CIS*3750 - System Analysis and Design in Applications

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Use Case Modeling

- A tool for modeling requirements
- They describe one use of the system that is self contained.
- Useful in communication, usability testing and requirements validation

Use Cases Modeling

- Use case diagram
- Use case narrative

What’s a Use Case?

- They describe one use of the system that is self contained.

Use Cases

- They need pre-conditions.

Use Cases

- And they should end with post-conditions.

Use Cases

- They should begin and end in a stable state.

Use Cases

- They include the basic flow of the system.

Use Cases

- They may include alternate flows or paths.
- But all alternate flows/paths must end in a stable state.

Use Cases

- They identify the actors involved.
- Actors may be users, or other systems that interact with our system.

Use Cases

- Definitely has to indicate how our system responds to the actor.

Use Cases

- Use Case: *Title*
- User inputs X
- System validates X
- System calculates Y given X
- System displays Y
- User exits

Use Cases

- There are three types of Use Cases:
  - Brief
  - Casual
  - Fully Dressed

Use Case - Brief

- Paragraph format
- Actors embedded in the paragraph
- Informs what actor does and what the system does in response
- Not as detailed as **Casual** and **Fully Dressed** Use Cases
- Main flow only

Use Case - Casual

- Paragraph format
- Actors embedded in the paragraph
- Informs what actor does and what the system does in response
- More detailed than **Brief**, but not as detailed as the **Fully Dressed** Use Case
- Similar to Brief, except includes some alternate pathways

Use Case - Fully Dressed

- Table/bullet format (but still with proper sentences)
- Primary actors identified
- Informs what actor does and what the system does in response
- **Most detailed** Use Case
- Numbered list, with alternative pathways clearly stated

User stories and Use Cases

- User stories help in identifying use cases!!!

User stories and Use Cases

- As a new customer, I want to create an account so that I can make purchases online.
- As a customer, I want to search for products so that I can quickly add them to my shopping cart.
- As a customer, I want to view product description so that I can learn more about the product.

User stories and Use Cases

User story	Actor	Goal
As a new customer, I want to create an account so that I can make purchases online.	new customer	create account
As a customer, I want to search for products so that I can quickly add them to my shopping cart.	customer	search products
As a customer, I want to view product description so that I can learn more about the product.	customer	view product description

Activity (5 -10 min)

- Get together with your project group
- Pick 3-5 user stories from the user stories you came up with during Lab 2
- Identify use cases

User Story, Requirement and Use Case?

- Let’s consider a ‘Search and Replace’ feature

User Story, Requirement and Use Case?

- <u>User Story</u>: As a User *I want* the ability to search for all occurrences of a single word within my document and to replace them with a new word *so that* I can make mass edits more efficiently.

User Story, Requirement and Use Case?

- Requirement: The user must be able to search for all occurrences of a plain text search term in a document and replace them with a specified replacement text.

User Story, Requirement and Use Case?

- Use Case: Search and Replace
- Summary: All occurrences of a search term are replaced with replacement text.
- Users: All
- Preconditions
  - The user is logged in
  - A document is loaded into the system and is being edited.

User Story, Requirement and Use Case?

Path:

1. The user indicates that they wish to perform a search-and-replace in the document.
2. The software responds by requesting the search term and the replacement text.
3. The user inputs the search term and replacement text and hits "Search and Replace".
4. The software replaces all occurrences of the search term with the replacement text.

User Story, Requirement and Use Case?

Alternate Path:

- 3.a. In Step 3, the user indicates that only the first occurrence is to be replaced. In this case, the software finds the first occurrence of the search term in the document being edited and replaces it with the replacement text. The postcondition state is identical, except only the first occurrence is replaced, and the replacement text is highlighted.

User Story, Requirement and Use Case?

- Post conditions: All occurrences of the search term have been replaced with the replacement text. The document is available to continue editing.

Use Case Template

- **Use Case Name** - should be unique for reference.
- **Use Case Summary** - short text description of the use case.
- **Participating actors** - who is interacting with the use case.
- **Preconditions** - conditions that need to be satisfied before the use case starts (what is the state of the system).
- **Path (main path and alternate paths) -** the sequence of actions of the use case, which are to be numbered for reference.
- **Postconditions** - conditions that are satisfied after the completion of the use case.

Use Cases

- Describe an activity the system performs in response to a request by an actor (e.g., user)
- Are logical models; they describe the activity without implementation details
- Tools to model system requirements
- Focus on users and their goals

Use Cases - Benefits

- Modeling tool used in analysis
- Useful in communication
- Useful in functional decomposition

Steps in Use Case Modeling

- Find actors
- Find use cases
- Describe how actors interact with use cases
- Present and discuss the use case model(s) as text and/or diagram
- Test and evaluate use cases

Prototyping

- What is a prototype?
- A prototype is a non-functional mock up; a model; “reasonably close”.
- It does not represent necessarily ALL aspects of the program.

Why do we prototype?

- Try out design options
- Demonstrate concepts
- Usability studies

Why do we prototype?

- Validate requirements
- Explore solutions
- Validate that the UI is usable
- Help identify if proposed structure fits the user’s work model

Prototypes as Communication Tools

- Developed for the user using vocabulary they understand
- Help the design team understand what the user it thinking when they use a particular word

Prototypes as Communication Tools

- Inspire “ownership”, as users feel like they are co-designers in the process
- Allow iterative refinement of the process

Benefits

- Improves system usability
- Users’ real needs are considered in the design process
- Improves design quality
- Reduces development effort

Types of prototypes

- Low fidelity (lo-fi)
  - paper prototyping
- High fidelity (high-fi)
  - wireframing

Types of prototypes

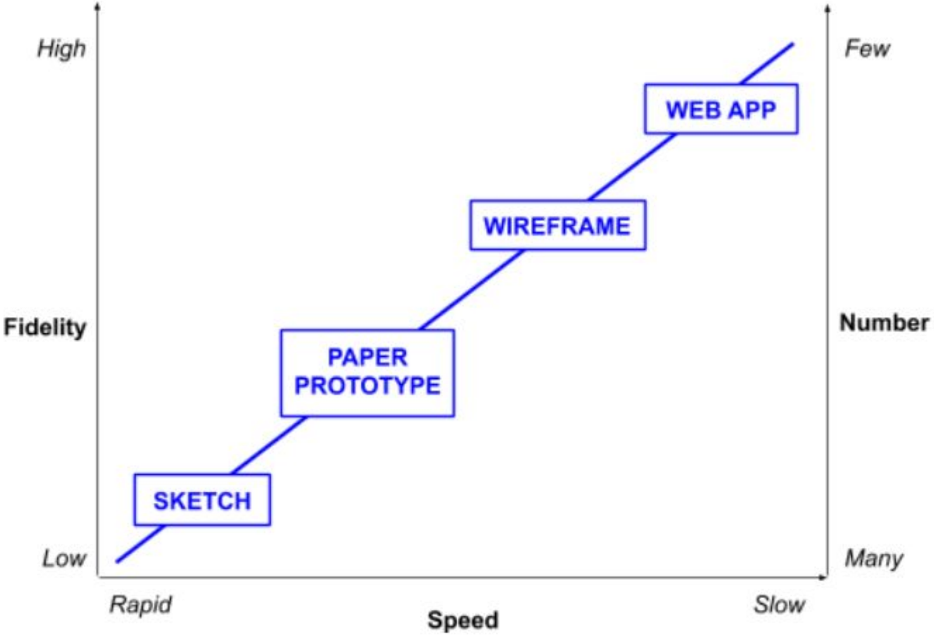


Image source: https://projects.history.qmul.ac.uk/handson/module-3/m3l1-prototyping/

Dimensions

- Multidimensional
  - visual
  - breath
  - depth
  - interactivity
  - data or content

Paper Prototyping

- What is paper prototyping?
- A prototype developed with paper, pens, sticky notes, markers, etc.

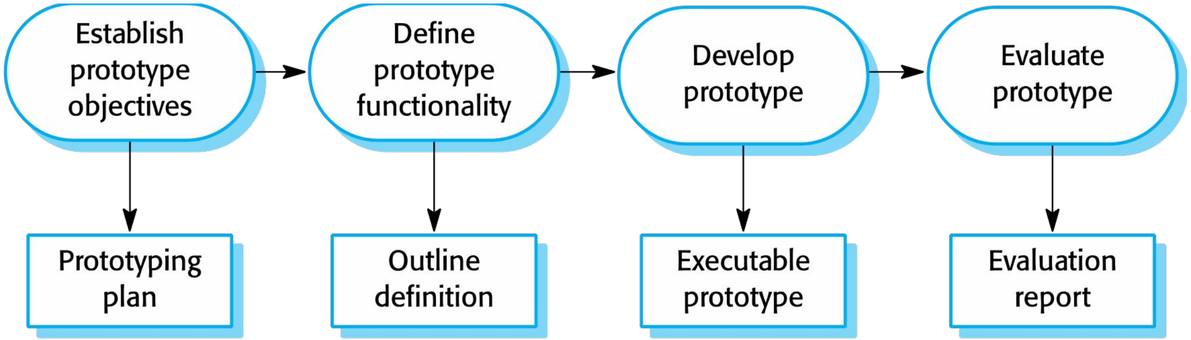
Paper Prototyping

- A tool for all stages of a project
- Allows a designer to test the usability of a design
- Can identify missing user stories
- Very rough

Paper Prototyping

- It’s not about the PRETTY
- It’s all about PROCESS FLOW

Prototyping



https://iansommerville.com/software-engineering-book/

Usability Session

- Participants
  - Facilitator
  - Human-computer actor
  - Observer/note taker

Usability Session

- Prepare Test Scenarios
    - Build from User Stories and Use Cases
- Practice
    - Transitions and responses to user should be smooth

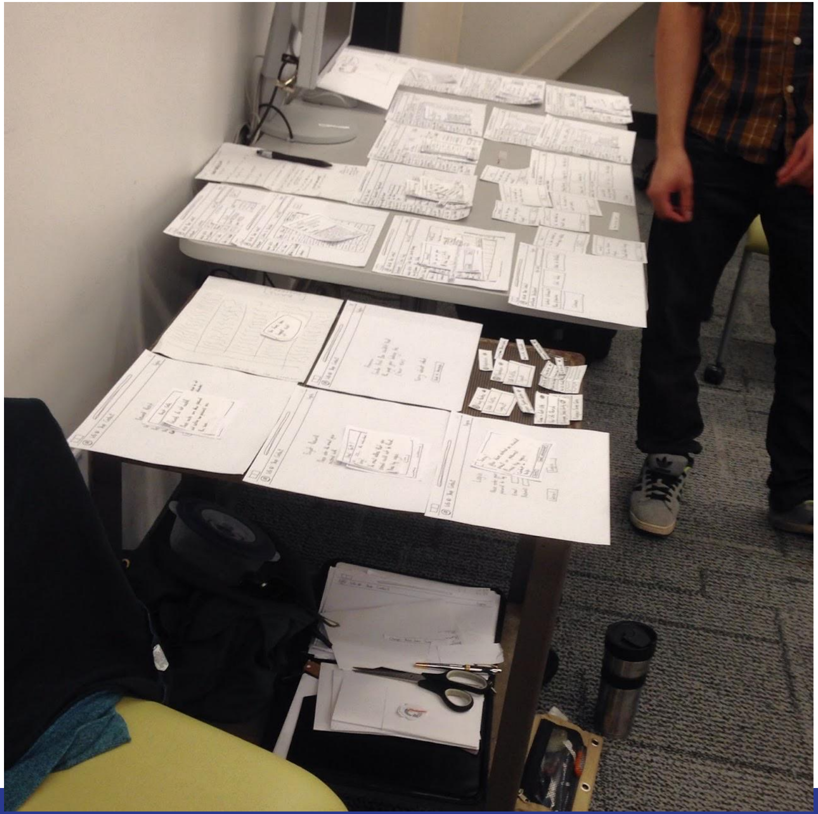
During the Session

- Introductions
- Outline paper prototyping session & rules/expectations
- Introduce simple to complex User Story/Use Case
- Do NOT help
- Do NOT lead
- Document everything

After the Session

- Post Mortem!
- What worked?
- What didn’t?
- Stop/Start/Continue
- Loved/Hated/Change
- Missing?

What does paper prototyping look like?



Activity

Create and test a simple, hand drawn paper prototype for an alarm clock