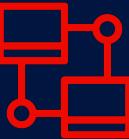


U



# Interaction Design and Development III

**CSIT226 Human Computer Interaction – 2024**

O

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA



## Acknowledgement of Country

We acknowledge that Country for Aboriginal peoples is an interconnected set of ancient and sophisticated relationships.

The University of Wollongong (UOW) spreads across many interrelated Aboriginal Countries that are bound by this sacred landscape, and intimate relationship with that landscape since creation. From Sydney to the Southern Highlands, to the South Coast. From fresh water to bitter water to salt. From city to urban to rural.

The University of Wollongong acknowledges the custodianship of the Aboriginal peoples of this place and space that has kept alive the relationships between all living things.

The University acknowledges the devastating impact of colonisation on our campuses' footprint and commit ourselves to truth-telling, healing and education.

*Journey* Artwork by Wodi Wodi  
Artist Lauren Henry.

A vibrant rainbow gradient background with horizontal brushstrokes.

# Everyone is welcome here.

UOW takes pride in  
the diversity of our  
community.

Find out more, seek support or join  
the UOW Ally Network  
[uow.info/ally](http://uow.info/ally)

# W

# U

# C

**Wollongong**  
Dr. Rory Sie  
([rorys@uow.edu.au](mailto:rorys@uow.edu.au))

SCHOOL OF COMPUTING AND INFORMATION  
TECHNOLOGY

FACULTY OF ENGINEERING AND INFORMATION SCIENCES



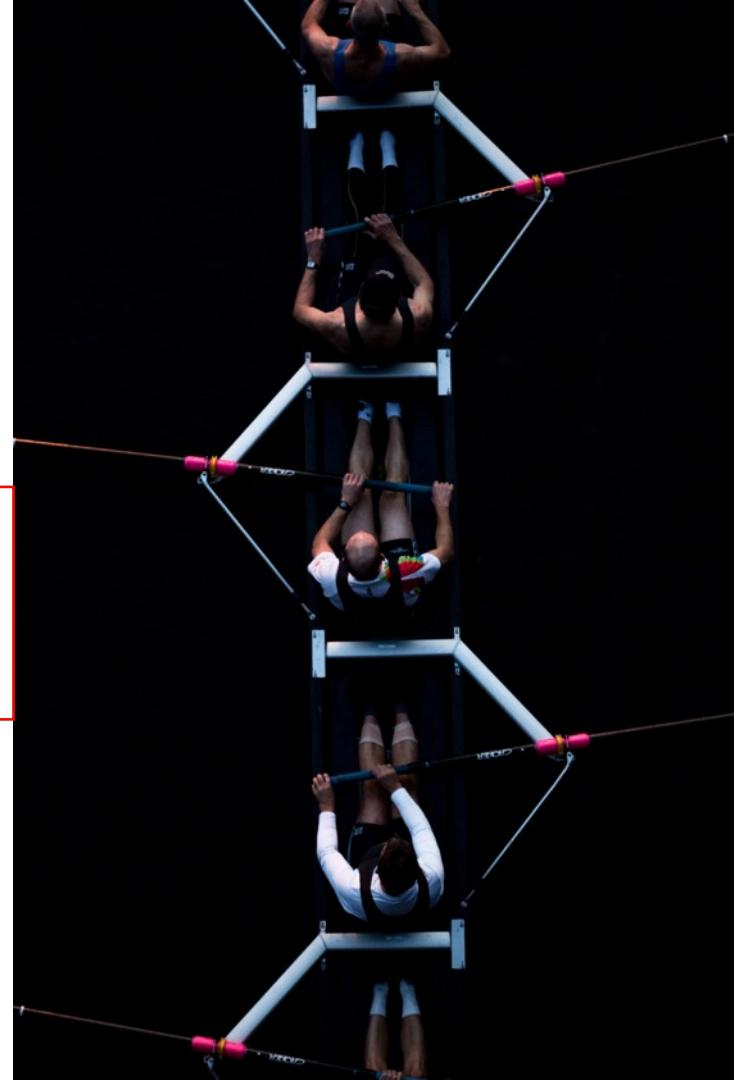
UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Why are we here?

## CSIT226 Human Computer Interaction - Introduction

Prototyping

- High-Fidelity Designs
- Rapid Prototyping



| Week | Topic   | Reading   |
|------|---|---|
| 1    | <b>Introduction to HCI; Design Principles</b>       | <b>Chapter 1</b>                                  |
| 2    | <b>User Interaction and Interfaces</b>              | <b>Chapter 2 &amp; 3 / Gould et al. (1987)</b>    |
| 3    | <b>User-Centred Design Process</b>                  | <b>Chapters 4, 5 &amp; 6 / Shin et al. (2017)</b> |
| 4    | <b>Information Presentation and Design Patterns</b> | <b>Chapters 7 &amp; 8</b>                         |
| 5    | <b>Interaction Design and Development I</b>         | <b>Chapters 9 &amp; 10</b>                        |
| 6    | <b>Interaction Design and Development II</b>        | <b>Chapters 11 &amp; 12</b>                       |
| 7    | <b>Interaction Design and Development III</b>       |   |
| 8    | Usability Evaluation Methods I                      | Chapter 13 / Borsci et al. (2015)                 |
| 9    | Usability Evaluation Methods II                     | Chapter 14, 15 & 16                               |
| 10   | Accessibility and Special Issues in HCI             | Online: WCAG2.1                                   |
| 11   | Models, Theories and Risks                          |   |
| 12   | Mixed Reality and Future HCI                        |   |
| 13   | Subject Revision                                    |   |

# Subject Description

The subject provides students with an understanding of **Human Computer Interaction (HCI) principles and practices**, and how to apply them in **the context of developing usable interactive computer applications and systems**. The subject also emphasises the importance of taking into account **contextual, organisational, and social factors** in the design of **computer systems**. Students will be taken through the **analysis, design, development, and evaluation of user interfaces**. They will acquire **hands-on design skills** through an **interaction design project**. The subject will cover topics including user-centred design, the development **process, prototyping, usability testing, measuring and evaluating the user experience and accessibility**.

# Subject Learning Outcomes (SLOs)

On successful completion of this subject, students will be able to:

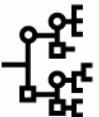
- 1. Identify** and **describe** HCI principles and design issues.
- 2. Discuss** and **justify** HCI solutions based on design principles.
- 3. Demonstrate** an understanding of the HCI design process.
- 4. Acquire skills to design** and implement user-centred design.
- 5. Select** and **use** suitable methods of measuring and evaluating the user experience.

*What did we discuss last  
week?*



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

by sorting out things like this:



CLASSIFICATION  
and HIERARCHY



LABELS and  
TAGGING



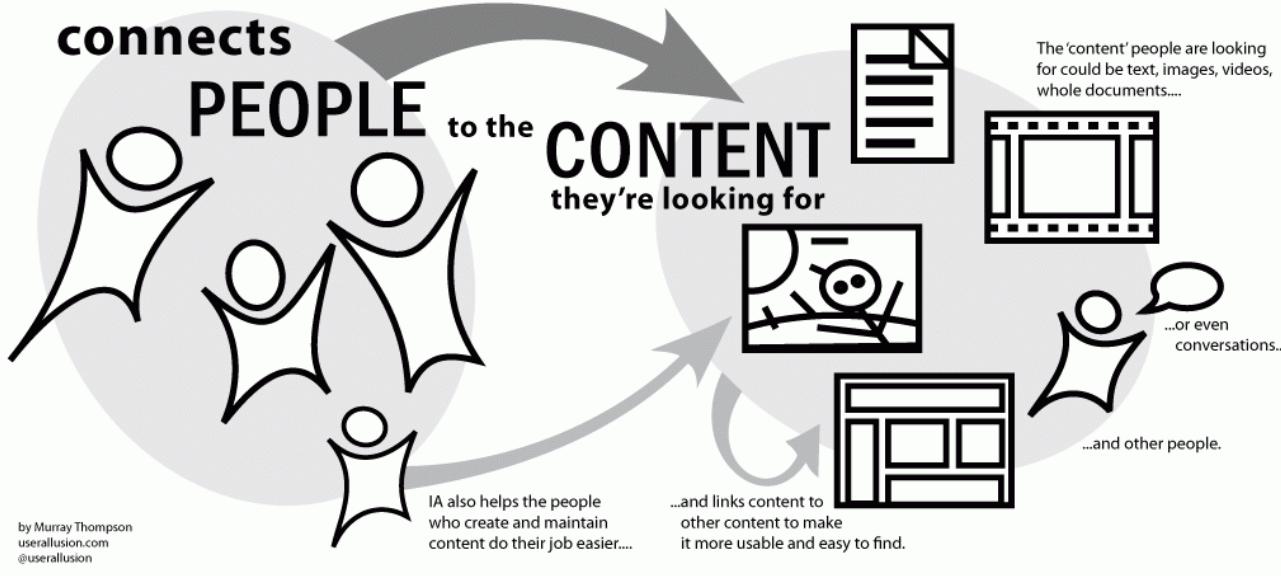
NAVIGATION and  
WAYFINDING



SEARCH

# INFORMATION ARCHITECTURE

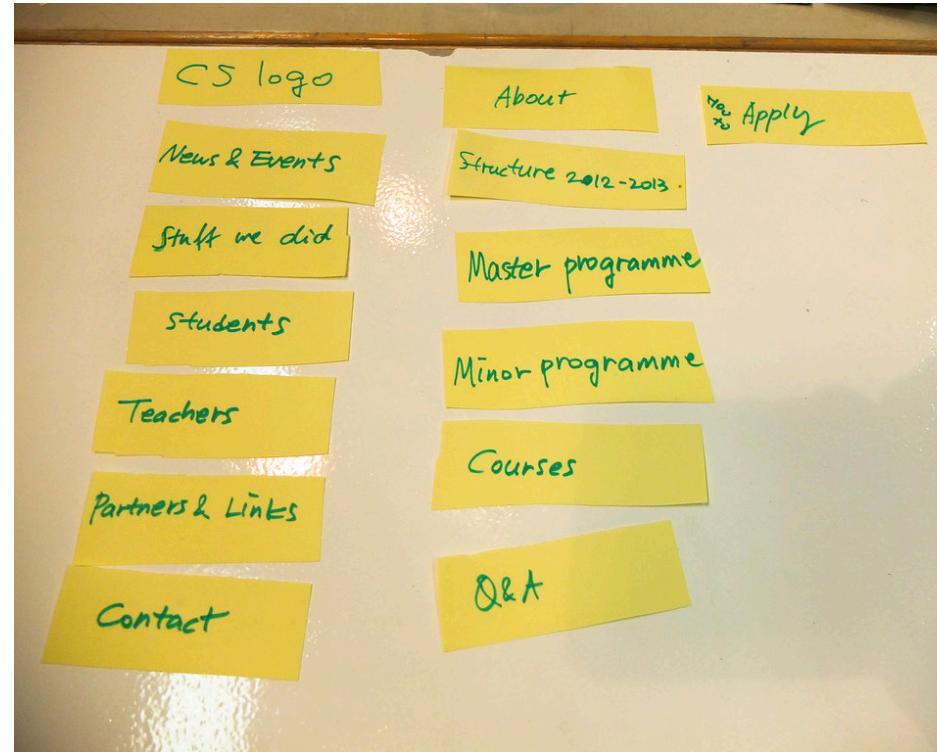
(IA for short)



# What is a common method to create an information architecture?



## Card sorting

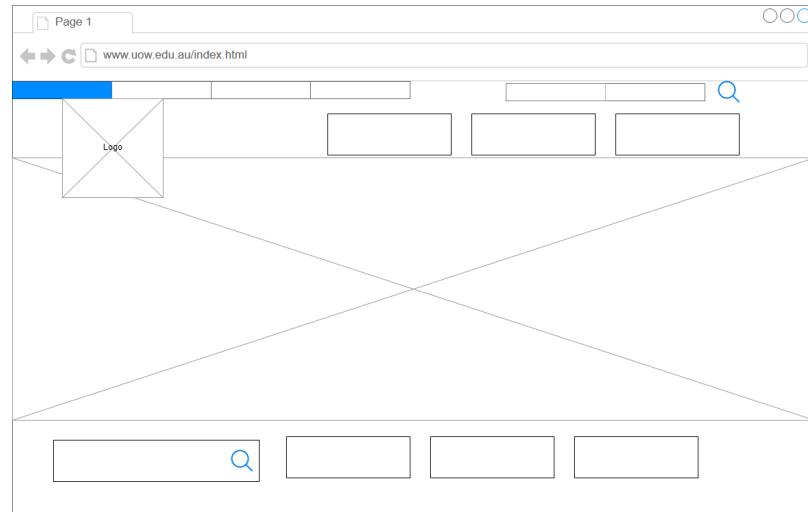


CC BY-SA 2.0

[Result of card-sorting by Creative Sustainability](#)

# Prototyping: Wireframes

- 2D illustration of a page's interface
- Focus:
  - Space allocation
  - Functions
  - Content sections
  - Intended behaviours
- Traditionally
  - No styling
  - No colour
  - No graphics
- Designed to develop relationships with a systems templates



# What elements do you want to be consistent?

- Logo
- Search
- Headers
- Menus
- Footers
- ...

# What elements do you want to be consistent?

- Logo
- Search
- Headers
- Menus
- Footers
- ...

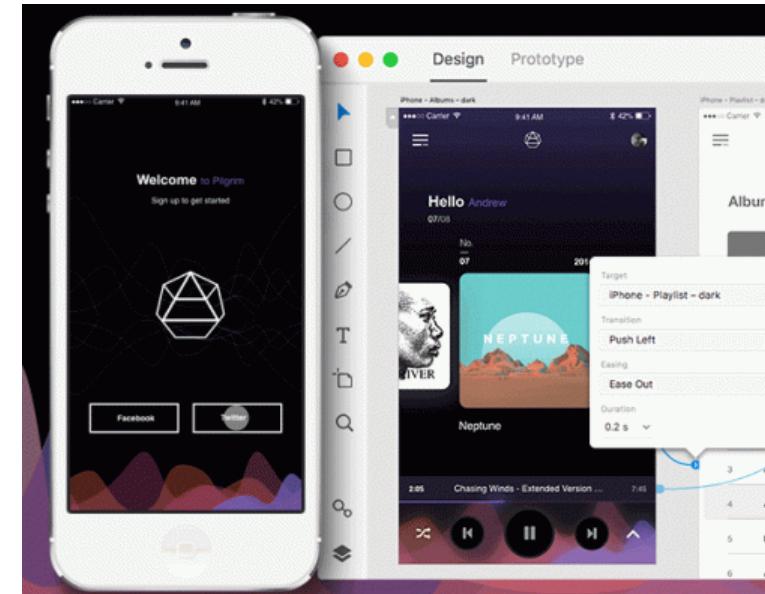
# High Fidelity



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# High-Fidelity Prototyping

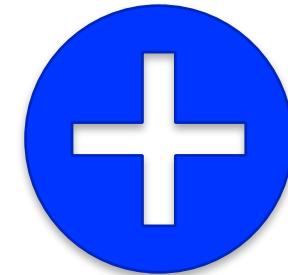
- Uses materials that you would expect to be in the final product
  - Visual design
  - Content
  - **Interactivity**
- Prototype has **more resemblance to the final system** than a low-fidelity version
- High-fidelity prototypes can be developed by integrating existing hardware and software components



- **Danger that users think they have a complete system!**

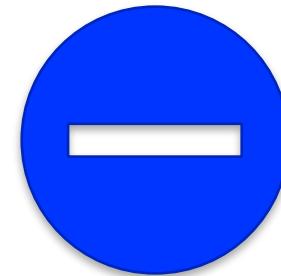
# High-Fidelity – Advantages

- **Enhanced user feedback**
  - Complete functionality and realistic interactions
  - Visual and functional fidelity
- **Improved design accuracy**
  - Detailed design
  - Interactivity
- **Better stakeholder communication**
  - Serves as a living version of the product
  - Marketing and sales tool
- **Reduced development time**
  - Serves as a living specification for developers
  - Early feedback on issues / feasibility
- **Better user testing**
  - Realistically shows the navigational scheme
  - Iterative improvement



# High-Fidelity – Disadvantages

- More resource-intensive to develop
- Time-consuming to create
- Inefficient for proof-of-concept designs
- Not effective for requirements gathering



| Type                    | Advantages   | Disadvantages  |
|-------------------------|--|--|
| Low-fidelity prototype  | <p>Lower development cost</p> <p>Evaluates multiple design concepts</p> <p>Useful communication device</p> <p>Addresses screen layout issues</p> <p>Useful for identifying market requirements</p> <p>Proof of concept</p>   | <p>Limited error checking</p> <p>Poor detailed specification to code to</p> <p>Facilitator-driven</p> <p>Limited utility after requirements established</p> <p>Limited usefulness for usability tests</p> <p>Navigational and flow limitations</p> |
| High-fidelity prototype | <p>Complete functionality</p> <p>Fully interactive</p> <p>User-driven</p> <p>Clearly defines navigational scheme</p> <p>Use for exploration and test</p> <p>Look and feel of final product</p> <p>Serves as a living specification</p> <p>Marketing and sales tool</p> | <p>More resource-intensive to develop</p> <p>Time-consuming to create</p> <p>Inefficient for proof-of-concept designs</p> <p>Not effective for requirements gathering</p>  |

**Table 11.3 Advantages and disadvantages of low- and high-fidelity prototypes**

# Example Tools



- Axure RP
- Adobe XD
- Figma
- Balsamiq
- JustInMind
- UXPin
- Mockplus
- Pencil



I don't recommend any specific tool for your project; you can decide which tool is the right one for you.

# How to create a high-fidelity prototype

1. **Research and plan** the proposed prototype: what are you trying to achieve?
2. **Define key functionality and interactions:** create a storyboard to plan for the entire workflow and interactions.
3. **Create a high-fidelity prototype:** You can start with wireframes, but your goal is to provide a realistic experience
4. **Test and iterate:** Collect feedback from your users and revise the design

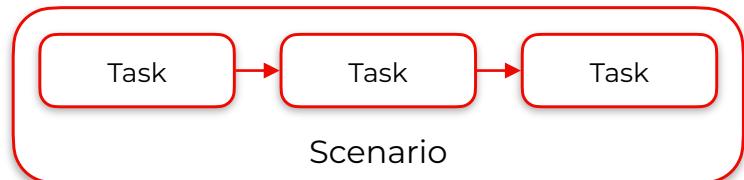
# 1. Research and plan

1. **Understand the user's needs**, pain points and behaviours
2. **Define goals and requirements**: what should the product do? Are there any non-functional requirements / constraints in terms of speed, latency, etc.?
3. **Create personas**: who are your typical users?

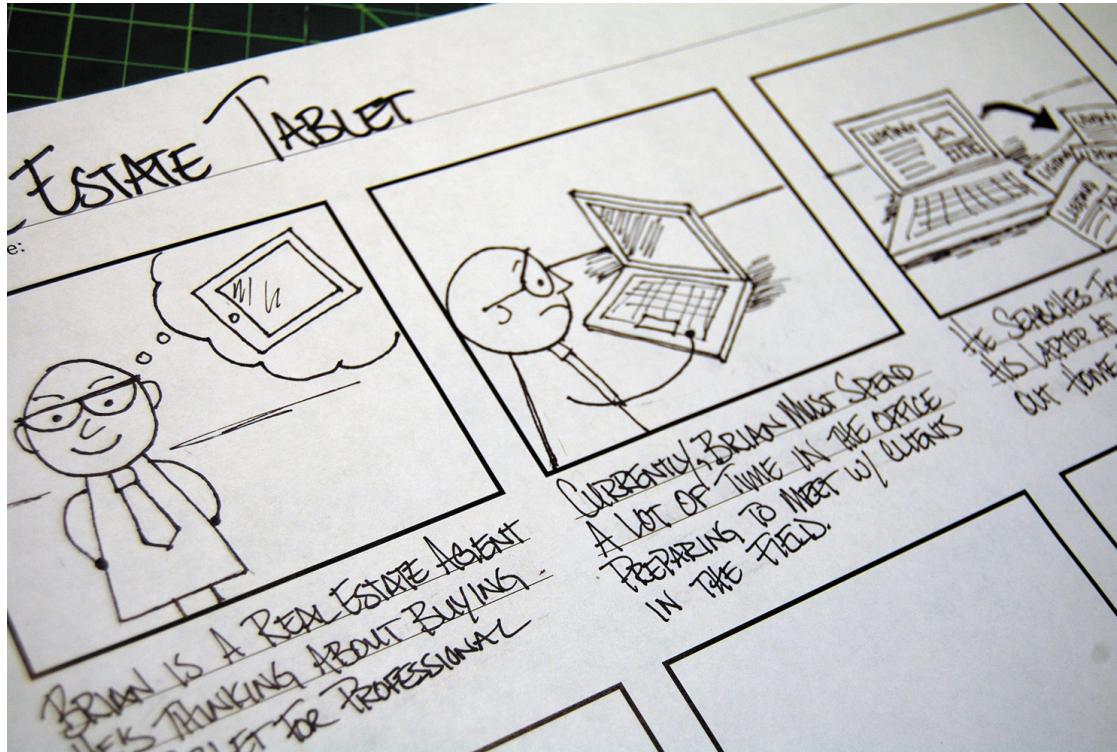
## 2. Define key functionality and interactions

A scenario:

- Expresses proposed or imagined situations
- Used throughout design in various ways
  - as a basis for overall design
  - scripts for user evaluation of prototypes
  - concrete examples of tasks
  - as a means of co-operation across professional boundaries
- Plus and minus scenarios to explore extreme cases



# Generate a storyboard from scenario



CC



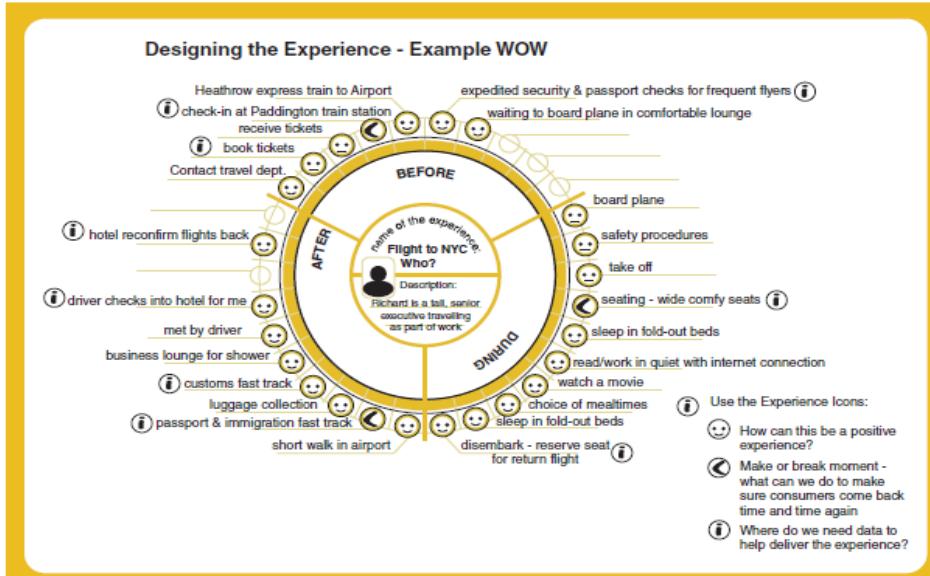
BY

MF228: Figure 6.31 by Rosenfeld Media

# Explore the user's experience

- Use personas, card-based prototypes or post-it-notes to model the user experience
- Visual representation called:
  - design map
  - customer/user journey map
  - experience map
- Two common representations
  - wheel
  - timeline

# An experience map drawn as a wheel



(a)

Figure 11.19 (a) An experience map using a wheel representation. (b) An example timeline design map illustrating how to capture different issues.

Source: (a) <http://www.ux-lady.com/experience-maps-user-journey-and-more-exp-map-layout/> (b) Adlin, T. and Pruitt, J. (2010) *The Essential Persona Lifecycle: Your guide to building and using personas*. Morgan Kaufmann p. 134.

# An experience map drawn as a timeline

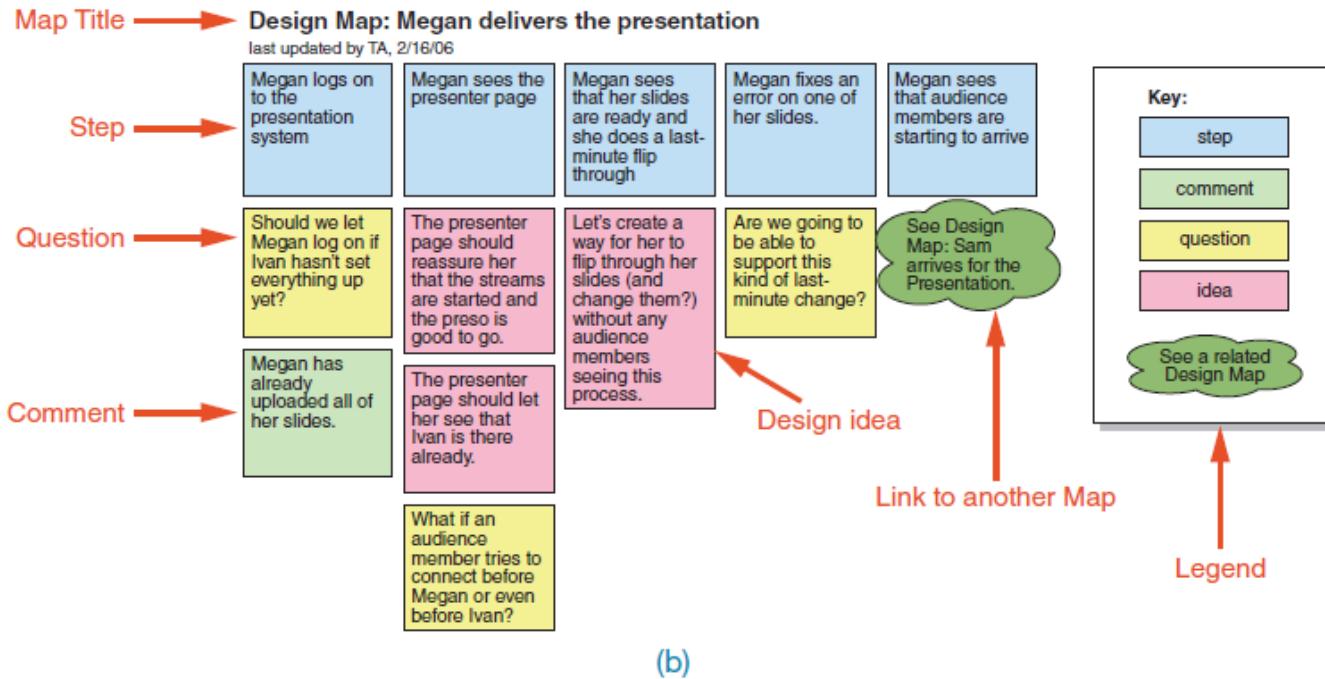
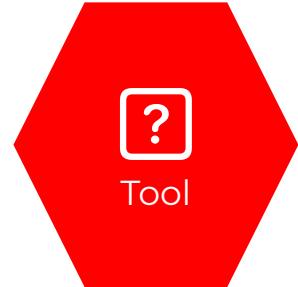
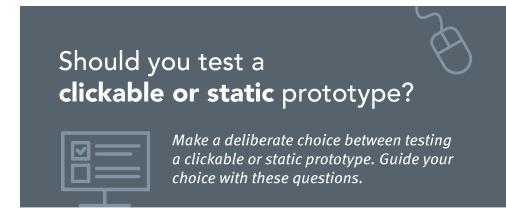


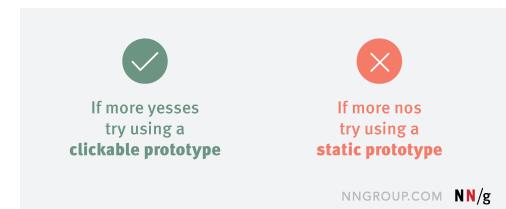
Figure 11.19 Continued

# 3. Create a high-fidelity prototype

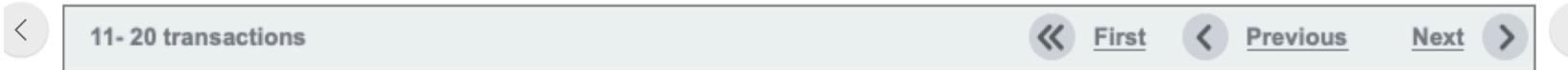
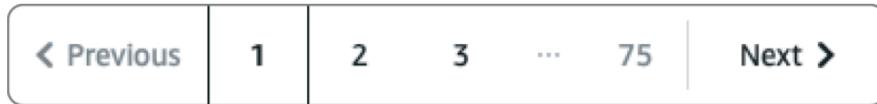
- A candidate design solution
- Watch users work with an actual example of the system
- Options
  - Single page vs multipage prototypes
  - Realistic and detailed vs hand sketched
  - Interactive vs static



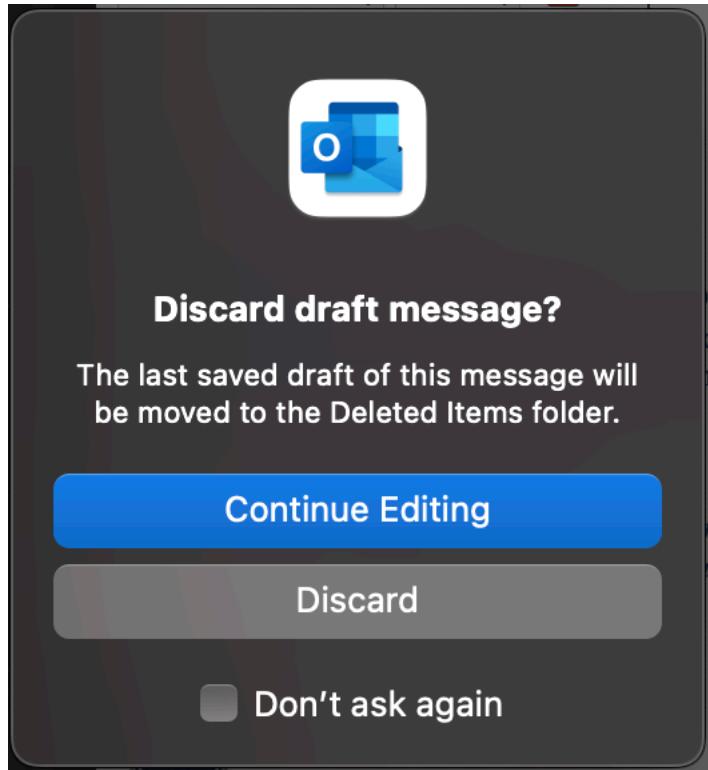
- ① Time and skills with tools to implement a response for all possible user actions?
- ② Time for multiple dry runs of the task with the prototype?
- ③ Time to pilot test the tasks with the prototype and fix all the issues found?
- ④ Design settled enough so no changes between test sessions?
- ⑤ Impossible for designer to play the “computer” in all tests?
- ⑥ Flow from screen to screen an important part of the study?
- ⑦ User noticing dynamic changes an important part of the study?



# Figure 13.5 Different instantiations of the pagination pattern



# Buttons and Data Entry



# Bootstrap V5

Email address

We'll never share your email with anyone else.

Password

Check me out

Submit

Primary

Secondary

Success

Danger

Warning

Info

Light

Dark

[Link](#)

Primary

Secondary

Success

Danger

Warning

Info

Light

Dark

The screenshot displays five examples of Bootstrap's sidebar components arranged horizontally. Each example includes a title bar with a large bold letter icon and a sidebar navigation.

- Sidebar**: A dark sidebar with a blue header bar containing the title "Sidebar". The sidebar lists "Home", "Dashboard", "Orders", "Products", and "Customers".
- Sidebar**: A dark sidebar with a blue header bar containing the title "Sidebar". The sidebar lists "Home", "Dashboard", "Orders", "Products", and "Customers".
- Collapsible**: A sidebar with a blue header bar containing the title "Collapsible". It features a vertical list of icons: house, gear, calendar, grid, and person. Below the icons is a collapsible menu:
  - Home
    - Overview
    - Updates
    - Reports
  - > Dashboard
  - > Orders
  - > Account
- List group**: A sidebar with a blue header bar containing the title "List group". It contains a list of items:
  - List group item heading** Wed  
Some placeholder content in a paragraph below the heading and date.
  - List group item heading** Tues  
Some placeholder content in a paragraph below the heading and date.
  - List group item heading** Mon  
Some placeholder content in a paragraph below the heading and date.
  - List group item heading** Wed  
Some placeholder content in a paragraph below the heading and date.
  - List group item heading** Tues  
Some placeholder content in a paragraph below the heading and date.
  - List group item heading** Mon  
Some placeholder content in a paragraph below the heading and date.
  - List group item heading** Wed  
Some placeholder content in a paragraph below the heading and date.

# What is a FAB?? – Floating Action Button

The image shows two side-by-side floating action buttons (FABs) against a black background. On the left, under 'M2', is a purple circular FAB with a white plus sign in its center. On the right, under 'M3', is a green rounded square FAB with a green painter's palette icon in its center. A small circular icon with a double-headed arrow is located in the top-left corner of the slide.

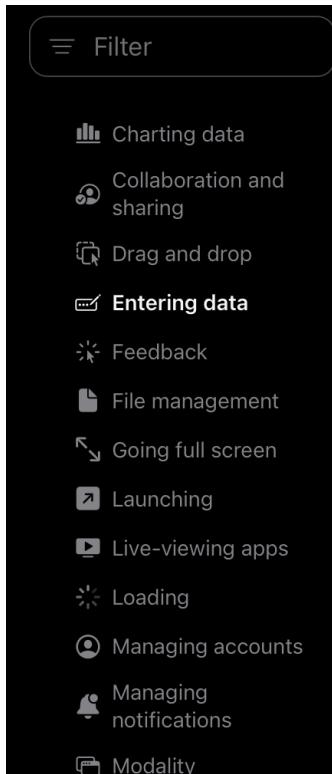
M2: FABs are circles and always have a drop shadow

M3: FABs have a boxier shape, can use dynamic color, and include a new large FAB variation

## 4. Test and iterate

- **Collect feedback** from users as soon as possible
- **Be consistent** and make use of existing **standards**
- Learn from **best practices** and **design guidelines**

# Best practices



## Best practices

**Get information from the system whenever possible.** Don't ask people to enter information that you can gather automatically — such as from settings — or by getting their permission, such as their location or calendar information.

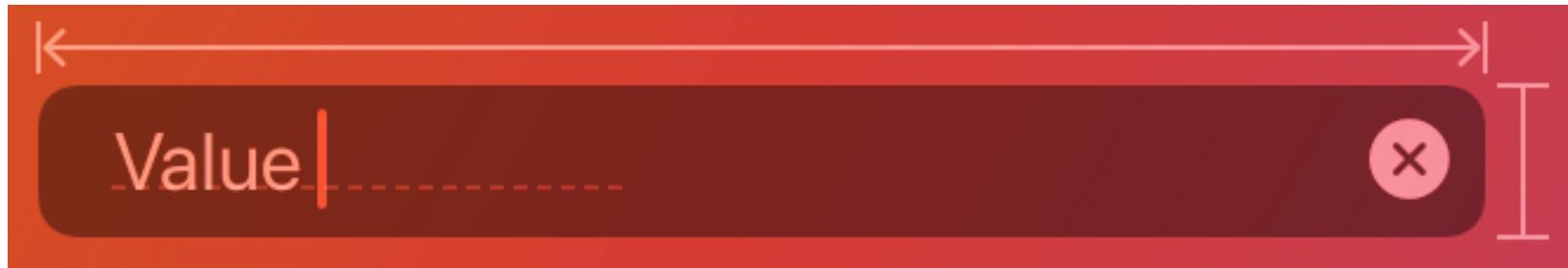
**Be clear about the data you need.** For example, you might display a prompt in a text field — like "username@company.com" — or provide an introductory label that describes the information, like "Email." You can also prefill fields with reasonable default values, which can minimize decision making and speed data entry.

**Use a secure text-entry field when appropriate.** If your app or game needs sensitive data, use a field that obscures people's input as they enter it, typically by displaying a small filled circle symbol for each character. For developer guidance, see [SecureField](#). In tvOS, you can also configure a [digit\\_entry\\_view](#) to obscure the numerals people enter (for developer guidance, see [isSecureDigitEntry](#)). When you use the system-provided text field in visionOS, the system shows the entered data to the wearer, but not to anyone else; for example, a secure text field automatically blurs when people use AirPlay to stream their content.

**Never prepopulate a password field.** Always ask people to enter their password or use biometric or keychain authentication. For guidance, see [Managing accounts](#).

# Best practices (2)

“Show a hint in a text field to help communicate its purpose. A text field can contain placeholder text — such as “Email” or “Password” — when there’s no other text in the field. Because placeholder text disappears when people start typing, it can also be useful to include a separate label describing the field to remind people of its purpose.” (Apple, 2023)





## Sign in

Use your Google Account

Email or phone

[Forgot email?](#)

Not your computer? Use Guest mode to sign in privately.

[Learn more](#)

[Create account](#)

[Next](#)



## Sign in

Use your Google Account

Email or phone

mark

[Forgot email?](#)

Not your computer? Use Guest mode to sign in privately.

[Learn more](#)

[Create account](#)

[Next](#)

# Human Interface Guidelines

- [Apple](#)
- [Microsoft Inclusive Design](#)
- Android
- Ubuntu
  
- Links are available on Moodle

# Future of prototyping



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Future of prototyping

- **AI/ML**

- Create prototypes rapidly, even high-fidelity prototypes
- Use behavioural data to propose changes to the design
- Simulate behaviour through synthetic data and 'digital twins'

- **Rapid prototyping**

- Quickly create prototypes to collect early feedback
- Easier to include interactivity in the design

- **Live prototyping**

- Adapt the design in a natural setting and experiment

You  
Given this picture, can you generate the html and css code for me?



Copilot  
✓ Analyzing the image: Privacy blur hides faces from Copilot  
Sure! Based on the image you provided, which appears to be a documentation page explaining a grid system, here's a sample HTML and CSS code to create a similar layout:

HTML

```
<!DOCTYPE html>
<html lang="en">
<head>
```

Ask me anything...

✖️ | 🔍 | ⏪ | ⏹ | ⏴

# Future of prototyping



You

create a food blog user interface using material design



Copilot

Sure! Here's a basic outline for a food blog user interface using Material Design principles. This will include a header, navigation drawer, main content area, and a footer.

## 1. Header

The header will contain the blog's title and a search bar.

HTML

```
<header class="mdc-top-app-bar">
  <div class="mdc-top-app-bar__row">
    <section class="mdc-top-app-bar__section mdc-top-app-bar__section--align-start">
      <span class="mdc-top-app-bar__title">Foodie's Paradise</span>
    </section>
    <section class="mdc-top-app-bar__section mdc-top-app-bar__section--align-end">
      <div class="mdc-text-field mdc-text-field--with-trailing-icon">
```

New topic

Ask me anything...



It forgot to include material design css, so after a few adaptations:

Foodie's Paradise

Search

search

## Delicious Pasta Recipe

Learn how to make this delicious pasta recipe with simple ingredients...

## Top 10 Restaurants in Sydney

Discover the top 10 restaurants in Sydney that you must visit...

Â© 2024 Foodie's Paradise. All rights reserved.

[facebook](#) [twitter](#) [insta](#)gram



# Take Home Message...

**Consider the message that you want to create when  
designing your interfaces.**



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Things to think about

What is the purpose of prototyping?

What is the difference between Lo-fi  
and Hi-fi designs?

What is a storyboard? When can these  
be used?

What should you show your client?

# References and Resources

- Babich, N. (2017) “Prototyping 101: The Difference between Low-Fidelity and High-Fidelity Prototypes and When to Use Each” [Available: <https://theblog.adobe.com/prototyping-difference-low-fidelity-high-fidelity-prototypes-use/>]
- CanvasFlip (2016) “The art of UX sketching and paper” [Available: <https://uxplanet.org/the-art-of-ux-sketching-and-paper-prototyping-5dae5a1efc7d>]
- Interaction Design Foundation (2016) “UX Tools: Wireframing and Prototyping Tools” [Available: <https://www.interaction-design.org/literature/article/ux-tools-wireframing-and-prototyping-tools>]
- Tubik Studio (2017) “Information Architecture. Basics for Designers” [Available: <https://uxplanet.org/information-architecture-basics-for-designers-b5d43df62e20>]
- Ekvall, H., & Winnberg, P. (2023). Integrating ChatGPT into the UX Design Process Ideation and Prototyping with LLMs.

U

# Questions

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

O



# Interaction Design and Development II

CSIT226 Human Computer Interaction– 2024

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Why are we here?

CSIT226 Human Computer Interaction - Introduction

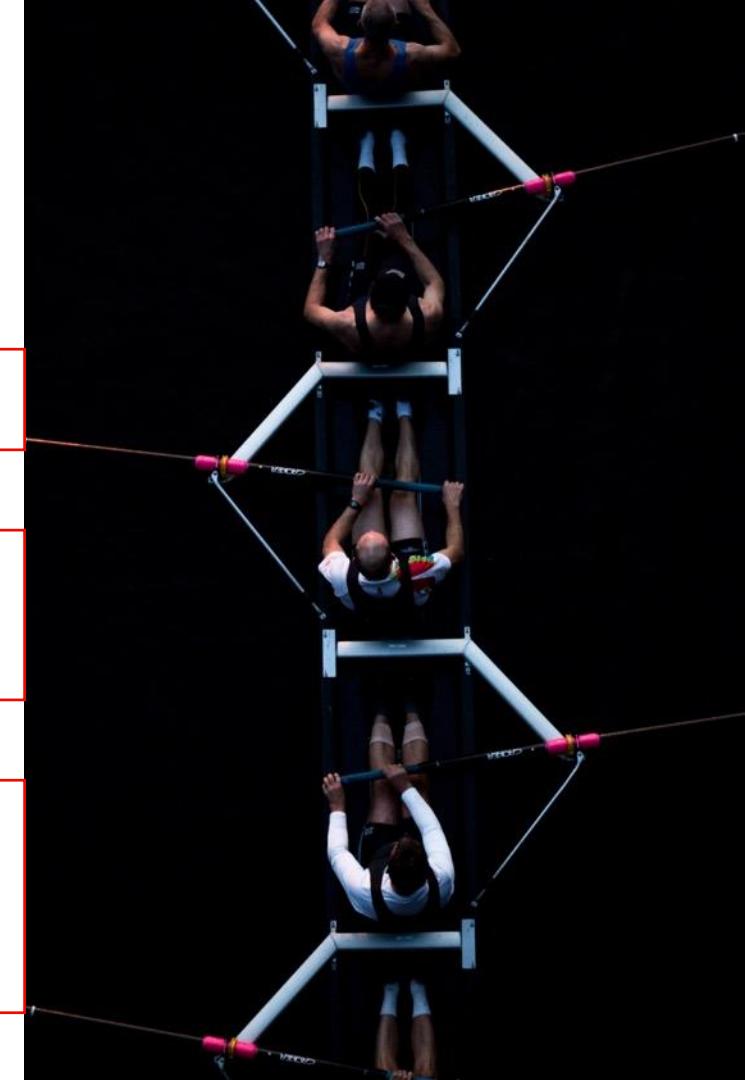
Data Analysis

Information Architecture

- Card Sorting

Prototyping

- Low-Fidelity Designs
- Storyboards



# Choosing and combining techniques

## TRIANGULATION

- Depends on the:
  - Focus of the system / study
  - Complexity of the system
  - Type of participants involved
  - Nature of the technique(s)
  - Resources available
  - Time available
- Multiple techniques are needed to gain insight into developing systems and designing appropriate user experiences and interfaces

# Data Analysis



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Quantitative and qualitative

## Quantitative data

- expressed as numbers

## Qualitative data

- difficult to measure sensibly as numbers, e.g. count number of words to measure dissatisfaction

## Quantitative analysis

- numerical methods to ascertain size, magnitude, amount

## Qualitative analysis

- expresses the nature of elements and is represented as themes, patterns, stories

# Simple quantitative analysis

- Averages
  - Mean: add up values and divide by number of data points
  - Median: middle value of data when ranked
  - Mode: figure that appears most often in the data
- Percentages
- Graphical representations give overview of data
- Recurring patterns or themes
  - Emergent from data, dependent on observation framework
- Categorizing data
  - Categorization scheme may be emergent or pre-specified
- Looking for critical incidents
  - Helps to focus in on key events

# Tools to Support Data Analysis

- Spreadsheet software
  - simple to use
  - basic graphs
- Statistical packages, e.g. SPSS, R
- Qualitative data analysis tools
  - Categorization and theme-based analysis
  - Quantitative analysis of text-based data
  - Nvivo and Atlas.ti support qualitative data analysis

# Use Case Description

FOR DESCRIBING FUNCTIONAL REQUIREMENTS

|                            |       |        |
|----------------------------|-------|--------|
| <b>Use Case Name:</b>      |       |        |
| <b>Scenario:</b>           |       |        |
| <b>Triggering Event:</b>   |       |        |
| <b>Brief Description:</b>  |       |        |
| <b>Actors:</b>             |       |        |
| <b>Related Use Cases:</b>  |       |        |
| <b>Stakeholders:</b>       |       |        |
| <b>Pre-conditions:</b>     |       |        |
| <b>Post-conditions:</b>    |       |        |
| <b>Flow of Activities:</b> | Actor | System |
| <b>Exceptions:</b>         |       |        |

# Consider CRUD

Create

Read

Update

Delete

# User Story (Brief) – Used in Agile Methods and Design Thinking

- Less structured than a ‘use case’
- A User Story is a one-sentence description of a work-related task done by a user to achieve some goal or result
- Acceptance Criteria identify the features that must be present at the completion of the task
- The template for a user story description is:
  - “As a <role> I want to <goal> so that <benefit>”

# Things to think about

What are some of the methods that you could use for your project?

How will you analyse the data?

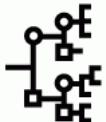
# Information Architecture (IA)

- Organising and structuring content of systems
- *Card Sort to involve users in the design of IA*
- Focus:
  - Organisation, Structuring and labelling of content
  - Allows an understanding for users to find information and complete the tasks on a system
- <https://www.usability.gov/what-and-why/information-architecture.html>
- <http://www.uxbooth.com/articles/complete-beginners-guide-to-information-architecture/>
- <https://uxplanet.org/information-architecture-basics-for-designers-b5d43df62e20>

# Information Architecture

“IA is a blueprint of the design structure which can be generated into wireframes and sitemaps of the project. UX designers use them as the basic materials so that they could plan navigation system.” (Tubik Studio, 2017)

by sorting out things like this:



CLASSIFICATION  
and HIERARCHY



LABELS and  
TAGGING



NAVIGATION and  
WAYFINDING



SEARCH

# INFORMATION ARCHITECTURE

(IA for short)



# Card Sorting

TYPICALLY CONDUCTED EARLY IN THE DESIGN PHASE OF A PROJECT FOR DEFINING A SYSTEMS ARCHITECTURE



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA



Watch

# Card Sorting

- generate information about the associations and grouping of specific data items
- Technology:
  - Low-tech method using index cards or post-it notes
  - High-tech method (e.g. [OptimalWorkshop](#), [uxSort](#) or [UserZoom](#))
- Typically conducted as a:
  - Series of individual exercises
  - Concurrent activity in a small group
  - Mixed approach (individual then group discussion - differences)
- Open vs. Closed sorts
- See:
  - <http://measuringuserexperience.com/CardSorting/index.htm>
  - <https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/card-sorting>

# Activity 1: Card Sort

- Current Students
- University management
- Degree Structures
- Technology
- Sport
- Library
- Research
- Study Programmes
- Admissions
- Study at the university
- Moodle
- International programmes
- Directory
- Services
- Research Institutes
- Organisation chart
- Alumni
- Faculties
- Technological resources
- Webmail
- Schools

# Prototyping

- What is a prototype?
- Why prototype?
- Different kinds of prototyping
  - Low fidelity (Lo-Fi)
  - High fidelity (Hi-Fi)
- Compromises in prototyping
  - Vertical: provide a wide range of functions, but with little detail
  - Horizontal: provide a lot of detail for only a few functions
- Final product needs to be engineered

# What is a prototype?

In interaction design it can be

- a series of screen sketches
- a storyboard, i.e. a cartoon-like series of scenes
- a PowerPoint slide show
- a video simulating the use of a system
- a lump of wood (e.g. PalmPilot)
- a cardboard mock-up
- a piece of software with limited functionality written in the target language or in another language

# Why prototype?

Evaluation and feedback are central to interaction design

Stakeholders can see, hold, interact with a prototype more easily than a document or a drawing

Team members can communicate effectively

You can test out ideas for yourself

It encourages reflection: very important aspect of design

Prototypes answer questions, and support designers in choosing between alternatives

# What to prototype?



TECHNICAL ISSUES

WORK FLOW, TASK DESIGN

SCREEN LAYOUTS AND INFORMATION DISPLAY

DIFFICULT, CONTROVERSIAL, CRITICAL AREAS



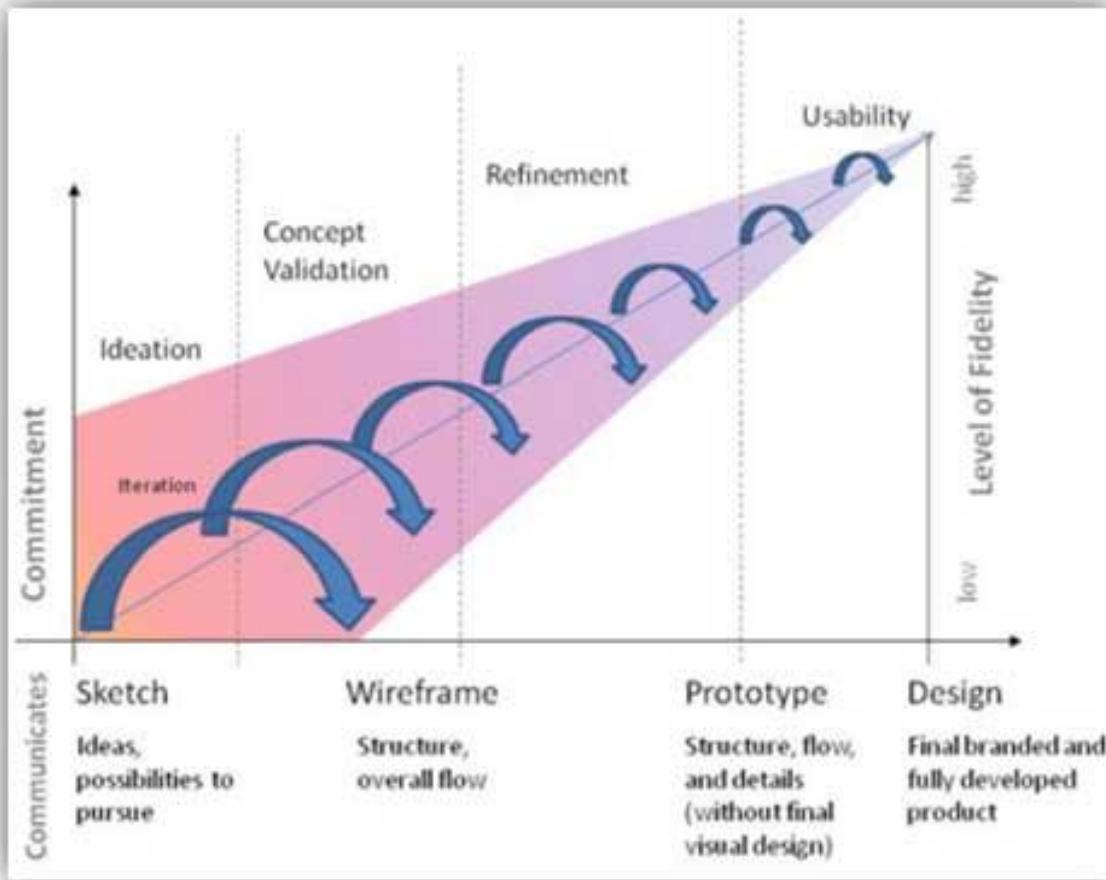
UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Conceptual design

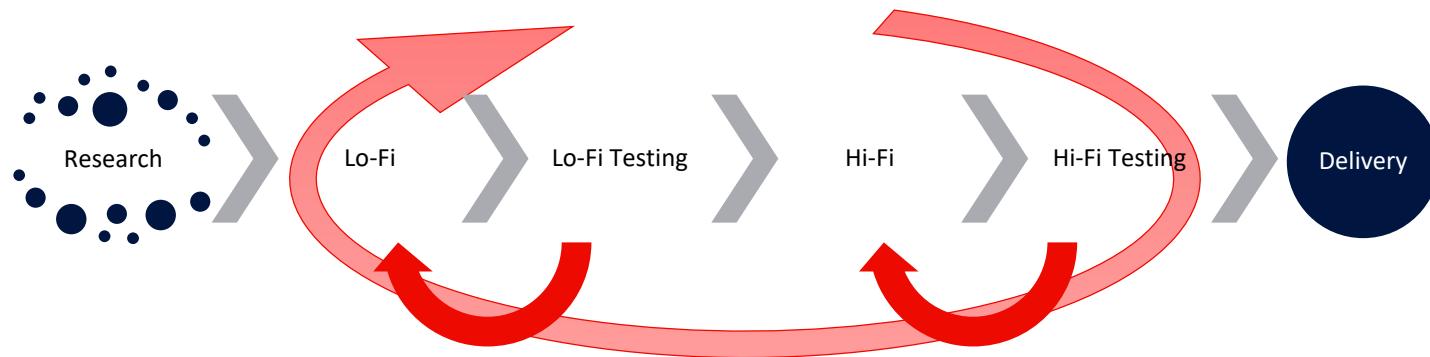
- Transform user requirements/needs into a conceptual model
  - A conceptual model is an outline of what people can do with a product and what concepts are needed to understand and interact with it
  - Mood board may be used to capture feel
  - Consider alternatives: prototyping helps
- 
- “A conceptual model is an outline of what people can do with a product and which concepts are needed for them to understand how to interact with it.”

# Concrete design

- Many aspects to concrete design
  - Colour, icons, buttons, interaction devices etc.
- User characteristics and context
  - Accessibility, cross-cultural design
- Cultural website guidelines
  - successful products “are ... bundles of social solutions. Inventors succeed in a particular culture because they understand the values, institutional arrangements, and economic notions of that culture.”



# Basic Process



# Low-Fidelity



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Sketching

- Sketching is important to low-fidelity prototyping
- Don't be inhibited about drawing ability. Practice simple symbols

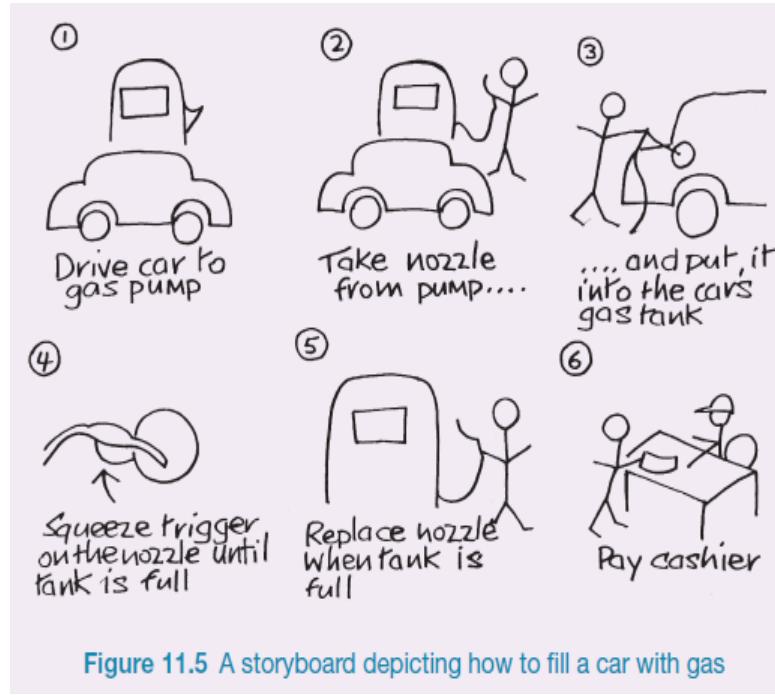


Figure 11.5 A storyboard depicting how to fill a car with gas



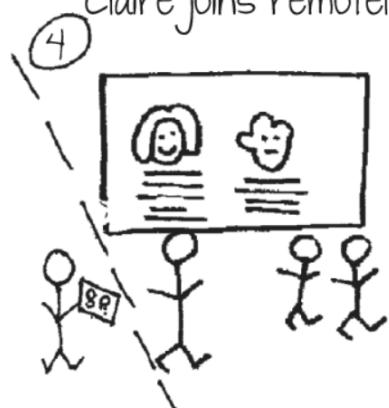
Thomson family  
gather around  
Claire joins remotely



Will tells their  
initial idea



System suggests  
flotilla



System shows  
descriptions



Will asks  
for details



Details sent

# Wireframes

- 2D illustration of a page's interface
- Focus:
  - Space allocation
  - Functions
  - Content sections
  - Intended behaviours
- Typically / Traditionally
  - No styling
  - No colour
  - No graphics
- Designed to develop relationships with a systems template or components

# The value of Wireframing

Identify the interfaces functionality

Identify a pages space allocation

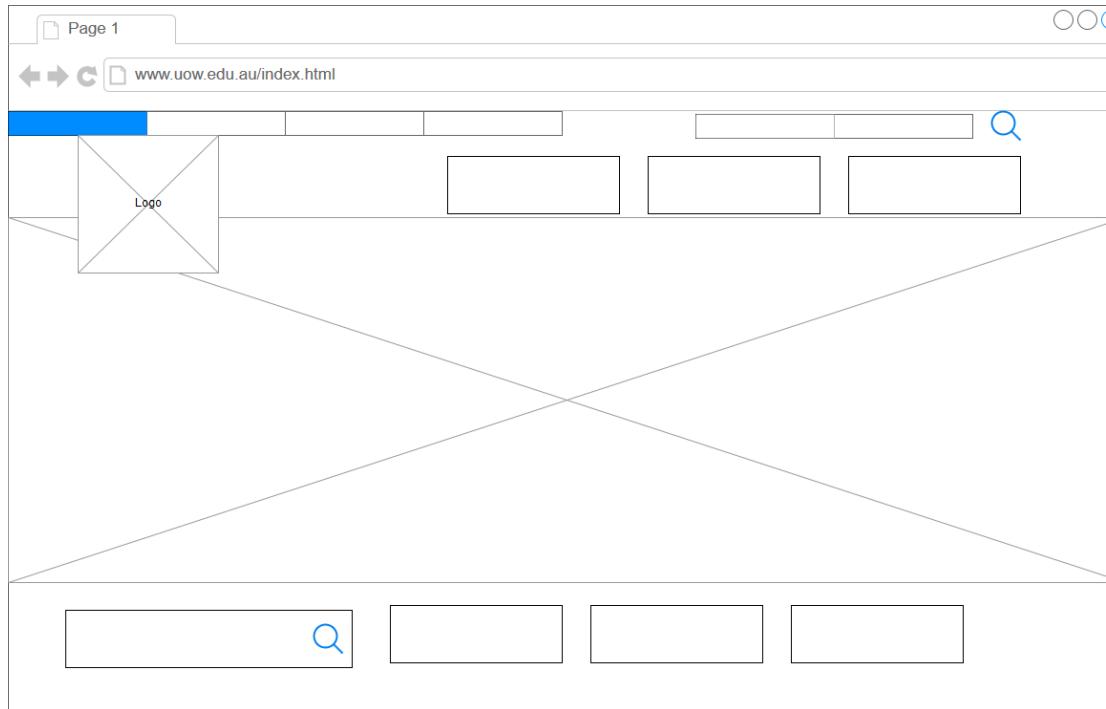
Ensure consistency for particular elements in an interface

Links between a systems information architecture and its visual design

# What elements do you want to be consistent?

- Logo
- Search
- Headers
- Menus
- Footers
- Etc.

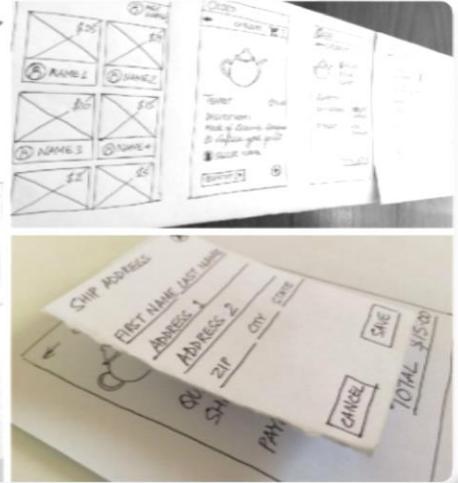
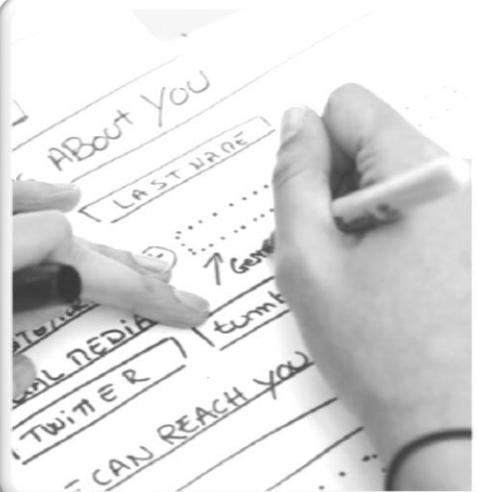
# Basic Wireframe of Old UOW Homepage



# Low-Fidelity Prototyping

- Traditionally, uses a medium which is unlike the final medium
  - paper
  - Cardboard
  - ‘post-it’ notes
- Examples:
  - sketches of screens (wireframes), task sequences, etc.
  - storyboards

# Ideas



# Low-Fidelity – Advantages

- Quick
  - Does not take long to develop
- Cheap
- Easily changed
  - Even during testing
- Designers feel less attached to lo-fi prototypes
- Stakeholders recognise that the work is not finished

# Low-Fidelity – Disadvantages

- Can be uncertainty during testing
  - What is the design showing?
  - How will the interaction work?
- Requires imagination by the user
- Limited interactivity to show complex elements
  - Animations
  - Transitions

# Card-based prototypes

Travel Organizer 23 August

WELCOME HELEN

Where do you want to go?

What date do you want to travel?

Which form of transport do you want?  TRAIN

Do you need accommodation?  YES

Travel Organizer 23 August

Train timetable from Milton Keynes Central to York on 16 Sept

| Depart | 09:09 | 10:09 | same      | 22:09 |
|--------|-------|-------|-----------|-------|
| Arrive | 12:30 | 13:30 | past hour | 01:30 |

Accommodation Hotel B&B  
£40 to £150 £20 to £60

Where do you want to go?

My passport was issued in

Why are you going there?

- Tourism
- Business
- Passing through

Destination

Nationality

The purpose of my trip is

- Tourism
- Business
- Transit

- Each card represents one screen or part of screen

# Generate card-based prototype from use case

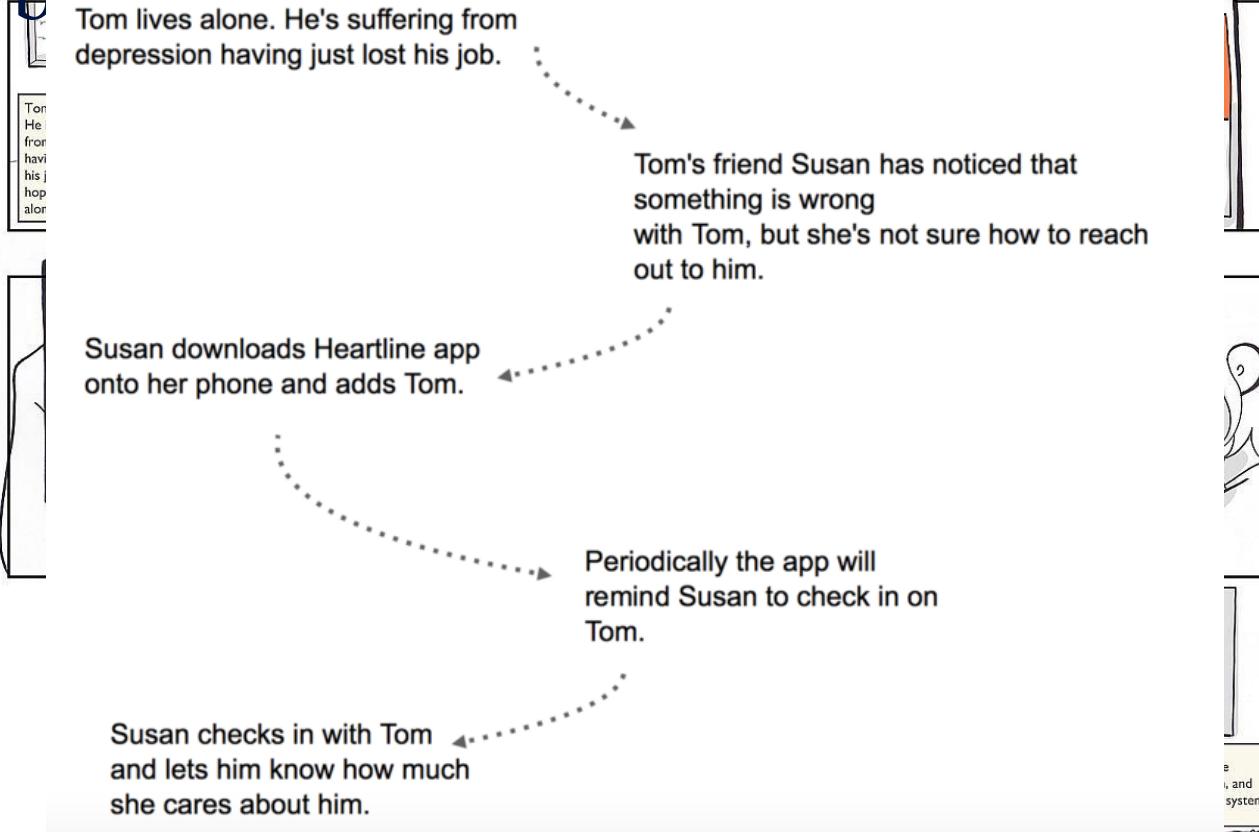


Figure 11.6 Prototype developed for cell phone user interface

# Storyboards

- Designed to illustrate the interaction between the user and the product
  - Drawings, sketches and pictures that tell a story
  - Creates meaning beyond a typical technical drawing (e.g. flowchart)
- 
- <https://blogs.msdn.microsoft.com/crm/2006/11/02/using-storyboard-prototypes-in-your-design-process/>
  - <http://www.usabilitybok.org/storyboard>
  - <https://uxmag.com/articles/storyboarding-in-the-software-design-process>

# Storyboard example



# Style Guides

“ALL GOOD BRANDS HAVE A GREAT STYLE GUIDE” (STRIBLEY, 2018)

**NOTE:** A STYLE GUIDE FOR YOUR GROUP PROJECT IS NEEDED – THIS SHOULD BE ATTACHED AS AN APPENDIX AND FOLLOWED IN YOUR DOCUMENT AND DESIGNS



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

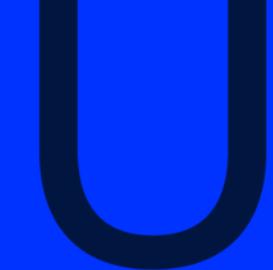
# Style Guides (Branding Guidelines)

- A document that catalogues:
  - Colours
  - Font types
  - Logos
  - Patterns
  - Images
  - Tone
- For consistency in interface designs across an organisation or team

# Some Examples

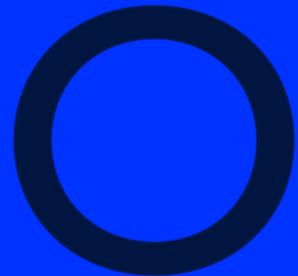


- UOW
  - <https://www.uow.edu.au/brand/>
- NSW Government
  - <https://www.nsw.gov.au/branding>
- Apple – App Store Promotion
  - <https://developer.apple.com/app-store/marketing/guidelines/>
- Spotify
  - <https://developer.spotify.com/branding-guidelines/>
- Facebook
  - <https://about.meta.com/brand/resources/meta/company-brand/>



# Take Home Message...

**When designing the UI/UX for a system you need to think beyond the traditional approaches to come up with creative solutions that meet the needs of multiple stakeholders**



# Additional Resources

- Dam, R. & Siang, T. (2018) "Personas – A Simple Introduction" [Available: <https://www.interaction-design.org/literature/article/personas-why-and-how-you-should-use-them>]
- Harley, A. (2015) "Personas Make Users Memorable for Product Team Members" [Available: <https://www.nngroup.com/articles/persona/>]
- Gregersen, H. (2018) "Better Brainstorming", *Harvard Business Review*, March-April.
- IDEO (2017) "Designing the Levi's Commuter Trucker Jacket with Jacquard by Google" [Available: <https://www.ideo.com/case-study/designing-the-levis-commuter-trucker-jacket-with-jacquard-by-google>]
- Stribley, M. (2018) "50 meticulous style guides every startup should see before launching" [Available: <https://www.canva.com/learn/50-meticulous-style-guides-every-startup-see-launching/>]

U

# Questions

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

O

U



# Interaction Design and Development I

O

CSIT226 Human Computer Interaction– 2024

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Why are we here?

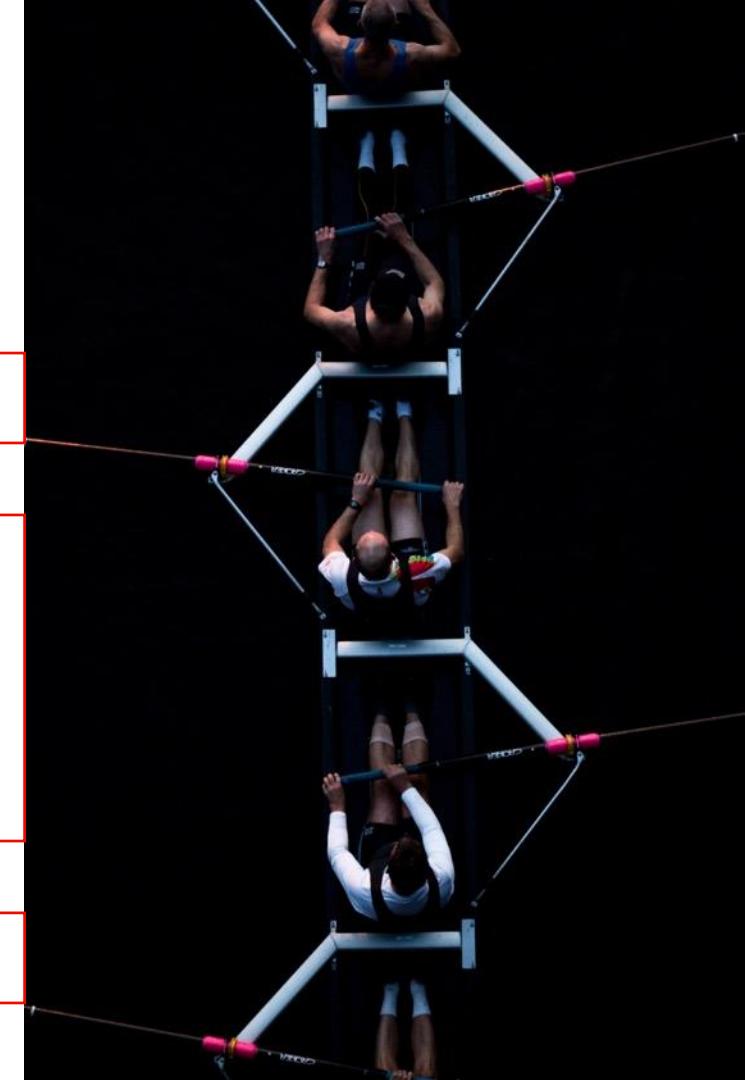
CSIT226 Human Computer Interaction - Introduction

Interaction Design

Data Gathering Techniques

- Market Analysis
- Observation
- Interviews
- Surveys

Data Analysis





Think

# You need to become a Problem Solver!

WHAT DATA TO GATHER?

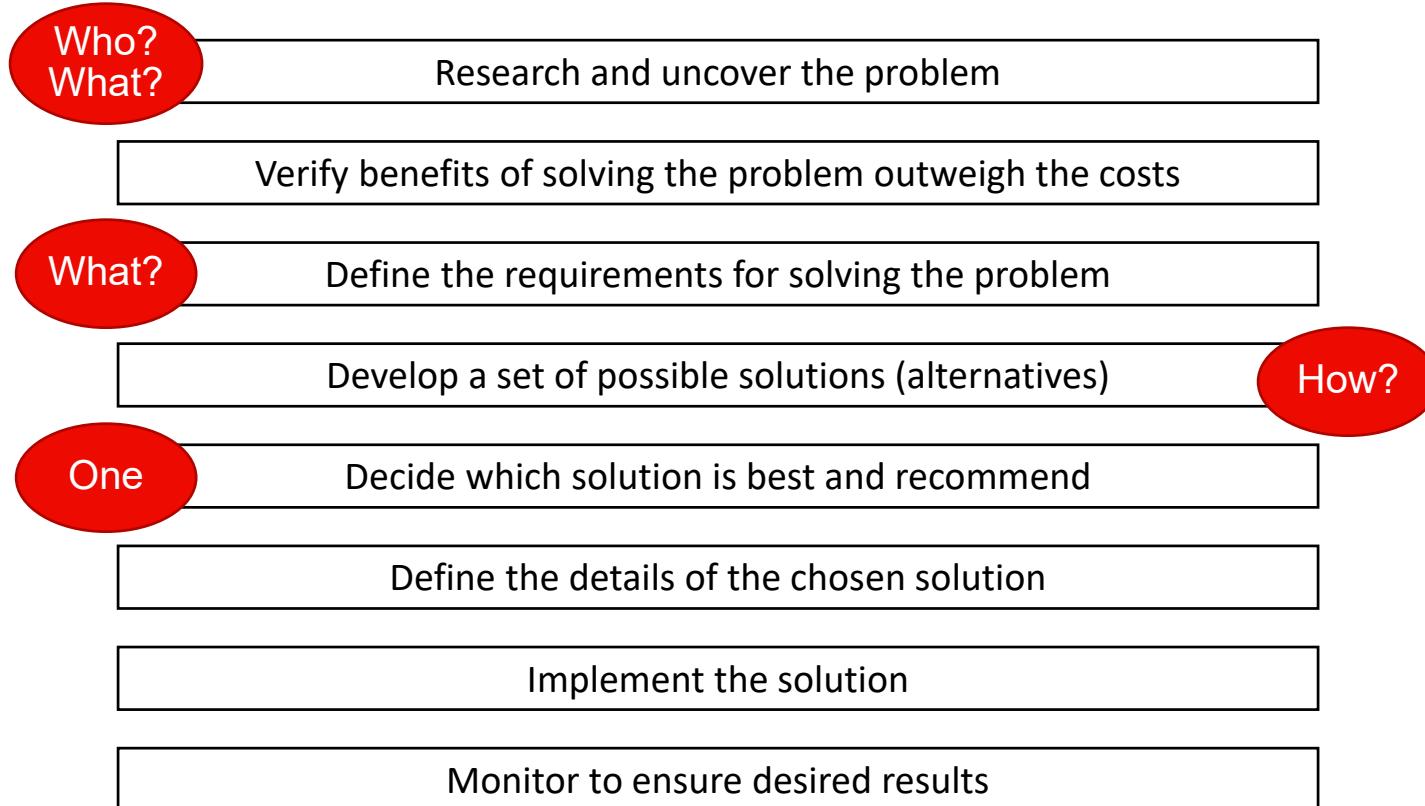
FROM WHO?

REMEMBER: IN UCD WE DO NOT START WITH REQUIREMENTS THESE EMERGE FROM  
THE USERS!



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Traditional Approach to Problem Solving



What is DESIGN?  
What are we DESIGNING?



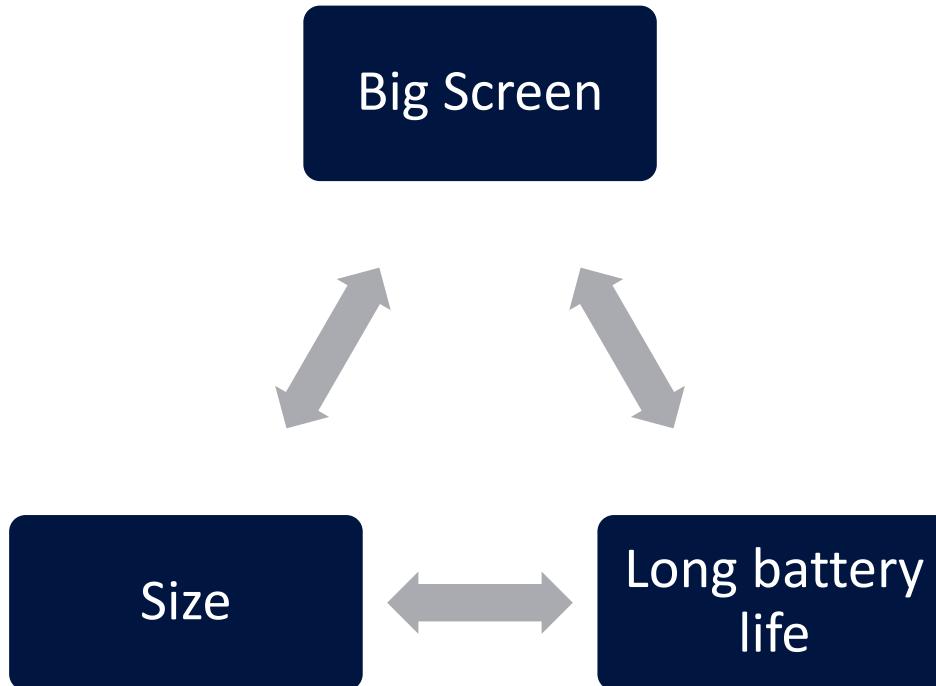
# “Design” - a verb & a noun

- Problem solving
  - Applied creativity... solution focus
  - As learning... learn your way thru a problem
  - As evolution (iterative process)
  - As a social process
  - Heuristics, patterns, templates
- 
- Design both a **THING & A WAY of USING IT**

# Consider...What features would you put in a new smartphone?

- Big screen
- Long battery life
- Size

## THE ART OF TRADEOFF



# NEVER - One single solution

- If any algorithm could generate a perfect solution to the multi-dimensional constraint satisfaction problem...

THEN...

There'd be NO engineers,  
architects or designers



# So... What is “DESIGN”?

- It is a series of TRADE-OFF's
  - To SATISFY all of a project's NEEDS (requirements)
- AND
  - A maximal subset of WANTS
- WITHIN a bunch of Constraints



# Understanding Objectives in Design

- SMART criteria are useful reminders on how to ensure that the project has created understandable and measurable objectives

Specific

Measurable

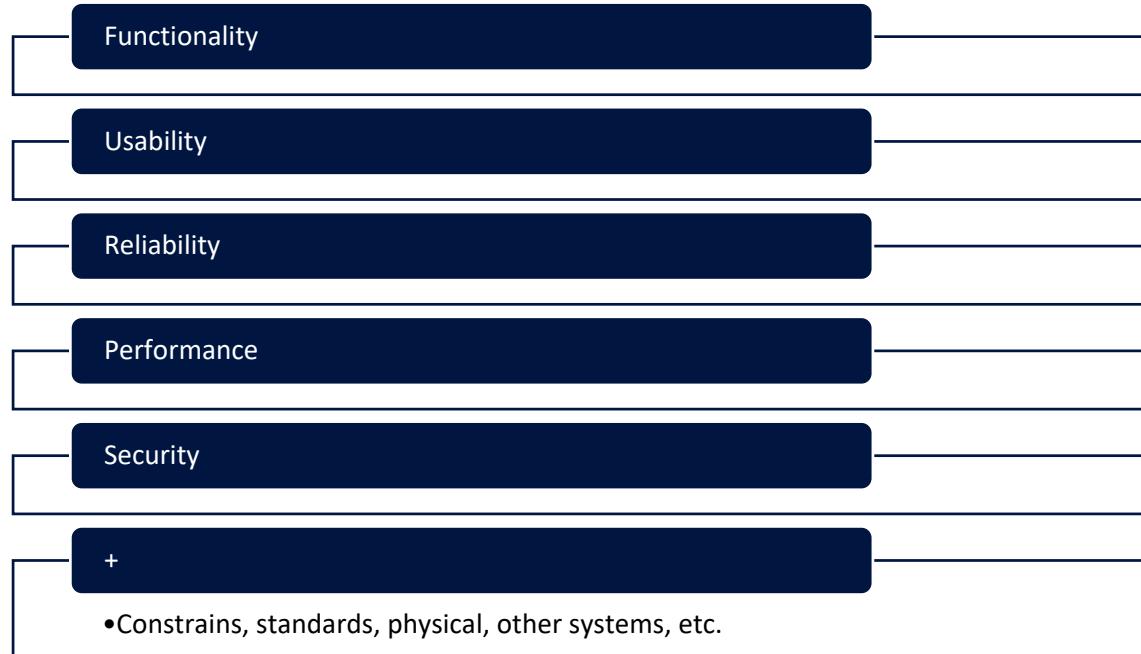
Agreed upon

Realistic

Time-framed

# FRUPS+

## A WAY OF CATEGORIZING REQUIREMENTS



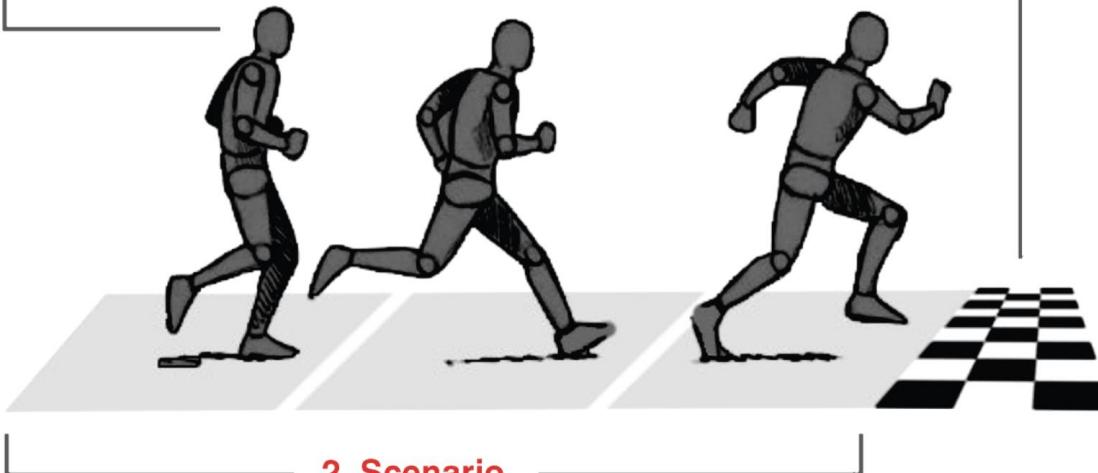
# Scenarios and Personas

## 1. Persona

Defines who the story is about. This main character has attitudes, motivations, goals, and pain points, etc.

## 3. Goal

Defines what the persona wants or needs to fulfill. The goal is the motivation of why the persona is taking action. When that goal is reached, the scenario ends.



Defines when, where, and how the story of the persona takes place. The scenario is the narrative that describes how the persona behaves as a sequence of events.

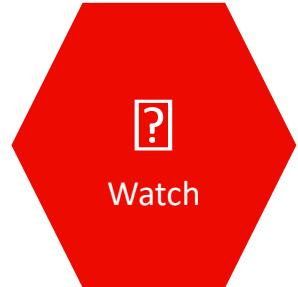
# Scenarios

- A story about the process of a user achieving an action or a goal
- *How a user would perform tasks in a planned system*
- Consider:
  - User motivations
  - Processes
- Traditionally written, but can be in the form of a storyboard, flow diagram or journey map
- Designed around typical users
- Scenarios are linked to user personas

# Personas

- *“Personas are fictional characters, which you create based upon your research in order to represent the different user types that might use your service, product, site, or brand in a similar way.” (Dam and Siang, 2018)*
- Capture a set of user characteristics (user profile)
- Fictional characters, but synthesised from real users
- Should not be idealised
- Bring them to life with a name, characteristics, goals, attitudes, personal background, expected system use
- Develop a small set of personas with one primary

# Example: NN/g



## Company "Investigator"

Rosa Cho  
Content Strategist, Freelance

Age: 34  
Location: Seattle, WA

*"I'm looking to join the right company that challenges me and allows me to grow and develop my skills."*

### About Rosa

Rosa does not believe in settling. She won't settle for a job with a company that isn't as innovative and cutting edge as she believes she deserves. She wants to get the most out of every professional experience, and before moving to a new position, Rosa investigates every angle of aligning herself with a company.

### Behavioral Considerations

- + Expects the site experience to reflect the business's culture and values
- + Interested in career opportunities within the organization that fit her career goals
- + Thoroughly compares multiple companies with similar opportunities
- + Is interested in the unique benefits of working at a company, including cultural elements, mentoring programs, and continuing education policies
- + Needs to be confident the company has innovative products that will be interesting to work on
- + Needs to know company has reputable partners and customers

*"I crave variety in the types of industries and goals of each content project I work on. I need to ensure I won't get bored."*

### Frustrations

- + Thinks that too many companies have career sections that just talk about open positions but not why she would actually want to work there
- + Would like to challenge herself and have a more stable job, but is comfortable as a freelancer and wouldn't stop for just any job

### Goals

- + Needs to see reasons why a company is interesting: has it won awards, had intense growth, won big contracts?
- + Wants to figure out how to get in touch with someone at the company to explore opportunities further

### Tasks

- + Learn about current customers and success stories
- + Read press releases about recent big contract wins and other accolades
- + Read about culture, benefits and perks, and the people that work there
- + View job openings and apply

# Task descriptions

- Scenarios
  - an informal narrative story, simple, ‘natural’, personal, not generalisable
- Use cases
  - assume interaction with a system
  - assume a detailed understanding of the interaction
- Essential use cases
  - abstract away from the details
  - does not have the same assumptions as use cases

# Scenario for travel organizer

“The Thomson family enjoy outdoor activities and want to try their hand at sailing this year. There are four family members: Sky (10 years old), Eamonn (15 years old), Claire (35), and Will (40). One evening after dinner they decide to start exploring the possibilities. They all gather around the travel organizer and enter their initial set of requirements – a sailing trip for four novices in the Mediterranean. The console is designed so that all members of the family can interact easily and comfortably with it. The system’s initial suggestion is a flotilla, where several crews (with various levels of experience) sail together on separate boats. Sky and Eamonn aren’t very happy at the idea of going on vacation with a group of other people, even though the Thomsons would have their own boat. The travel organizer shows them descriptions of flotillas from other children their ages and they are all very positive, so eventually, everyone agrees to explore flotilla opportunities. Will confirms this recommendation and asks for detailed options. As it’s getting late, he asks for the details to be saved so everyone can consider them tomorrow. The travel organizer emails them a summary of the different options available.”

# Using scenarios

- Express proposed or imagined situations
- Used throughout design in various ways
  - as a basis for overall design
  - scripts for user evaluation of prototypes
  - concrete examples of tasks
  - as a means of co-operation across professional boundaries
- Plus and minus scenarios to explore extreme cases

# Different kinds of UI/UX requirements

CONSIDER WITH FURPS+

- Functional:
  - What the system should display to the user
- Non-functional: security, response time...
- Data:
  - What kinds of data need to be collected/stored?
  - How will they be stored (e.g. database)?
- Environment or context of use:
  - physical: dusty? noisy? vibration? light? heat? humidity?
  - social: sharing of files, of displays, in paper, across great distances, synchronous, privacy for client
  - organisational: hierarchy, IT department's attitude and remit, user support, communications structure and infrastructure, availability of training

U

Where to gather data  
from?

O

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Techniques for Data Gathering

Other systems / Processes (Market Analysis)

Business Documents

Observation

Interviews

- Formal One-on-one
- Focus groups
- Brainstorming

Questionnaires

Use case analysis (for new systems being built)

Requests for {information, proposals, tenders, quotation}

# U Market Analysis O

**COMPARE: FEATURES (UTILITY)**

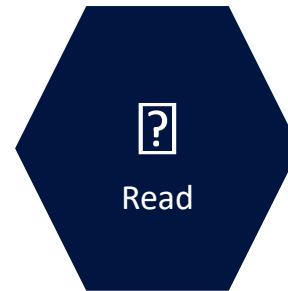


UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# W

# Other Systems and Processes

- It is important to consider competitor products and services and what processes that they use
- A systematic review of these system could be appropriate
- Read: <https://www.lukew.com/ff/entry.asp?1995>



- This article is about a review of the on-boarding process
- What insights from this could you use if you were designing an on-boarding process?

# Analogy – Assembly Line (Henry Ford)

**INSPIRED BY OBSERVATION OF SLAUGHTERHOUSES AND GRAIN WAREHOUSES**

1. Start by extracting attributes of your problem scenario
2. Look towards nature
3. Look towards an industry completely unrelated to yours
4. Look for specific people you could interview
5. Use brainstorming or brainwriting methods
6. Create an analogous inspiration board



# Business Documents & Observation

- Observe and document business processes
- Varies from office walkthroughs to performing actual tasks ‘hands-on’
- Not necessary to observe all processes at same level of detail - complexity
- NOTE: Observation can make employees/system users nervous, so use common sense
- Could document workflow with diagrams
  - UML (Universal Modelling Language) - Activity Diagrams
  - BPMN (Business Process Modelling Notation)

# Observation of other tasks

- Direct observation in the field
  - Structuring frameworks
  - Degree of participation (insider or outsider)
  - Ethnography
- Direct observation in controlled environments
- Indirect observation: tracking users' activities
  - Diaries
  - Interaction logging
  - Video and photographs collected remotely by drones or other equipment

# Planning and conducting observation in the field

- Decide on how involved you will be: passive observer to active participant
- How to gain acceptance
- How to handle sensitive topics, e.g. culture, private spaces, etc.
- How to collect the data:
  - What data to collect
  - What equipment to use
  - When to stop observing

# Structuring frameworks to guide observation

- Three easy-to-remember parts:
  - The person: Who?
  - The place: Where?
  - The thing: What?
- A more detailed framework (Robson, 2014):
  - Space: What is the physical space like and how is it laid out?
  - Actors: What are the names and relevant details of the people involved?
  - Activities: What are the actors doing and why?
  - Objects: What physical objects are present, such as furniture
  - Acts: What are specific individual actions?
  - Events: Is what you observe part of a special event?
  - Time: What is the sequence of events?
  - Goals: What are the actors trying to accomplish?
  - Feelings: What is the mood of the group and of individuals?

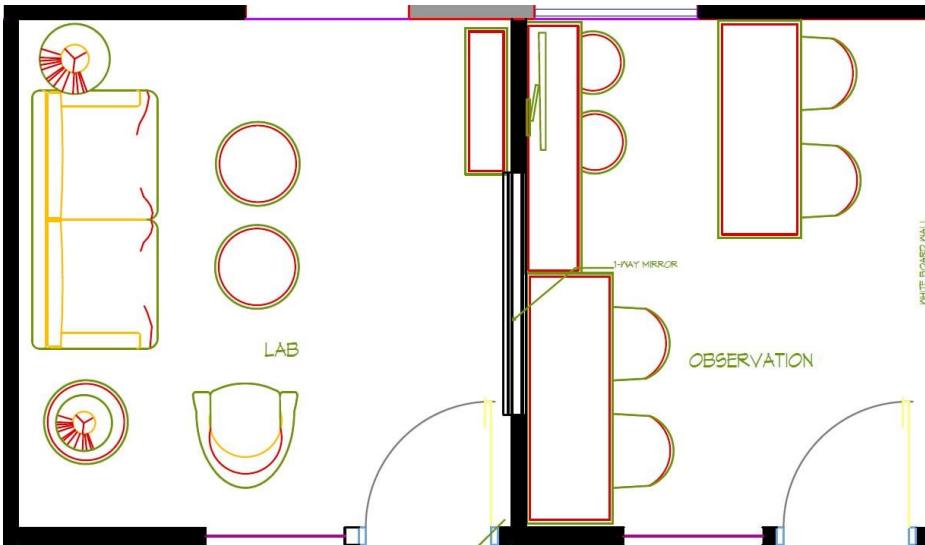
# Observation - Controlled Environments



- Direct observation
  - Think aloud techniques
- Indirect observation – tracking users' activities
  - Diaries
  - Interaction logs
  - Web analytics
- When can each of these methods be used?

# Example

[MEASURINGU.COM/BUILD-USABILITY-LAB/](http://MEASURINGU.COM/BUILD-USABILITY-LAB/)



# Recording data during observations

Notes, audio, video, photographs can be used individually or in combination

Different challenges and advantages with each combination

Consider the ethical implications



Aloud

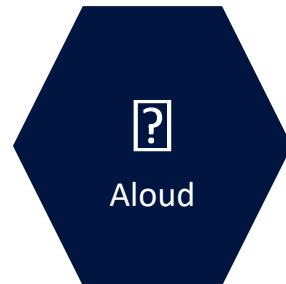
# How can observation be used to design a User Experience (UX)?



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

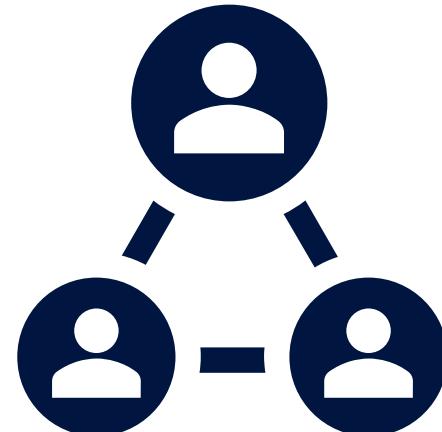
# Key issues involving participants

- Setting goals
  - Decide how to analyze data once collected
- Identifying participants
  - Decide who to gather data from
- Relationship with participants
  - Clear and professional
  - Informed consent when appropriate
- Triangulation
  - Look at data from more than one perspective
  - Collect more than one type of data, e.g. qualitative from experiments and qualitative from interviews



# Interviews

- **Unstructured** - are not directed by a script. Rich but not replicable.
- **Structured** - are tightly scripted, often like a questionnaire. Replicable but may lack richness.
- **Semi-structured** - guided by a script but interesting issues can be explored in more depth. Can provide a good balance between richness and replicability.
- **Focus groups** – a group interview

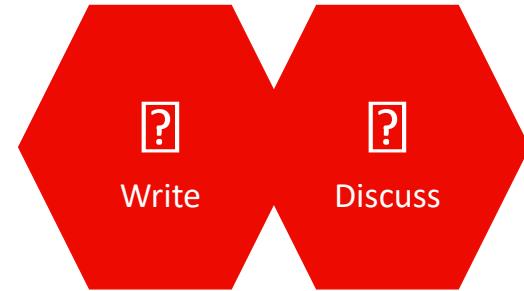


# Interview Questions

- Two types:
  - ‘closed questions’ have a predetermined answer format, e.g.. ‘yes’ or ‘no’, scale based
  - ‘open questions’ do not have a predetermined format
- Closed questions are easier to analyze
- Avoid:
  - Long questions
  - Compound sentences - split them into two
  - Jargon and language that the interviewee may not understand
  - Leading questions that make assumptions e.g.. why do you like ...?
  - Unconscious biases e.g.. gender stereotypes

# Question Design

- Come up with sample questions to ask for:
  - Designing a system for the purchase concert tickets.
  - Do the questions give you enough information to elicit (gather) requirements?
    - What additional questions would you need to ask?
    - What other process would you employ?



# Running the interview

- Introduction – introduce yourself, explain the goals of the interview, reassure about the ethical issues, ask to record, present the informed consent form.
- Warm-up – make first questions easy and non-threatening.
- Main body – present questions in a logical order
- A cool-off period – include a few easy questions to defuse tension at the end
- Closure – thank interviewee, signal the end, e.g. switch recorder off.

# Enriching the interview process

- Props - devices for prompting interviewee,  
e.g. use a prototype, scenario



# Advantages of Interviews

Opportunity for Feedback

Probing Complex Answers

Length of Interview

Props & Visual Aids

High Participation

# Disadvantages of Interviews

**Cost**

**Lack of Anonymity**

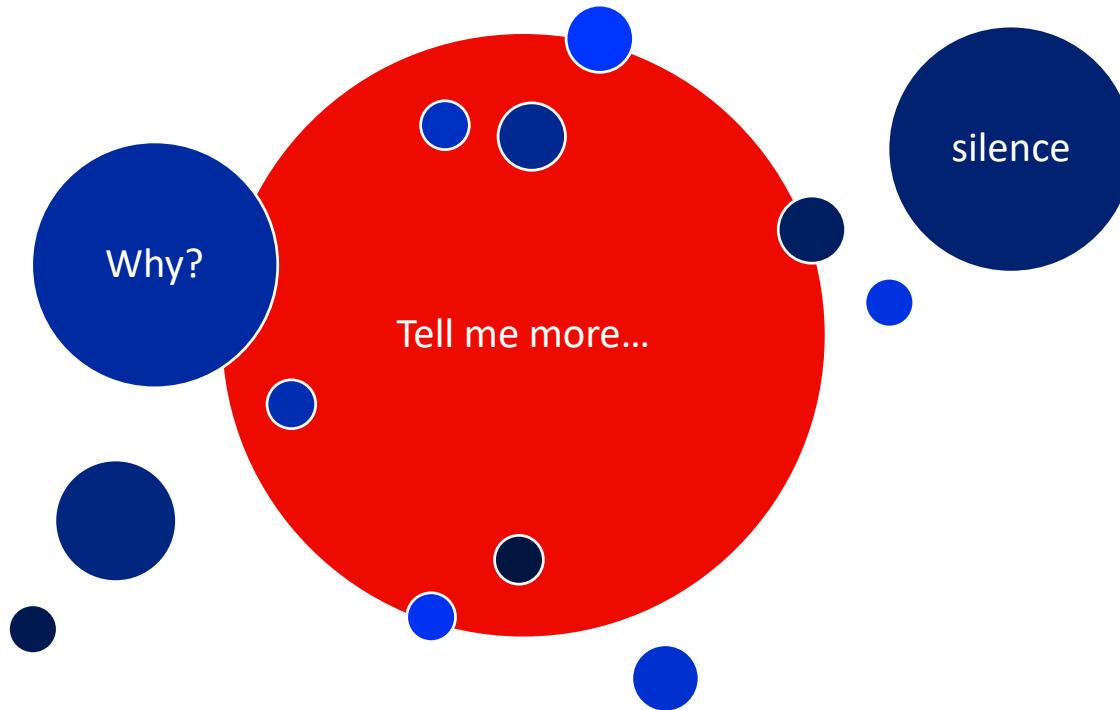
**Variance Effects**

**Dishonesty**

**Personal Style**

**Global Considerations**

# Enhancing Interviews





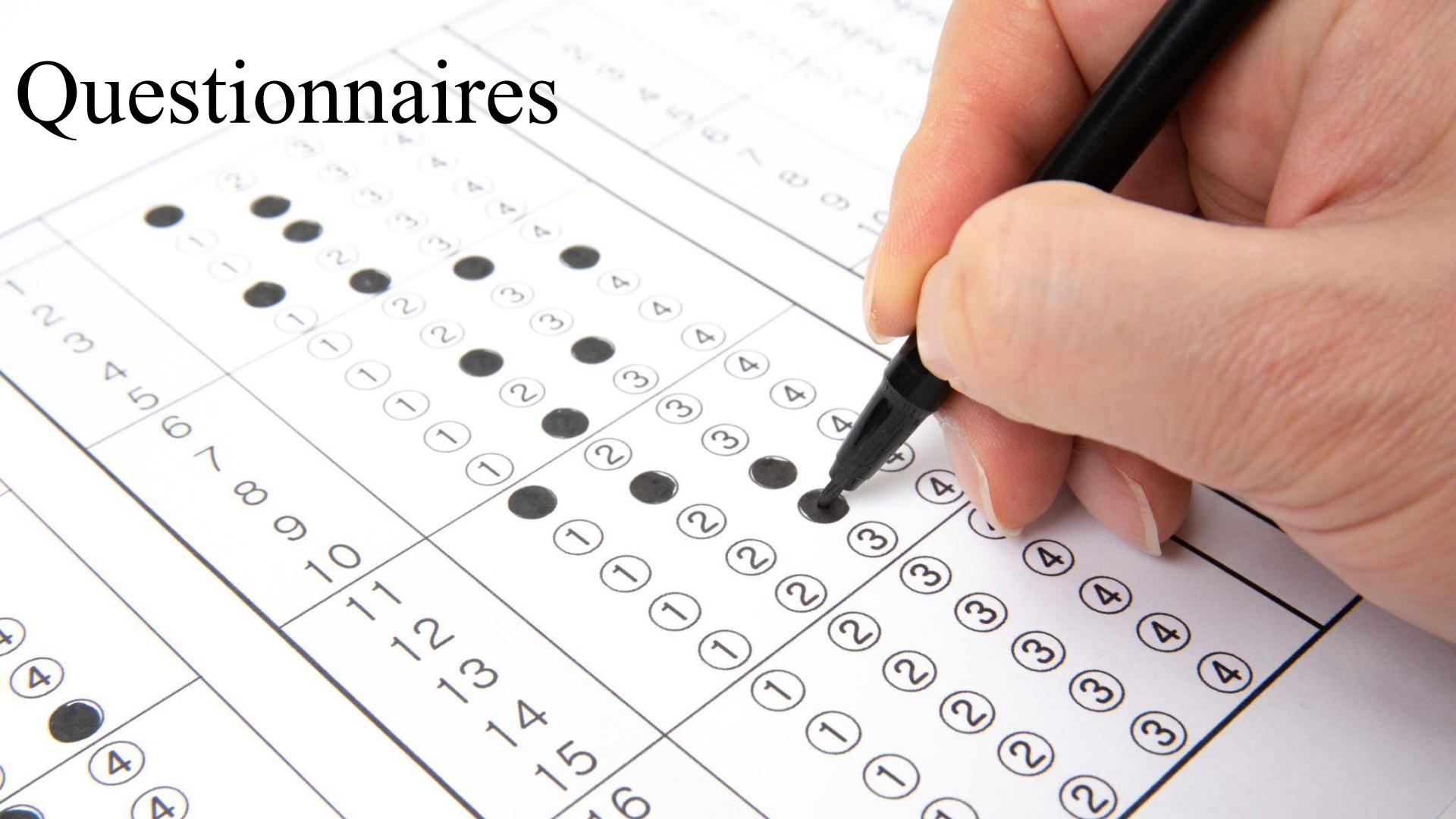
Aloud

# How can interviews be used to design a User Experience (UX)?



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Questionnaires



# Advantages of questionnaires

- Can reach a large population
- Relatively easy and quick to distribute
- Responses are usually received quickly
- For online
  - No copying and postage costs
  - Data can be collected in a database for analysis
  - Time required for data analysis is reduced
  - Errors can be corrected easily

# Disadvantages of questionnaires

- Sampling can be a problem when the size of a population is unknown as is common online evaluation
- Knowing what questions to actually ask
- Participant selecting the same option for all questions (reliability)
- Having appropriate questions that will allow for system requirements to be identified

# Questionnaire design

- The impact of a question can be influenced by question order
- You may need different versions of the questionnaire for different populations
- Provide clear instructions on how to complete the questionnaire
- Avoid very long questionnaires
- Decide on whether phrases will all be positive, all negative or mixed

# Question and response format

- ‘Yes’ and ‘No’ checkboxes
- Select one checkboxes
- Checkboxes that offer many options
- Dropdown lists
- Rating scales
  - Likert scales
  - semantic scales
  - 3, 5, 7 or more points
- Open-ended responses



Aloud

# How can questionnaires be used to design a User Experience (UX)?



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Choosing and combining techniques

## TRIANGULATION

- Depends on the:
  - Focus of the system / study
  - Complexity of the system
  - Type of participants involved
  - Nature of the technique(s)
  - Resources available
  - Time available
- Multiple techniques are needed to gain insight into developing systems and designing appropriate user experiences and interfaces

# Data Analysis



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Quantitative and qualitative

## Quantitative data

- expressed as numbers

## Qualitative data

- difficult to measure sensibly as numbers, e.g. count number of words to measure dissatisfaction

## Quantitative analysis

- numerical methods to ascertain size, magnitude, amount

## Qualitative analysis

- expresses the nature of elements and is represented as themes, patterns, stories

# Simple quantitative analysis

- Averages
  - Mean: add up values and divide by number of data points
  - Median: middle value of data when ranked
  - Mode: figure that appears most often in the data
- Percentages
- Graphical representations give overview of data
- Recurring patterns or themes
  - Emergent from data, dependent on observation framework
- Categorizing data
  - Categorization scheme may be emergent or pre-specified
- Looking for critical incidents
  - Helps to focus in on key events

# Tools to Support Data Analysis

- Spreadsheet software
  - simple to use
  - basic graphs
- Statistical packages, e.g. SPSS, R
- Qualitative data analysis tools
  - Categorization and theme-based analysis
  - Quantitative analysis of text-based data
  - Nvivo and Atlas.ti support qualitative data analysis

# Use Case Description

FOR DESCRIBING FUNCTIONAL REQUIREMENTS

|                            |       |        |
|----------------------------|-------|--------|
| <b>Use Case Name:</b>      |       |        |
| <b>Scenario:</b>           |       |        |
| <b>Triggering Event:</b>   |       |        |
| <b>Brief Description:</b>  |       |        |
| <b>Actors:</b>             |       |        |
| <b>Related Use Cases:</b>  |       |        |
| <b>Stakeholders:</b>       |       |        |
| <b>Pre-conditions:</b>     |       |        |
| <b>Post-conditions:</b>    |       |        |
| <b>Flow of Activities:</b> | Actor | System |
| <b>Exceptions:</b>         |       |        |

# Consider CRUD

Create

Read

Update

Delete

# User Story (Brief) – Used in Agile Methods and Design Thinking

- Less structured than a ‘use case’
- A User Story is a one-sentence description of a work-related task done by a user to achieve some goal or result
- Acceptance Criteria identify the features that must be present at the completion of the task
- The template for a user story description is:
  - “As a <role> I want to <goal> so that <benefit>”

# Things to think about

What are some of the methods that you could use for your project?

How will you analyse the data?

U

# Questions

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

O

U



# Information Presentation and Design Patterns

CSIT226 Human Computer Interaction– 2024

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Why are we here?

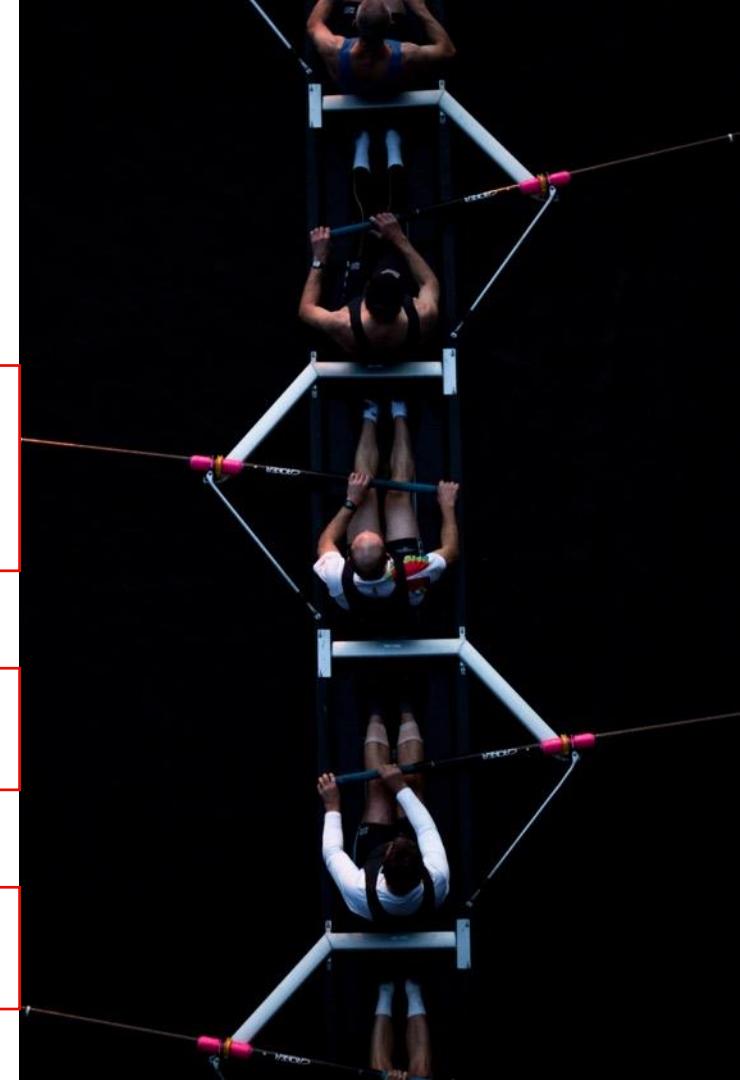
CSIT226 Human Computer Interaction - Introduction

Design Pattern

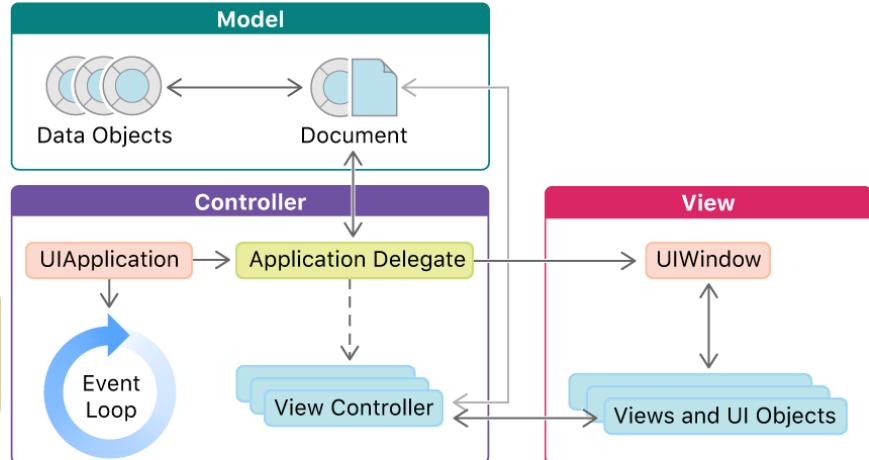
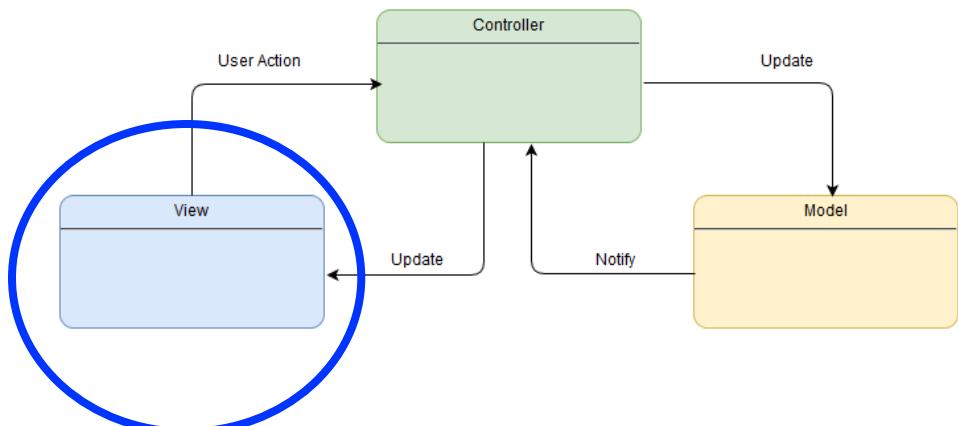
- MVC

Design Patterns

Navigation



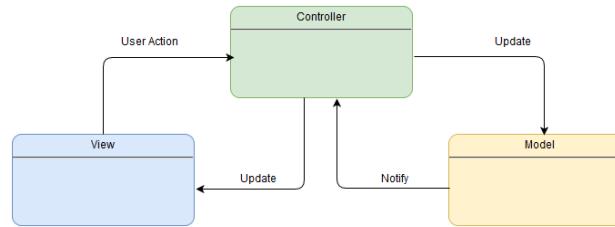
# Model-View-Controller (MVC) Design Pattern



Legend:

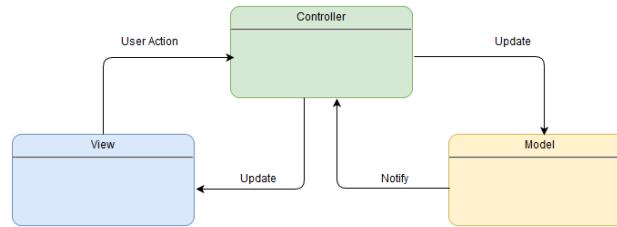
- Custom Objects (Yellow)
- System Objects (Orange)
- Either system or custom objects (Teal)

# Model in MVC



- Where the application's data objects are stored
- Used to encapsulate the data for an application
- Define the logic and computation that manipulate and process the data
- “Ideally, a model object should have no explicit connection to the view objects that present its data and allow users to edit that data—it should not be concerned with user-interface and presentation issues.” (Apple, 2015)
- **Communication:** User actions in the view layer that create or modify data are communicated through a controller object and result in the creation or updating of a model object. When a model object changes (for example, new data is received over a network connection), it notifies a controller object, which updates the appropriate view objects. (Apple, 2015)

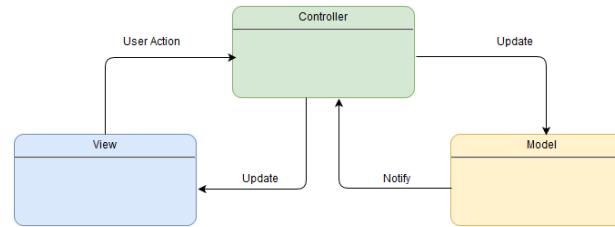
# Controller in MVC



- A decision maker
- Intermediary between one or more application view objects and model objects
- A conduit through which objects learn about changes
- **Communication:** A controller object interprets user actions made in view objects and communicates new or changed data to the model layer. When model objects change, a controller object communicates that new model data to the view objects so that they can display it. (Apple, 2015)

# View in MVC

OUR FOCUS IN HCI



- What is presented to the user
  - An application that users interact with
  - Draws itself and can respond to user actions
  - Display data from the application's model objects and to enable the editing of that data.
- 
- **Communication:** View objects learn about changes in model data through the application's controller objects and communicate user-initiated changes—for example, text entered in a text field—through controller objects to an application's model objects. (Apple, 2015)

U

Why a design pattern  
such as MVC?

O

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Remember: Design Principles

---

Familiarity

---

Consistency

---

Predictability

---

Recoverability

---

Guidance

---

Diversity

# Remember: Interaction Styles

- Based on the design principles there are several common interaction styles that are used today
- Command language
- Menu selection
- Form fill-in
- Direct manipulation
- Anthropomorphic (including Natural language)
  - Systems interact with humans in the same way that they interact with each other

# Veen, J (2000) The Art & Science of Web Design



Where am I?



What's here?



Where can I go?

# Designing Interfaces – Design Patterns

- “patterns are structural and behavioral features that improve the “habitability” of something—a user interface, a web site, an object-oriented program, or even a building. They make things easier to understand or more beautiful; they make tools more useful and usable.” (Tidwell, 2006)
- van Welie, M (2008)
  - [www.welie.com/patterns](http://www.welie.com/patterns)

# Common Patterns (basic – single view)

(TIDWELL, 2006)

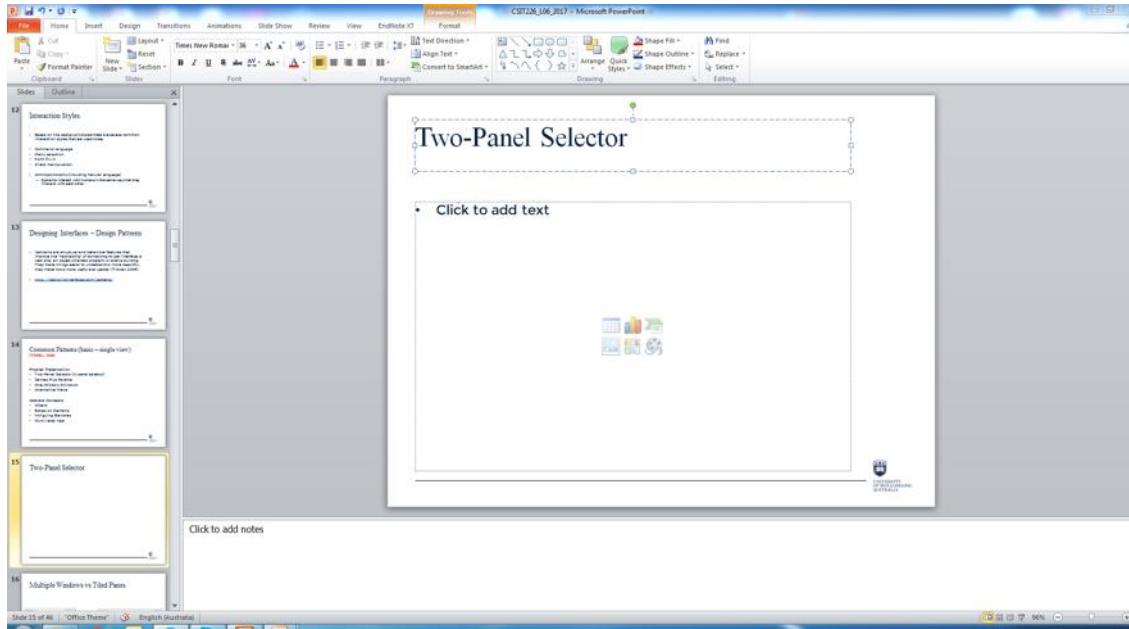
## Physical Presentation

- Two-Panel Selector (n-panel selector)
- Canvas Plus Palette
- One-Window Drilldown
- Alternative Views

## Abstract Concepts

- Wizard
- Extras on Demand
- Intriguing Branches
- Multi-level help

# Two-Panel Selector

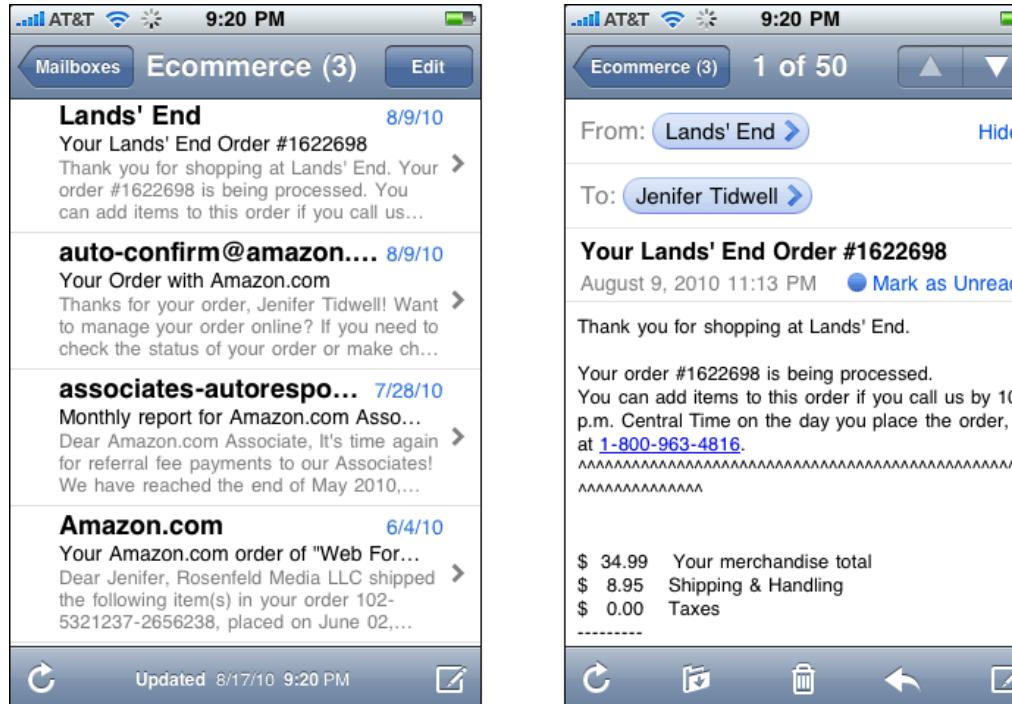


# Canvas Plus Palette

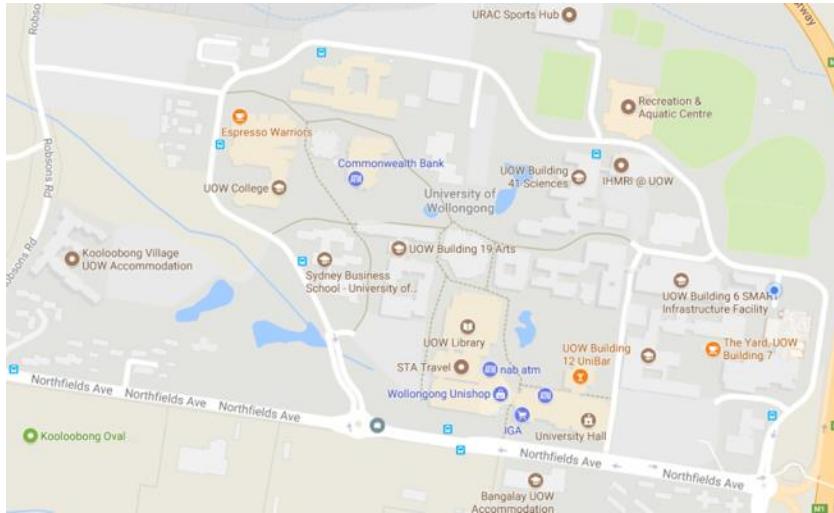


# One-Window Drilldown

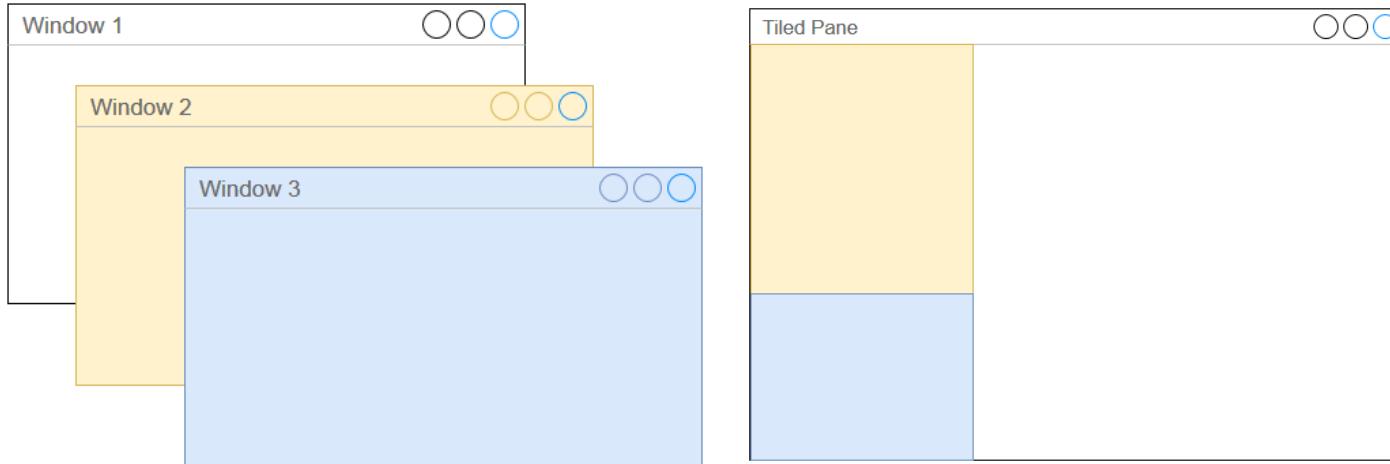
MOBILE METHOD TO DISPLAY A LIST OR MENU (VS. TWO-PANEL SELECTOR)



# Alternate Views



# Multiple Windows vs Tiled Panes



# Design and Code Windows Apps

← WinUI 3 Gallery Dev

≡

Search

Home

Design guidance

All samples

Basic input

Collections

Date & time

Dialogs & flyouts

Layout

Media

Menus & toolbars

Motion

Navigation

Scrolling

Settings

WinAppSDK 1.2

# WinUI 3 Gallery

**Getting started**  
An overview of app development options, tools, and samples.

**Windows design**  
Design guidelines and toolkits for creating native app experiences.

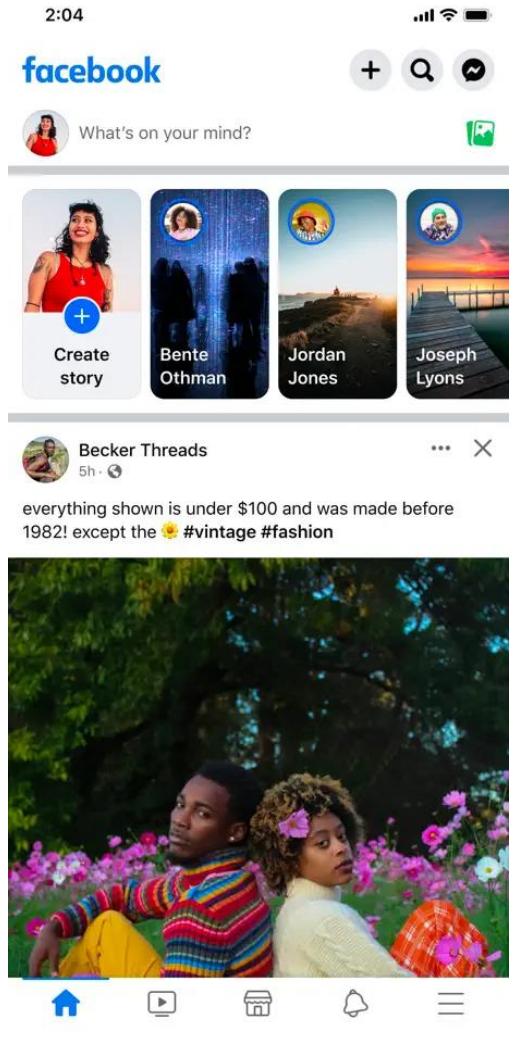
**WinUI GitHub**  
The latest Windows native controls and styles for your applications.

**Community Toolkit**  
A collection of helper functions, custom controls, and app services.

## Recently added samples

|   |   |
|---|---|
| Clipboard<br>Copy and paste to and from the system Clipboard. | FilePicker<br>Access files and folders through the file pickers.    |
| Line<br>Draws a straight line between two points.             | MediaPlayerElement<br>A control to display video and image content. |

# Facebook



# TikTok

Explore  
easy & tasty recipes



Tap into summer.

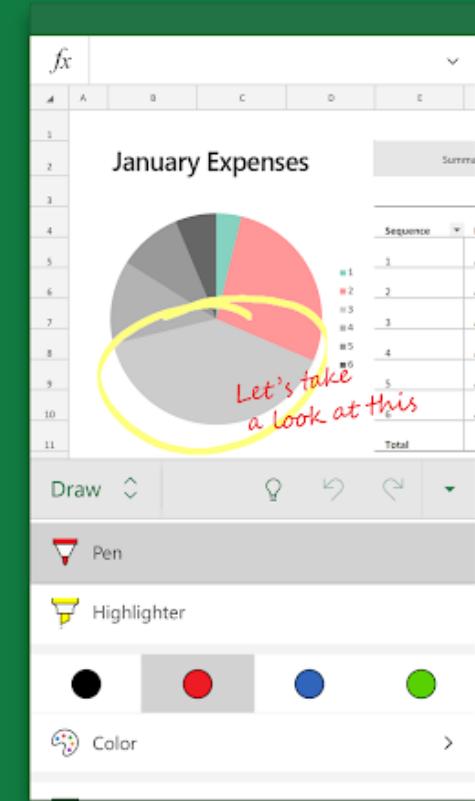


# Microsoft Excel

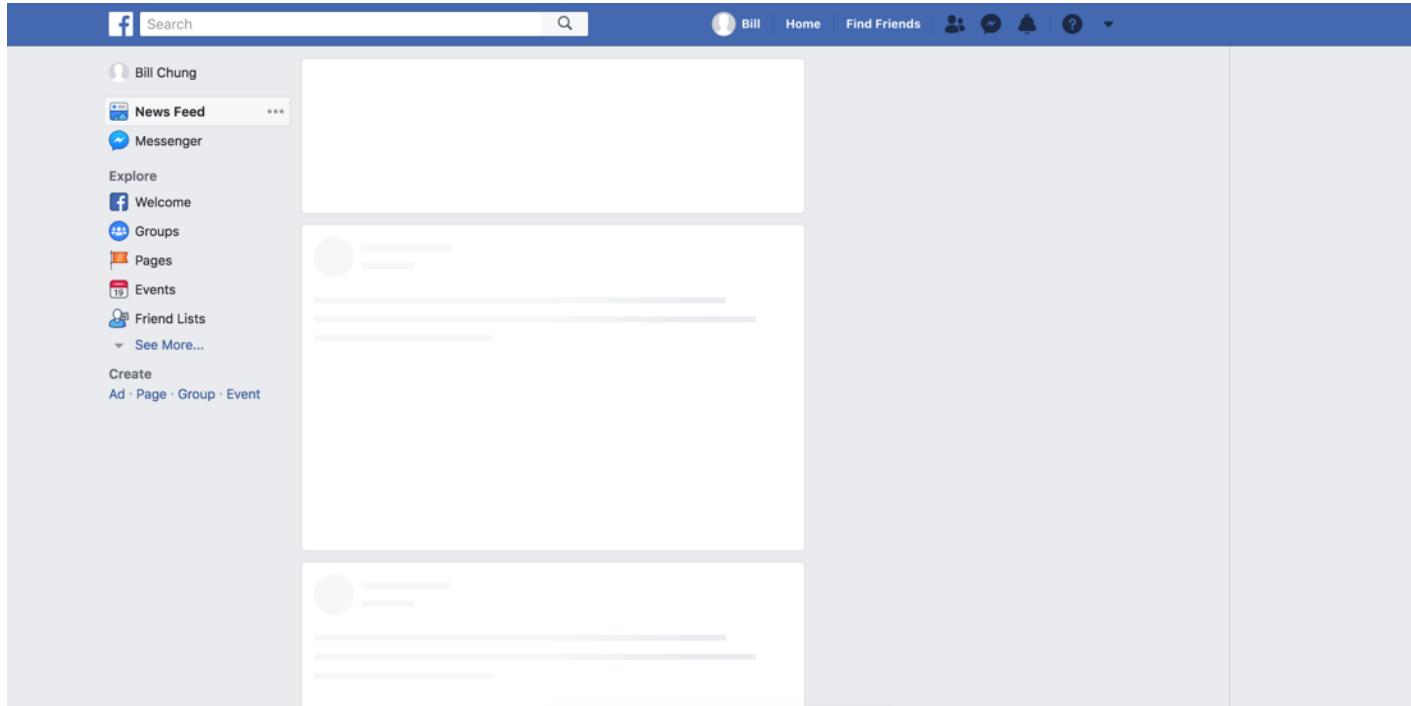
Trusted



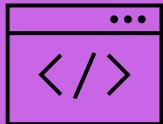
Trusted

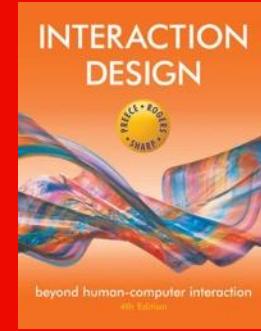


# Skeleton Loading



# Dark UX Patterns





# How can we visualise information?

CHAPTER 6 - INTERFACES



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Menus

Flat-lists

Ribbon

Drop-down

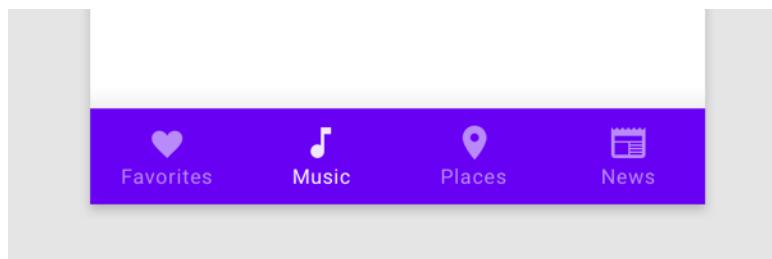
Pop-up

Contextual

Expanding

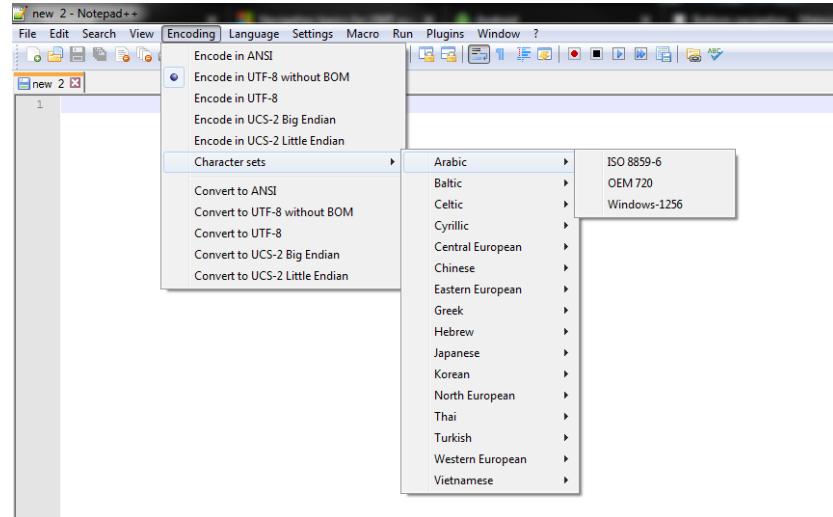
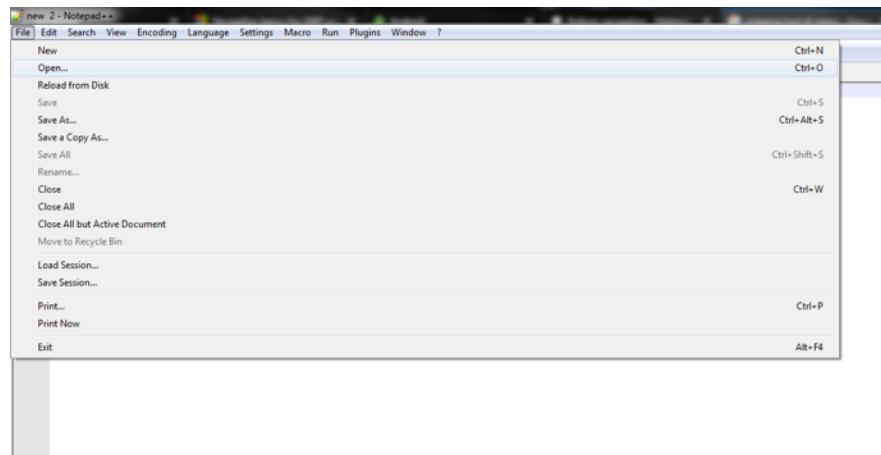
# Flat-list menus

- good at displaying a small number of options at the same time and where the size of the display is small
  - but if large number have to nest the lists of options within each other, requiring several steps to get to the list with the desired option
  - moving through previous screens can be tedious



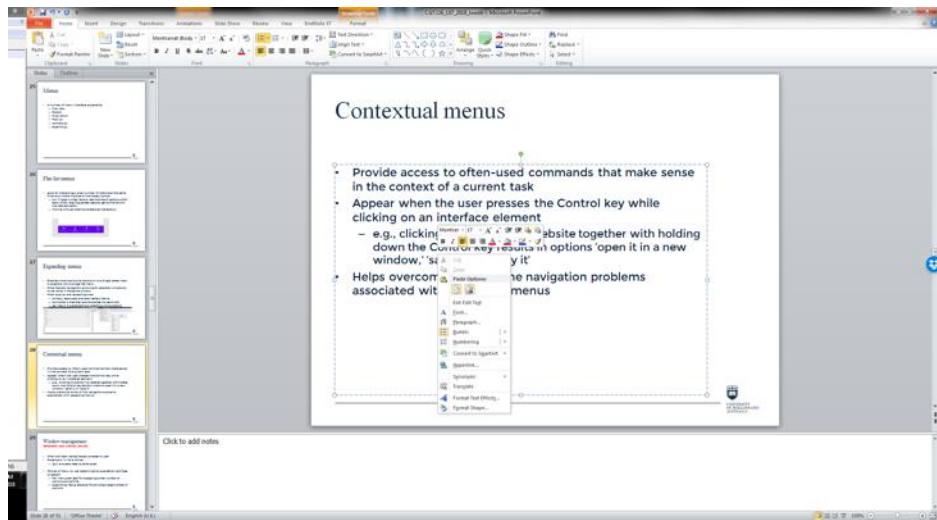
# Expanding menus

- Enables more options to be shown on a single screen than is possible with a single flat menu
- More flexible navigation, allowing for selection of options to be done in the same window
- Most popular are cascading ones
  - primary, secondary and even tertiary menus
  - downside is that they require precise mouse control
  - can result in overshooting or selecting wrong options



# Contextual menus

- Provide access to often-used commands that make sense in the context of a current task
  - Appear when the user presses the Control key while clicking on an interface element
    - e.g., clicking on a photo in a website together with holding down the Control key results in options ‘open it in a new window,’ ‘save it,’ or ‘copy it’
  - Helps overcome some of the navigation problems associated with cascading menus

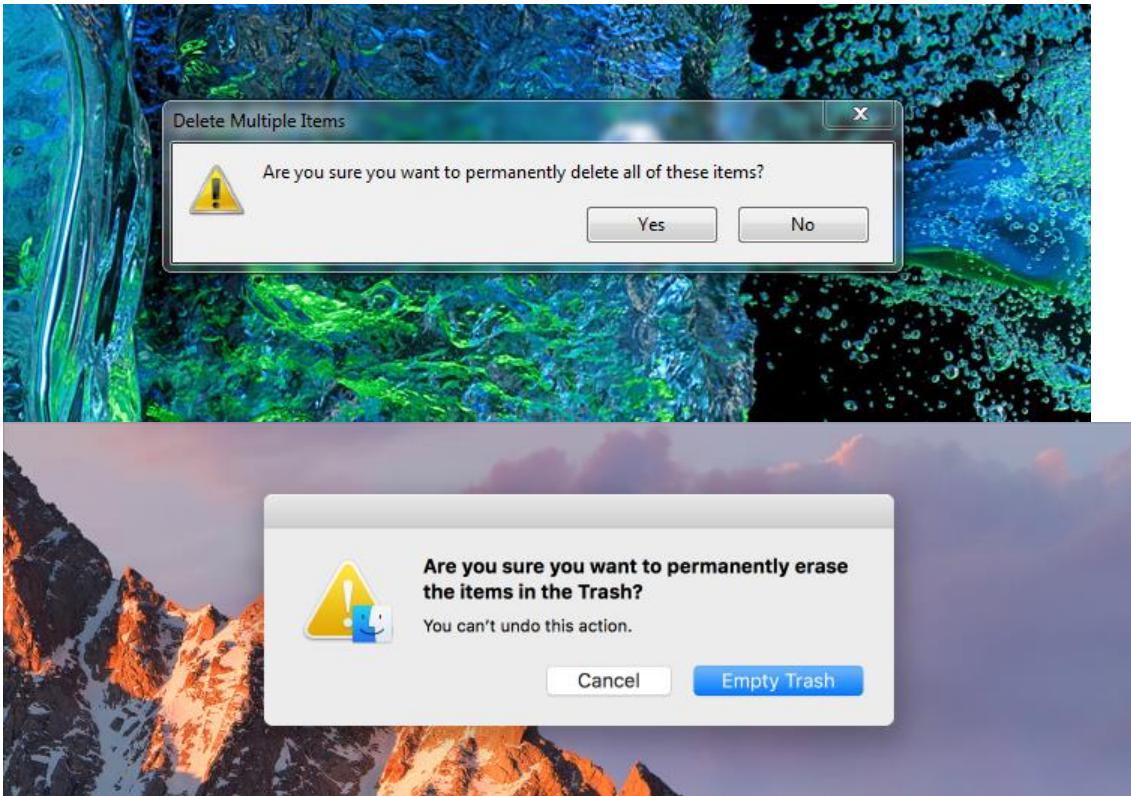


# Window management

## RESEARCH AND DESIGN ISSUES

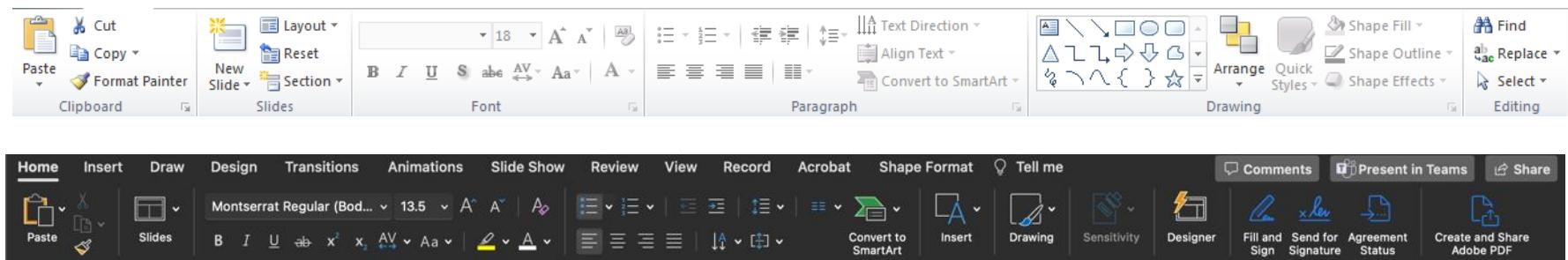
- What are best names/labels/phrases to use?
- Placement in list is critical
  - Quit and save need to be far apart
- Choice of menu to use determined by application and type of system
  - flat menus are best for displaying a small number of options at one time
  - expanding menus are good for showing a large number of options
- Read: <https://www.lifehacker.com.au/2018/06/the-problem-with-ok-cancel-buttons-or-is-that-cancel-ok/>

# Answer Order



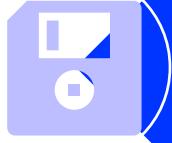
# Icon design

- Icons are assumed to be easier to learn and remember than commands
  - Can be designed to be compact and variably positioned on a screen
  - Now pervasive in every interface
    - e.g. represent desktop objects, tools (e.g. paintbrush), applications (e.g. web browser), and operations (e.g. cut, paste, next, accept, change)



# Icon forms

The mapping between the representation and underlying referent



similar (e.g., a picture of a file to represent the object file)



analogical (e.g., a picture of a pair of scissors to represent 'cut')



arbitrary (e.g., the use of an X to represent 'delete')



Aloud

# Class Activity (5 minutes)

- Sketch simple icons to represent the following operations to appear on a phone camera application:
  - Use
  - Turn image 90 degrees sideways
  - Auto-enhance the image
  - Fix red-eye
  - Crop the image
- Compare your design to the camera app on your phone

# Realism versus abstraction?

- Challenge facing interaction designers
- This means designing objects either to:
  - (i) give the illusion of behaving and looking like real-world counterparts or
  - (ii) appear as abstractions of the objects being represented.
- This concern is particularly relevant when implementing conceptual models that are deliberately based on an analogy with some aspect of the real world.
- AI Chatbots...

# Information visualization and dashboards

- Computer-generated interactive graphics of complex data
- Amplify human cognition, enabling users to see patterns, trends, and anomalies in the visualization (Card et al, 1999)
- Aim is to enhance discovery, decision-making, and explanation of phenomena
- Techniques include:
  - 3D interactive maps that can be zoomed in and out of and which present data via webs, trees, clusters, scatterplot diagrams, and interconnected nodes

# Dashboards

- Show screenshots of data updated over periods of time - to be read at a glance
- Usually not interactive - slices of data that depict current state of a system or process
- Need to provide digestible and legible information for users
  - design its spatial layout so intuitive to read when first looking at it
  - should also direct a user's attention to anomalies or unexpected deviations

# Which dashboard is best?



(a)



(b)

Figure 6.18 Screenshots from two dashboards: (a) British Airways frequent flier club that shows how much a member has flown since joining them, and (b) London City that provides various information feeds. Which is the easier to read and most informative?

# Dashboards

## **RESEARCH AND DESIGN ISSUES**

- Whether to use animation and/or interactivity
- What form of coding to use, e.g. color or text labels
- Whether to use a 2D or 3D representational format
- What forms of navigation, e.g. zooming or panning,
- What kinds and how much additional information to provide, e.g. rollovers or tables of text
- What navigational metaphor to use

U

# Mobile Devices

O

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Mobile challenges



**Smaller screens, small number of physical keys and restricted number of controls**



**Usability and preference varies**

depends on the dexterity and commitment of the user



**Smartphones overcome mobile physical constraints through using multi-touch displays**

# Mobile Applications

## RESEARCH AND DESIGN ISSUES

- Mobile interfaces can be tricky and cumbersome to use for those with poor manual dexterity or 'fat' fingers
- Key concern is hit area
  - area on the phone display that the user touches to make something happen, such as a key, an icon, a button or an app
  - space needs to be big enough for fat fingers to accurately press
  - if too small the user may accidentally press the wrong key

# Alistapart, 2015



49%

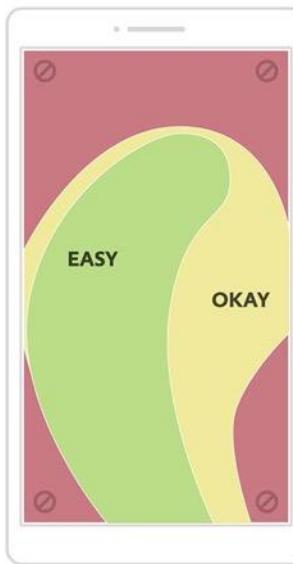
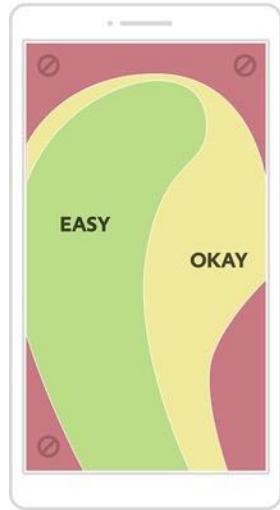


36%

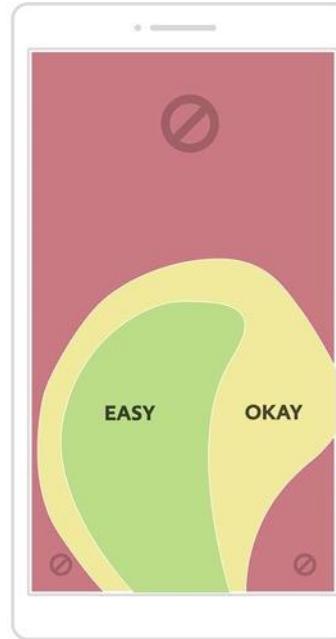


15%

# Alistapart, 2015



## THE PINKY BOUNDARY



U

# Take Home Message...

Consider elements that make up the entire interface and how they fit together!

O

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# References

- Tidwell, J. (2006). *Designing interfaces*, CA : O'Reilly.
- MVC
  - [https://developer.apple.com/documentation/uikit/about\\_app\\_development\\_with\\_uikit](https://developer.apple.com/documentation/uikit/about_app_development_with_uikit)
  - <https://developer.apple.com/library/mac/documentation/General/Conceptual/DevPedia-CocoaCore/MVC.html>
  - [https://developer.chrome.com/apps/app\\_frameworks](https://developer.chrome.com/apps/app_frameworks)
- <http://alistapart.com/article/how-we-hold-our-gadgets>
- <https://www.lifehacker.com.au/2018/06/the-problem-with-ok-cancel-buttons-or-is-that-cancel-ok/>

U

# Questions

W



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

O