at the WebApp?
  - What characteristics does the user like and dislike?

Revisiting Use Cases

- Analyse and elaborate where necessary
  - Find gaps, missing details
- Identify overlaps and possible optimizations
  - Allows design simplification
  - E.g. often “view” task can be seen as a specialization of an “edit” task.



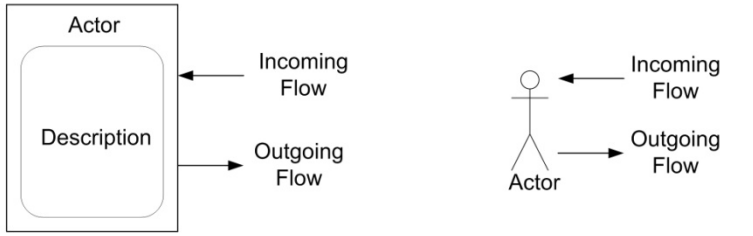
The Content Model

- Identify content objects:
  - *External entities* (e.g., other systems, databases, people) that produce or consume information to be used by the WebApp
  - *Things* (e.g., reports, displays, video images) that are part of the information domain for the problem
  - *Occurrences or events* (e.g., a quote or an order) that occur within the context of a user's interaction with a WebApp
  - *Roles* (e.g., retail purchasers, customer support, salesperson) played by people who interact with the WebApp
  - *Organizational units* (e.g., division, group, team) that are relevant to an application
  - *Places* (e.g., manufacturing floor or loading dock) that establish the context of the problem and the overall function of the WebApp
  - *Structures* (e.g., sensors, monitoring devices) that define a class of objects or related classes of objects

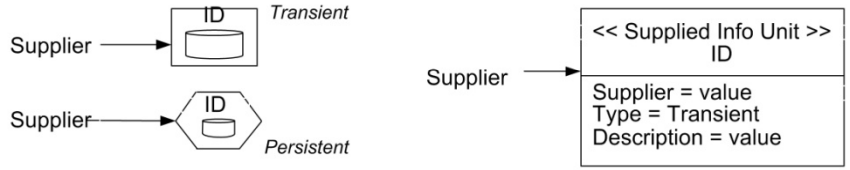
Web Info. Exchange - Notation

WebML-compliant *UML-compliant*

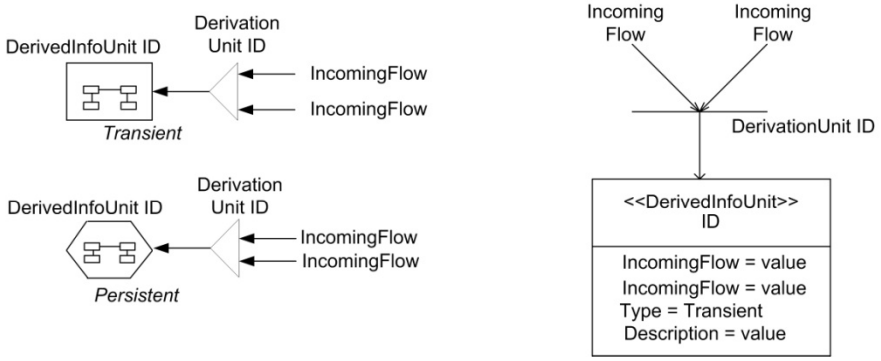
Actor Unit



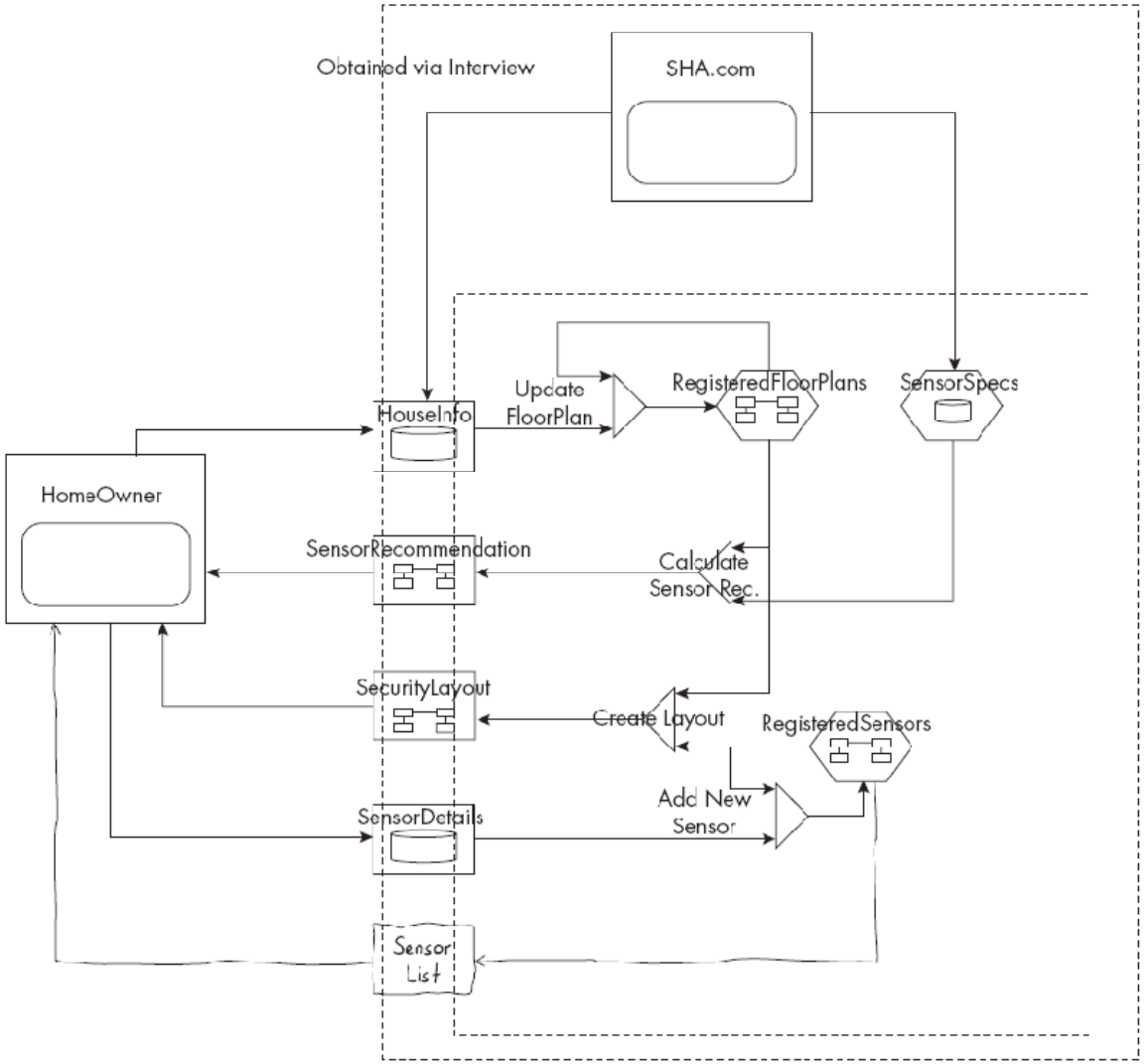
Supplied Information Unit



Derived Information Unit

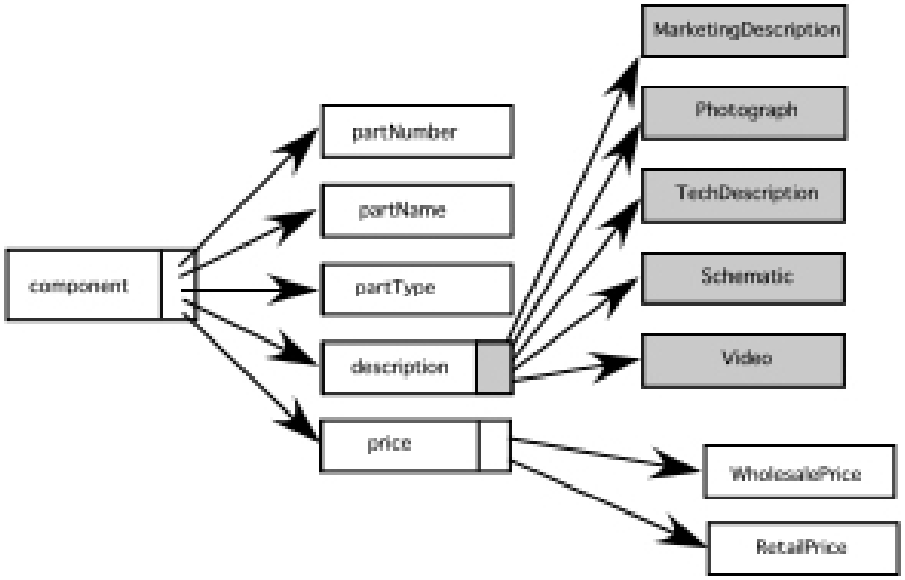


Web Info. Exchange - Example



Data Tree

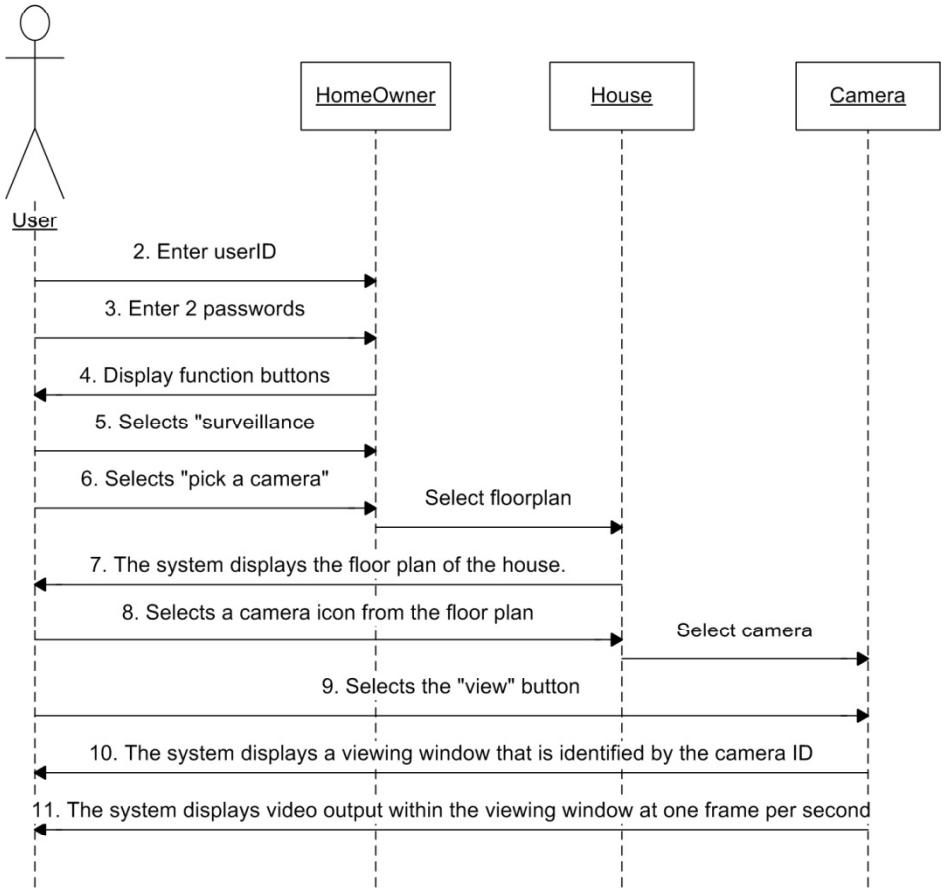
- In some cases, the content model may benefit from a richer analysis
- *Data trees* depict the relationships among content objects and/or the hierarchy of content maintained by a WebApp.



The Interaction Model

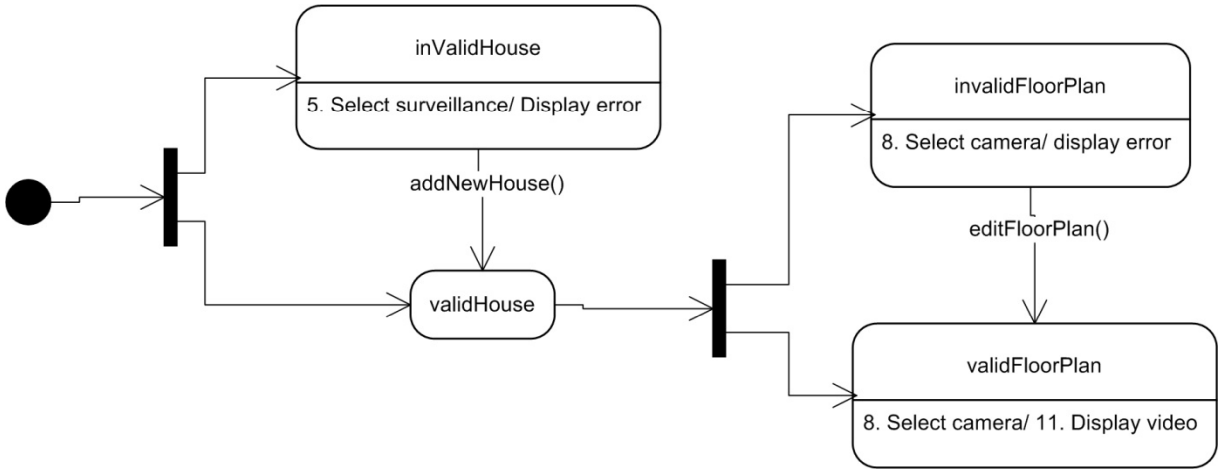
- Can be represented using:
  - Use cases
  - Sequence diagrams
  - State diagrams
  - User interface prototypes
- In many instances, a set of use cases is sufficient to describe the interaction at an analysis level (further refinement and detail will be introduced during design)
- However, when the sequence of interaction is complex and involves multiple analysis classes or many tasks, it is sometimes worthwhile to depict it using a more rigorous diagrammatic form.

Sequence Diagram



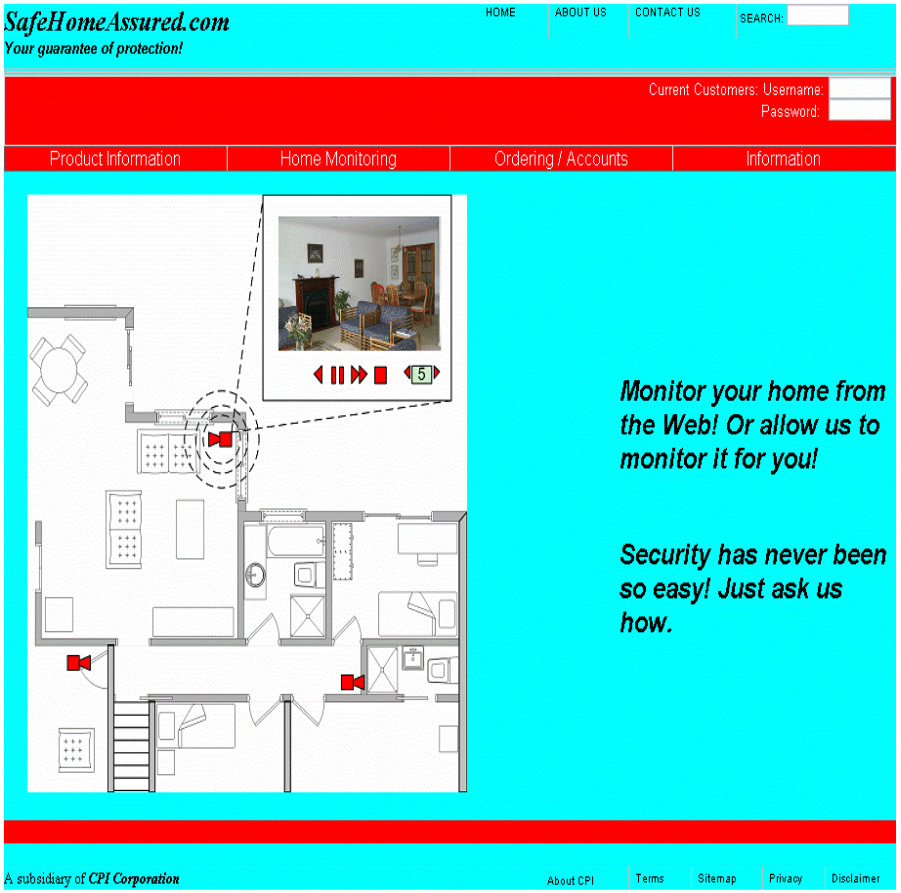
UML *sequence diagrams* describe how user actions collaborate with analysis classes (the structural elements of a system).

State Diagram



- UML *state diagrams* describe dynamic behavior of the WebApp as an interaction occurs.
- State diagrams are most useful when a user interaction triggers a change in the state of the WebApp—and hence changes the way in which it might react to a user.

Active Interface Prototype



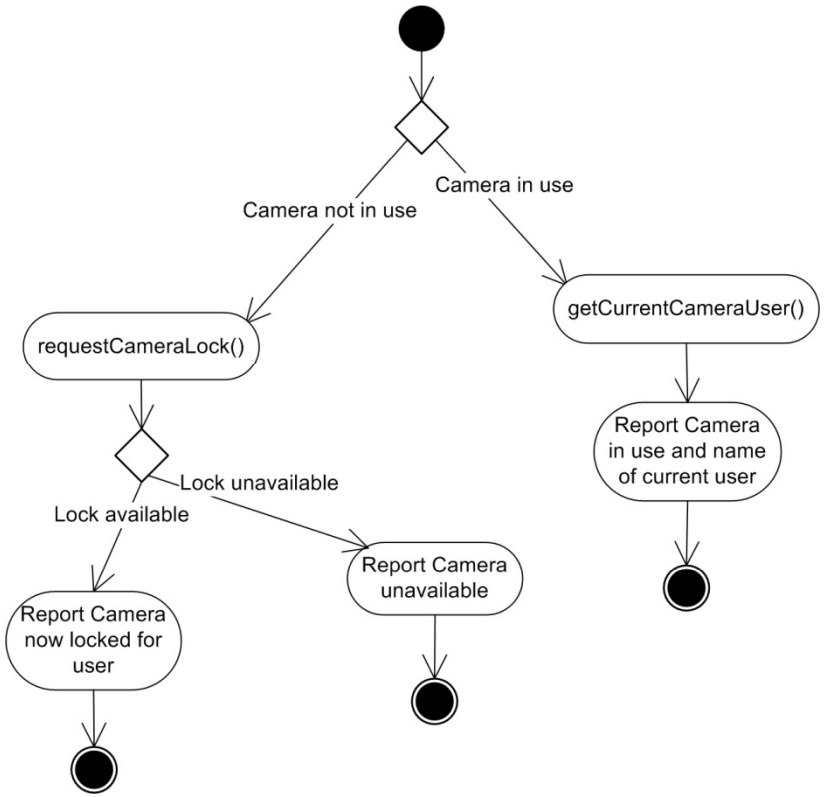
- A prototype shows the layout of the user interface, the content, interaction mechanisms and overall aesthetic
- Supports validation with the client of the requirements and analysis

The Functional Model

- Addresses two processing elements of the WebApp, each representing a different level of procedural abstraction:
  - user-observable functionality that is delivered by the WebApp to end users, and
  - the operations contained within analysis classes that implement behaviors associated with the class.
- The UML activity diagram can be used to represent processing details

Activity Diagram

- Illustrates the processing flow and logical decisions within the flow.
  - The construction details indicate how these operations are invoked, and the interface details for each operation are not considered until WebApp design commences.



The Configuration Model

- Among the many configuration issues that should be addressed are:
  - Server hardware and operating system environments
  - Interoperability considerations on the server side (e.g., large database access, other IT applications, specialized communication protocols)
  - On the client side:
    - Local OS
    - Browser software
    - Client hardware variations