

Users and Use Cases

- User Characterization
- Use Cases
 - what are they, why they are interesting
 - how they differ from specifications
- Use Case Development
 - identifying and characterizing classes of users
 - identifying and elaborating usage scenarios
- Representing Use Cases
 - XP user stories
 - UML (use case, activity, state) diagrams

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User Characterization

- User Characterization
 - identifying distinct sub-classes of users ●
- Common Criteria
 - product use roles (or intentions) ●
 - knowledge (domain or technology) ●
- Results in a profile for each user class
 - goals and expectations ●
 - knowledge and experience
 - typical usage scenarios

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Use Case

A stylized story about how an end user (in a specified role) interacts with the system under a specific set of circumstances.

In requirements, it captures a contract that describes the way the system should behave in response to a specified user request.

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Use Cases vs. Specifications

- Specifications are “abstract descriptions”
 - required behavior and other characteristics
- Use Cases are “stories”
 - scenarios the product must support
 - key elements of user/product interactions
- Use Cases are a better starting point
 - they are easier to gather and review ●
 - they more honestly capture requirements ●
 - a good starting point for specifications

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Scenarios, Tasks, & Steps

- Scenario ... representative work session
 - a sequence of related tasks to solve a problem (e.g. handle a customer phone call)
- Task ... smallest interesting unit of work
 - sequence of steps culminating in useful a result (e.g. scheduling an appointment)
- Step ... smallest interesting unit of action
 - one individual action in a sequence (e.g. entering a password)

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Use Cases

- Are a really good form for requirements
 - they tend to be concise
 - they tend to be very concrete
 - they are tied to real-world problems
 - they are expressed from the users' perspective
 - they describe functionality (vs. design)
 - they help us understand the user's world view
- They are also easy to develop/validate
 - ask people what they do, or simply watch them

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Developing Use Cases

- They can be based on existing processes
 - interview potential users
 - ask them to describe the things they do
 - identify the tasks within their scenarios
 - get descriptions of steps within those tasks
 - get descriptions of problems and exceptions
- Use these as a starting point
 - design to enable the same tasks & scenarios
 - design to deal with the problems & exceptions

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Developing Use Cases

- They can be brain-stormed
 - who are the primary actors?
 - what tasks do they need to perform?
 - what information is needed to perform task?
 - what information is user interested in?
 - what could go wrong in performing task?
 - how would user want to be informed of these?
- These suppositions must be validated
 - by interviews
 - by usability testing with prototypes

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Representing Use Cases

- Use cases capture product capabilities
 - describe what product should be able to do
 - may describe user/system interactions
- They can be represented in many ways
 - XP user stories overview of an operation
 - UML Diagrams
 - use case actors, objects, operations among them
 - behavior detailed interactions among actors & objects
 - state observable states and transitions
 - user interface prototypes or mock-ups ☺

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User Story Cards

- Brief summary of a desired capability
 - name of story
 - brief general description of a useful behavior
 - user assigned priority
 - development estimated cost
- All on a single 3x5 card
 - just enough to capture the concept
 - specifically not a complete specification
 - this is established between user and developer

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Sample User Story Card

Story #107: buy parking permit
Any registered student can buy a parking permit.
Can choose semester or annual.
Need to provide car license plate number.
Payment options:
credit card, PayPal, charge to student account

Priority: high Estimate: 3 days

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Using User Story Cards

- Product Descriptions
 - a product is a collection of features/capabilities
- Work planning tokens (the planning game)
 - each represents a requested development task
 - they can be laid out on a table
 - they can be laddered, grouped into releases
- Project Management metrics
 - completed cards record work accomplished
 - completion rate measures project velocity

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UML Use Case Diagrams

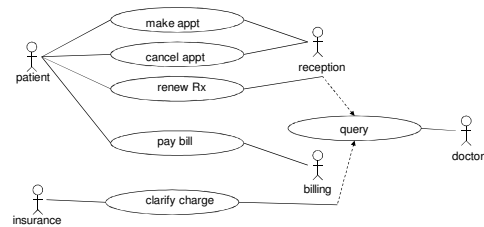
- A graphical overview of capabilities
 - a list of defined actions (use cases)
 - shows boundary between system and actors
- Use Case diagrams identify
 - classes of actors who can initiate actions
 - actions (use cases) each can initiate
 - other people (or objects) that will be affected
- They do not describe the interactions
 - that is left to more detailed behavioral models

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Sample UML Use Cases



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Using UML Use Cases

- an overview of system functionality
 - what are the general classes of users
 - what are the operations each can perform
- a summary of system capabilities
 - what are the basic things it can do
- a table of contents for the use cases
 - enumerating the things to be defined
- May be an introduction to the solution
 - external object classes and methods

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How they compare

- User Story Cards
 - summary of a specific functional capability
 - not a description, but a feature planning token
- UML Use Case Diagrams
 - enumerate the actors, objects and operations
 - a single snapshot of the major capabilities
- Use Case/Scenario Descriptions
 - detailed behavior descriptions/specifications
 - basis for designs and acceptance tests

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Modeling more detailed behavior

- Use-cases and story cards are imprecise
 - they capture intent, but not details
- Activity Diagrams
 - steps in a (potentially distributed) process
 - sequences of events
 - key decisions
- State Models
 - can be user-visible or internal states
 - events that cause changes between them

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Universal Modeling Language

- a family of related graphical notations
 - for representing software system designs
 - particularly those built in object oriented style
- supports a wide range of uses
 - a design sketching language
 - a system specification language
 - a programming language
- also has a textual (XML) representation
 - enabling development of CAD tools

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Analytical Models and Prototypes

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UML General Conventions

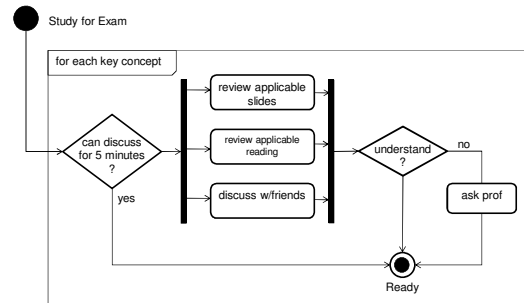
- square boxes represent things
 - classes, objects, packages, components
 - 3D boxes represent physical things
- round boxes represent processes/states
- circles represent class interfaces
 - entry-points
- arrows represent relationships
 - flow, communication, dependency
 - arrow heads determine type and direction
- UML diagrams can be nested/composed

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UML Activity Diagrams



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(UML Activity Diagrams)

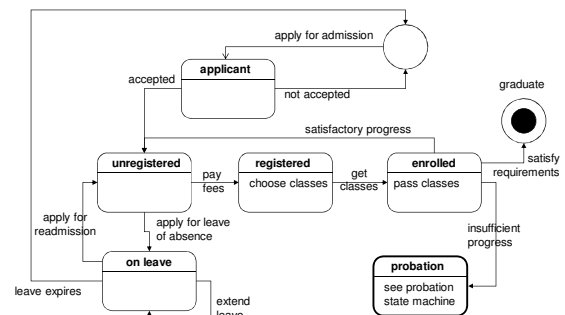
- Describe processes (not just algorithms)
 - in terms of steps (decisions and actions)
- a standard UML representation
 - rounded “capsules” represent activities
 - arrows represent temporal sequencing
 - diamonds represent decision & merge points
 - bars delimit parallel activities
- excellent for behavioral requirements
 - illustrative sample usage scenarios
 - additional detail for a use-case or story card

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UML State Diagrams



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(UML State Models)

- describe state/transition models
 - where events drive state changes
- a type of activity diagram
 - activity boxes have two compartments
 - state name in the top portion
 - processing steps in the bottom portion
 - arrows represent state transitions
 - from previous state, to next state
 - labels describe conditions triggering the transition
 - processing steps can also be placed on lines

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Team Exercise

- identify distinct classes of your users
 - what usefully distinguishes each sub-class
- identify key operations involving each
 - and the participants in each
 - diagram these as UML use cases
- you will be asked to briefly discuss
 - why you chose those classification criteria?
 - how well this diagram captures your product?

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Requirements Elicitation Session

- **when**
 - next lecture – in class
- **goals**
 - to demystify the process
 - to allow you to observe the process
 - provide an example we can discuss
 - to prepare you for your own sessions
- **preparation**
 - review chap 3 of my User Requirements paper

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For Next Lecture

- **McConnell Ch 20**
 - overview of quality assurance techniques
- **Rakitin – What is Quality**
 - many different dimensions
- **Spolsky – Five Worlds**
 - different types of S/W, different problems
- **Rakitin – What is S/W Quality Assurance**
 - history and overview of roles
- **Boehm – Software Defect Reduction**
 - problems: locations, costs, and remedies
- **Wiegiers – Peer Reviews**
 - where peer reviews fit in to the process

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