



Ethics and Privacy  
COMP3511/9511 Human Computer Interaction  
Never Stand Still

Dr Alexandra Vassar (Sasha)

Adapted from slides by Dr Daniel Woo and Dr Nadine Marcus

1

## Reading

- Molich et al, 2001, 'Ethics in HCI" – link provided in Moodle
- Fiesler, C., Hancock, J., Bruckman, A., Muller, M., Munteanu, C., & Densmore, M. (2018, April). Research Ethics for HCI: A Roundtable Discussion. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems* (p. panel05). ACM. – link provided in Moodle



2

## What is ethics?



<http://advanced-hci-diary.blogspot.com.au/2014/02/hci-diary-week-2.html>



3

## Ethics and Privacy

A central part of the process that is taught in Human Computer Interaction involves talking with people, using a formal technique.

You may talk to:

- workers, managers, consultants
- general public
- fellow students, family, friends



4

## Ethics and Privacy

- The information that is gathered as part of the process may contain personal details or sensitive information
- Often we record this information as transcripts, audio recordings, video recordings (no audio or video in this course)
- There is a process for doing this



5

## Ethics and Privacy

- We must treat such information with the utmost care respecting ethics and privacy
- There are privacy LAWS to take into consideration
- There is to be no *coercion*
  - persuade (unwilling person) to do something by force or threats



6

## Research Context

- Need participant consent
- Confidentiality - Participants must remain anonymous
- How much do you tell participants about the study?
  - Too much information could affect results
  - Too little information could be misleading and unethical
- Is it fair to subjects users to a potentially worse, frustrating and unusable application just to have a control group?



7

## Research Context

According to the American Psychological Association guidelines  
deception is permitted only if the following conditions are met:

1. The research is of great importance and can't be conducted without deception;
2. Participants can be expected to find the procedures reasonable once they have been informed, after the experiment;
3. Participants can withdraw at any time;
4. Experimenters debrief participants afterwards, explaining the purpose of the study & removing any stressful after effects.

See <http://www.apa.org/ethics/code2002.html>



8

## Privacy and Ethics – Facebook deception



<https://www.youtube.com/watch?v=r1rOYKhcQIg>



9

## Privacy and Ethics

- Recently, Alexa recorded a private conversation and send it to Amazon
- What do you think are some ethical considerations of this?

<https://www.nytimes.com/2018/05/25/business/amazon-alexa-conversation-shared-echo.html>



10

## Social Media and the 2016 US Election

- Automated bots and trolls used the social media platform to shift voter views
- During the election, for example, an imposter Facebook page called “Being Patriotic” used hot-button words such as “illegal”, “country” and “American” and phrases such as “illegal alien”, and “welfare state”
  - The page racked up at least 4.4m interactions, peaking between mid-2016 and early 2017.
  - What do you think are some ethical considerations of this?
  - Does Facebook have an ethical duty of care?

<https://www.theguardian.com/us-news/2017/oct/14/russia-us-politics-social-media-facebook>



11

## Conducting user-based research in HCI

- User-based research, such as interviews, focus groups and usability tests are a vital part of HCI
- Ethical considerations of using human participants are multifold



12

## During user feedback session

- Ensure that the participant understands the purpose of the session and understands exactly what kind of observation and recording is taking place
- Ensure that the participant does not feel uncomfortable (either physically or mentally)
- Ensure that you do not pass judgement on the participant's performance or opinions



13

## Consent Form

- Before a study/interview have the participant sign a consent form giving his/her permission for you to observe and/or record their comments and performance
- Ensure that the participant's identity remains confidential
- Allow the participant to terminate the session at any time



14

## Consent Form – Main Points

- Introduction
- Body
- Conclusion

<https://research.unsw.edu.au/document/participant-information-statement-and-consent-form-template-pis-and-cf-form-template>



15

## Privacy, observers & recording of data

Assure them that the information and opinions they provide will be used only for research purposes.

e.g. Representatives from the companies involved in the research will be observing the session [eg from behind the one-way mirror/via CCTV].



18

## Example data use

- The data recorded may be used for:
  - Analysis, to review interactions after the session
  - Documenting the findings of the session
  - Providing feedback to the project team about the design and how well it does/does not meet peoples' needs or communicating the same to other stakeholders within the organisation sponsoring the research
  - Teaching or training purposes by [researcher] or [client] but only for demonstrating the process of a typical research session



19

## Ethics and Privacy

A reminder that under no circumstances are you permitted to interview any one from the general public for Assignment 2



25

## Other Links

For example on ethical considerations at University of New South Wales

<http://research.unsw.edu.au/human-research-ethics>



26

## In-course context

We will work with people in two different contexts

- Interviewing or providing people with questionnaires to gather background information
- Asking people to use our prototype designs in a “usability testing session”



27

## Before

- Plan the interview or session in advance and develop a written protocol (agenda) of what will be achieved in the session
- Consider the duration of the session
- Prepare consent documentation
- Prepare any other documentation (background, prototypes, questionnaires)
- *Find participants*



28

## During

- Welcome the participant
- Make them feel comfortable
- Give an introduction to the purpose of the session
- Provide an opportunity to ask questions
- Provide and complete the consent form (2 copies)



29

## During

- Be polite
- If an interview, provide answers to any of their questions
- Be conscious of time



31

## After

- Provide an opportunity for them to ask questions
- Ensure they have a copy of the consent forms
- Thank them for their time



32

## After

- Analyse the results
- Prepare for the next interview



33

## Lab and Assignments

- You will conduct an interview as part of one of the Labs
- Interviews will be part of the work in Assignment 2
- You will need to have thoroughly understood your ethical and legal obligations = Completing the online quiz with full marks



34

## Online quiz

- Available from week 2 onwards in Moodle
- Please review this material
- Read the web links on ethics
- Complete the online quiz
  - There is a delay between attempts
- You cannot conduct any interviews unless you have correctly completed the online quiz, scoring 100%
- You have as many attempts as needed to score full marks



35

## Case Study

- Young people often play video games rated above their chronological age
- There are concerns around young people and children playing such games due to the potential effects of the violent and mature content
- What is the situational ethics of researching video game play with adolescents and children?

<https://ethicalencountershci.files.wordpress.com/2017/03/paper-3-hodge-et-al.pdf>



37

## Case Study

- Minors sharing their game play habits



38

## Case Study

- Parental involvement



39

## Case Study

- Legal implications



40

## Case Study

- Policy



41

## Case Study

- What are some other ethical considerations?



42

## Housekeeping - Turn-it-In

- A turn-it-in submission link will be made available to you for Assignment 1
- Help you to determine whether you have accidentally referenced incorrectly or plagiarised any sections
- Please remember that all cover sheets are the same, so your cover sheet will be highlighted – you can disregard this – this does not count as plagiarism!
- There will be three levels of originality in the report
  - **GREEN** – you are good to go!
  - **ORANGE** – you need to check over your submission, and make sure that any sections of text that are highlighted are properly referenced. Please make sure to resubmit your assignment after deleting all plagiarism incidences
  - **RED** – you have a high incidence of plagiarism and need to resubmit your assignment after addressing all the detailed issues.



43

## Originality Report Sample

The screenshot shows a Turnitin originality report. At the top right, a red circle highlights the similarity score '74%' with the text 'SIMILAR' and 'CUT OF 100'. Below this is a 'Match Overview' table:

Rank	Source	Percentage
1	Submitted to Universit...	61%
2	media.johnwiley.com.au Internet source	3%
3	www.theguardian.com Internet source	2%
4	toyotacarforum.com Internet source	2%
5	id-book.com Internet source	1%
6	[REDACTED]	1%
7	www.slideshare.net Internet source	1%
8	Redstrom, J... "Toward..." Publication	1%

A large red oval highlights a portion of the student's submitted text on the left, which discusses website design and user interaction. A red arrow points from this highlighted text to the 'Match Overview' table.

44

## Questions?

- Any questions regarding either Ethics or Assignment 1?



45



Interviews and Questionnaires

Never Stand Still

Human Computer Interaction - COMP3511/9511  
By Dr Alexandra Vassar (Sasha)

Adapted from slides by Dr Nadine Marcus

1

## Reading

- ID Ch 8.4 (page 268)
- See also id-book.com



2

## Data Gathering

- User Interviews
  - Exploratory
  - In combination with user testing



3

## Common characteristics of Interviews and Questionnaires

- Involves a set of predetermined questions
- Involves sampling
- Used to describe characteristics of a population of interest
- Need clear set of goals
- Not useful for exploratory research



4

## Interview techniques

- Consistency is important
- Avoid leading questions
- Avoid jargon
- Avoid long questions
- Need accurate records
- Need to make participants feel comfortable
- Written consent needed and sometimes ethics approval



5

## Running the interview

- *Introduction*
- *Warm-up*
- *Main body*
- *A cool-off period*
- *Closure*



6

## Types of interview

- **Unstructured**
  - Open-ended questions, process not pre-determined, can't replicate
  - Generate rich data, but more difficult to analyze
- **Structured**
  - Closed questions, pre-determined, standardised procedure, replicable but may lack richness.
  - Used when study's goals are clear, need a pilot study



7

## Types of interview

- **Semi-structured**
  - Both closed and open questions, start with pre-planned questions, then probe for more details
  - Broadly replicable, provides a good balance between richness and ability to replicate
- **Group interviews**
  - Pros: access to more participants, participants less intimidated, build on each other's ideas
  - Cons: more difficult to find convenient time, need a skilled facilitator to focus discussion, maybe harder to analyse issues from tape



8

## Open versus closed questions

- Open ended
  - What do you think of this screen layout?
  - How often do you think you use this website on a weekly basis?
  - What are some of your favourite websites for finding and booking a restaurant?



9

## Open versus closed questions

- Closed question
  - Are these two buttons distinguishable from one another?  
Please circle your answer YES / NO
  - How many times a week do you use this website?  
Please circle your answer:  
1-5 times a week, 6 – 10 times a week, 10 – 20 times a week, 20 – 50 times a week, more than 50 times a week



10

## Another example of open vs closed questions

- What type of input device do you prefer to use?

---

VS

- Which of the following input devices do you prefer using? Please circle your answer.
  1. Touchscreen
  2. Touchscreen + audio
  3. Mouse only
  4. Mouse + keyboard
  5. Other?



11

## Focus groups

- Type of group interview, often used in social sciences research
- Involves 3 to 10 users chosen as a representative sample of target population of interest
- Trained facilitator:
  - guides discussion
  - preset agenda, but unanticipated issues can be explored
  - prompts participants



12

## Focus groups

- Enables people to put forward their opinions in a supportive social environment
- Can be used in requirement gathering to identify conflicts in terminology or expectations between different users.

See ID section 8.4.4



13

## Interviews

- General considerations
  - Does people's reported behaviour correspond to their actual behaviour
  - How representative is the sample?
  - Were respondents interviewed together or separately?
  - How do these impact on the results?



14

## Different types of interviews

- Personal interview
- Telephone interview/questionnaire



15

## Questionnaires

- *Similar to a structured interview*
- Can have closed and open questions
- Can be distributed easily to large number of people
- Less personal, may be more difficult to get subject participation
- Can be paper-based or online (email, web)
- Sampling can be a problem when the size of a population is unknown as is common online



16

## Different types of questionnaires

- Mail questionnaire
  - Good for highly personal topics
  - Has to be completely self-explanatory
  - No control over order survey is filled out
  - Response bias



17

## Different types of questionnaires

- Online questionnaire
  - Reach large numbers quickly
  - Lower costs - no copying and postage
  - Data analysis is quicker and easier
  - No control over order survey is filled out
  - Response bias (sample not random)
  - Email - limited to text, but can target specific users
  - Web-based - can include graphics, help-screens, pop-up screens, & can enforce rules such as one selection only



18

## Questionnaire construction

- Steps involved in preparing a questionnaire
  - Decide what information is being sought
  - Decide on type of questionnaire to be used
  - Write a draft of the questionnaire
  - Re-examine and revise the questionnaire
  - Pre-test or **pilot** the questionnaire
  - Make changes and specify the procedure for use.



19

## Questionnaire construction

- **Order** of questions is important
- **Wording** must be carefully chosen
- **Free response vs. closed questions**
- **Think of the layout and pace**
- **Instructions** clear and succinct



20

## Question and response format

1. Did you find the 'Save' feature useful?

Yes

No

What factors are important to you when buying a software product?

Price

Usability

Features

Support

Other, please specify...

Type here

<http://fluidsurveys.com/blog/checkbox-questions-multiple-answer-questions/>



22

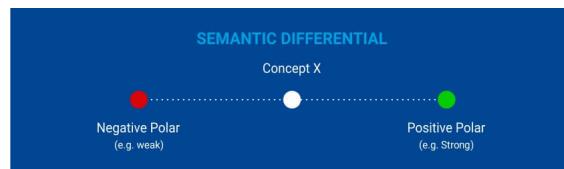
## Question and response format

- Rating scales
  - Likert scales
  - Semantic scales
  - 3, 5, 7 or more points?



23

## Semantic vs Likert Scale



Which of the following categories best describes your last experience purchasing a product or service on our website?

Very Pleasant	Somewhat Pleasant	Neither Pleasant nor Unpleasant	Somewhat Unpleasant	Very Unpleasant
---------------	-------------------	---------------------------------	---------------------	-----------------

My experience was Very Unpleasant 

<https://www.questionpro.com/semantic-differential-scale.html>



24

## Desirability toolkit

- Another way to avoid bias is to use the Desirability Toolkit
  - Use a simple checklist of adjectives (usually <25)
    - Microsoft developed a kit with 118 possible adjectives
    - Include positive, negative and neutral descriptors
    - The words included depend on what you are measuring
  - Users select 5
  - These become basis of post-interview (Why did you chose these)

<http://www.userfocus.co.uk/articles/satisfaction.html>

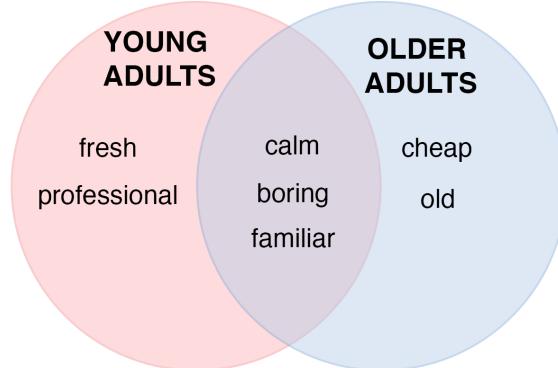
<https://www.nngroup.com/articles/microsoft-desirability-toolkit/>



25

## Example analysis post Desirability Toolkit

Words Chosen to Describe a Flat Design, by Age Group



26

## Observation



- Direct observation in the field
  - Structuring frameworks: used to guide observation
  - Degree of participation (insider or outsider)
  - Ethnography : where observers immerse themselves in the culture that they study
- Direct observation in controlled environments
  - Think-aloud technique
- Indirect observation: tracking users' activities
  - Diaries
  - Interaction logging

28

28

## Sample structuring framework to guide observation

- The Goetz and LeCompte (1984) framework:
  - *Who* is present?
  - *What* is their role?
  - *What* is happening?
  - *When* does the activity occur?
  - *Where* is it happening?
  - *Why* is it happening?
  - *How* is the activity organized?



29

## Data Recording

- Notes, audio, video, photographs
- Notes plus photographs
- Audio plus photographs
- Video
- NO audio or video for your assignments!



Image credit: <https://www.lifehacker.com.au/2013/03/record-a-practice-job-interview-ahead-of-time-to-find-errors/>



30

## Ethnography

- Traditionally used in social sciences to understand the social organization of activities and also work.
- Ethnography is a philosophy with a set of techniques that includes participant **observation** as well as interviews, questionnaires and studying artifacts.
- Ethnographers immerse themselves in the culture that they study.
- Allows one to understand people's real needs. Can thus design products that fit intuitively into people's lives.

Van Manaan, 1991 "The smile factory: Work at Disneyland" - an ethnography of Disneyland workers

Ducheneaut, Nicolas. (2005). Socialization in an Open Source Software Community: A Socio-Technical Analysis. *Computer Supported Cooperative Work*. 14. 323-368. 10.1007/s10606-005-9000-1.



31

## Key issues when data gathering

1. Setting goals
    - Decide how to analyze data once collected
  2. Relationship with participants
    - Clear and professional
    - Informed consent when appropriate (ethics)
  3. Multiple approaches
    - Gather information/data using more than one approach
  4. Pilot studies
    - Small trial of main study
- Note: Data gathering used both to develop requirements and for evaluation purposes



32

## Choosing and combining techniques

- Depends on
  - The focus of the study
  - The participants involved
  - The nature of the technique
  - The resources available



33

## Data gathering techniques: summary table

Technique	Good for	Kind of data	Advantages	Disadvantages
Interviews	Exploring issues	Some quantitative but mostly qualitative	Interviewer can guide interviewee if necessary. Encourages contact between developers and users	Time-consuming. Artificial environment may intimidate interviewee
Focus groups	Collecting multiple viewpoints	Some quantitative but mostly qualitative	Highlights areas of consensus and conflict. Encourages contact between developers and users	Possibility of dominant characters
Questionnaires	Answering specific questions	Quantitative and qualitative	Can reach many people with low resource	The design is crucial. Response rates may be low. Unless carefully designed, the responses may not provide suitable data
Direct observation in the field	Understanding context of user activity	Mostly qualitative	Observing gives insights that other techniques don't give	Very time-consuming. Huge amounts of data are produced
Direct observation in a controlled environment	Capturing the detail of what individuals do	Quantitative and qualitative	Can focus on the details of a task without interruption	Results may have limited use in the normal environment because the conditions were artificial
Indirect observation	Observing users without disturbing their activity; data captured automatically	Quantitative (logging) and qualitative (diary)	User doesn't get distracted by the data gathering; automatic recording means that it can extend over long periods of time	A large amount of quantitative data needs tool support to analyze (logging); participants' memories may exaggerate (diary)

Table 7.1 Overview of data gathering techniques and their use

Table 7.1, p270 in ID 2015



35

## Summary of Data Gathering

- Three main data gathering methods: interviews, questionnaires, observation
- Key issues for data gathering: goals, multiple approaches, participant relationship, pilot
- Interviews may be structured, semi-structured or unstructured
- Questionnaires may be on paper, online or telephone
- Observation may be direct or indirect, in the field or in controlled setting
- Techniques can be combined depending on study focus, participants, and available resources





## Requirements to prototype

Never Stand Still

Human Computer Interaction - COMP3511/9511  
By Dr Alexandra Vassar (Sasha)

Adapted from slides by Dr Nadine Marcus

1

## So far...

- The language of usability evaluation and critique
- Scenarios/Personas
- Stakeholders
- Accessibility
- Ethics
- Sketching
- Brainstorming
- Interview Techniques



2



3



## User Centred Design process

- Become familiar with the language of usability evaluation and critique
- Conceptual Designs
- Creative thinking
- Product Statement
- People involved and personas
- Scenarios
- Techniques to discover information about users experience
  - Questionnaires
  - Interviews
- Functional and non-functional requirements
- [Running usability test on existing sites]
- Data gathering for requirements
- Analysis
- Paper WireFrames
- Planning and running usability tests
- Compile Issues Table
- Review the design
- Iterate the process



4

## Today

- Continue with data gathering techniques for requirements
- Consideration for information requirements
- Prototyping



5

## Reading

- Interaction Design (ID 5<sup>th</sup> ed) 2019, Ch 11



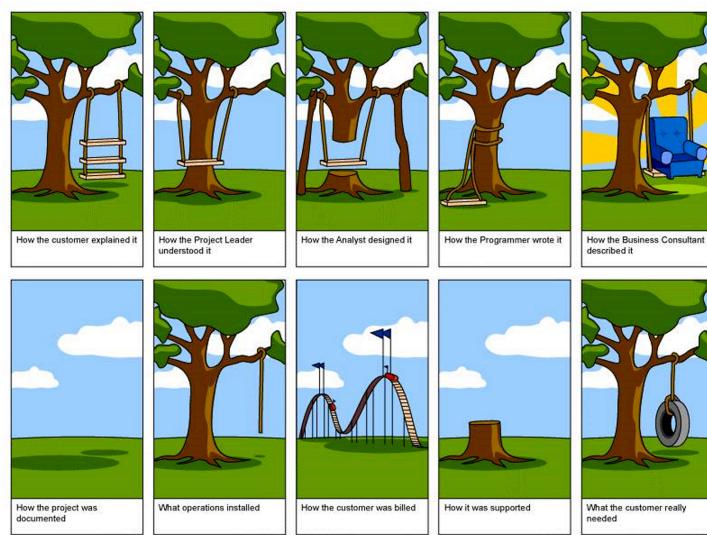
7

## Requirements



8

## Requirements



9

## Requirements

- Functional
- Non-functional
- Specific, non ambiguous
- Iterative
- Will be influenced by data gathering



10

## Requirements

- Functional
  - Specific behaviours or functions
  - What a system is meant to do
- Non-functional
  - Qualities of a system – usability, accessibility
  - How a system is meant to be
- Data Requirements
  - Specify the meaning and structure of data



11

## Examples of non-functional requirements

Important to User	Important to Team	Important to business
Performance	Maintainability	Time to market
Security	Portability	Cost
Usability	Reusability	Flexibility
Compatibility	Testability	Speed
Accessibility	Naming Convention	
Flexibility	Tech Stack	
Disaster Recovery	Monitoring	

Image credit: <https://medium.com/agiletransformation/what-comes-first-functional-or-non-functional-requirements-b3ee96424742>



14

## Volere template for requirements

Requirement #: UniqueId Requirement Type: Template Event/use case #: Origin of section the requirement

Description: A one-sentence statement of the intention of the requirement

Rationale: Why is the requirement considered important or necessary?

Source: Who raised this requirement?

Fit Criterion: A quantification of the requirement used to determine whether the solution meets the requirement.

Customer Satisfaction: Measures the desire to have the requirement implemented Customer Dissatisfaction: Unhappiness if it is not implemented

Dependencies: Other requirements with a change effect

Conflicts: Requirements that contradict this one

Supporting Materials: Pointer to supporting information

History: Origin and changes to the requirement

**Volere**  
Copyright © Atlantic Systems Guild



15

16

Requirement Summary	Description	Categories	Depends On	Dependents	Effort (days)	Actual Effort (days)	Release Id	Assignee	Comments
DEM-R3 (1)	—	—	DEM-R7 (1)	—	10	3	Release 1.0	???	—
DEM-R4 (1)	Requirement Validation	—	—	—	—	—	—	—	—
DEM-R6 (1)	Release Specific Requirements	—	—	—	—	—	—	—	—
<Move>	<Enter new requirement>	—	—	—	—	—	—	—	—

17

The screenshot shows a JIRA issue page for a task titled "Purchase and install window frames". The task is categorized as a "Task" with a priority of "Medium". The status is "TO DO" and the resolution is "Unresolved". The description notes that frames were chosen from Window Brothers & Co. There are several issue links listed under "Issue Links", including REQ-005, REQ-001, and REQ-004. The "Activity" section indicates there are no comments yet. The "People" section shows that the issue is unassigned, reported by A. D. Min, and has 2 votes. The "Dates" section shows the issue was created 21 minutes ago and updated just now.

18



## Requirements Exercise

- Suggest some functional and non-functional requirements for an interactive email client for mobile devices
  - Functional
  - Non-functional
    - Look and feel
    - Usability
    - Performance
    - Operational
    - Maintainability
    - Security
    - Accessibility

19



## Requirements

- Arise from understanding user needs
- Can be justified
- Relate to data
- Environment or context of use must be considered
  - Physical
  - Social
  - Organisational



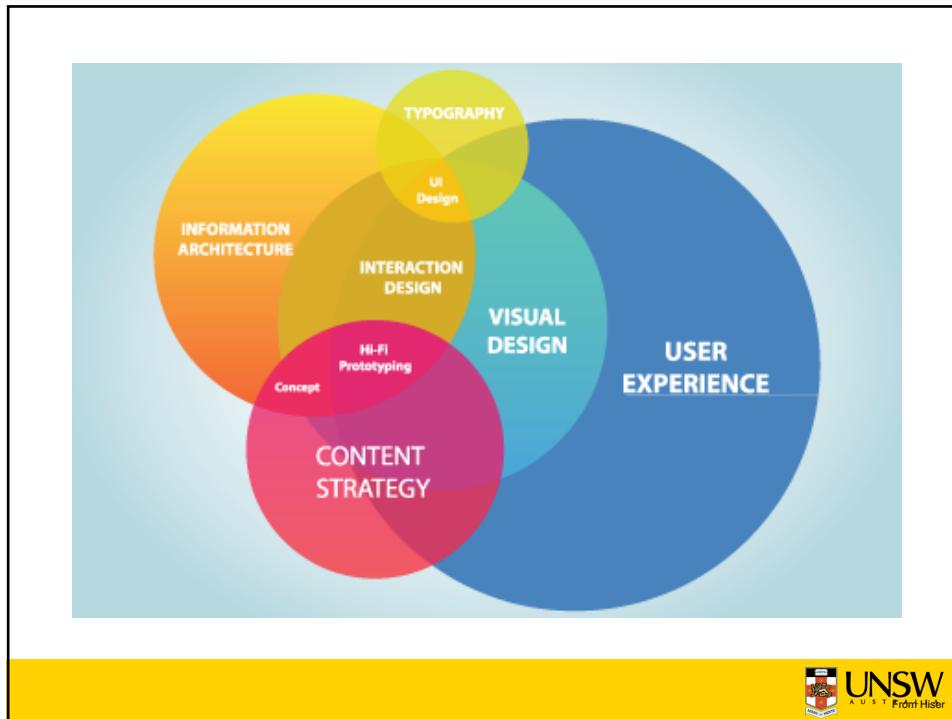
21

## Consider:

- 1) The product shall have a gasoline-powered engine.
  - 2) The product shall have four wheels.
  - 3) The product shall have a rubber tire mounted to each wheel.
  - 4) The product shall have a steering wheel.
  - 5) The product shall have a steel body.
- The product makes it easy and fast for me to mow my lawn.
  - I am comfortable while using the product.



22



24



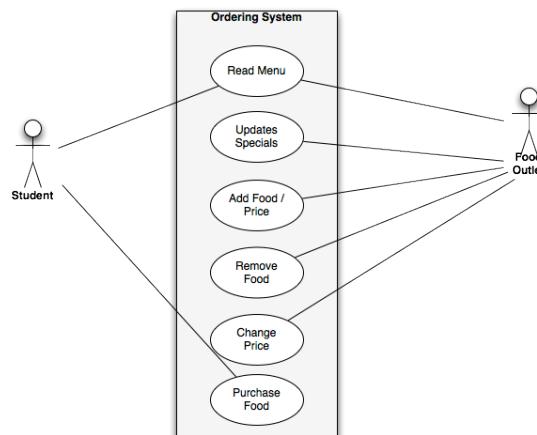
## Use Cases

- Documentation of possible interactions between users and a system
  - Sequence of steps
  - Starts with user goal and ends when that goal is fulfilled

40



## Use Case



41

## What next?

- What do we do with our initial requirements and our use cases?!



44

## Prototyping

- Prototypes will be based on the previous user centered design activities
  - Product objectives
  - User research
  - Scenarios
  - Information design



45

## Fidelity

Different stages of design require different levels of complexity, difficulty, and fidelity.



46

## Fidelity

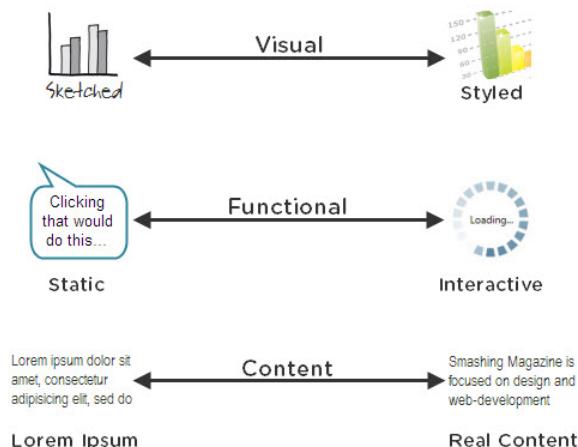


Image credit: <https://www.smashingmagazine.com/2010/06/design-better-faster-with-rapid-prototyping/>



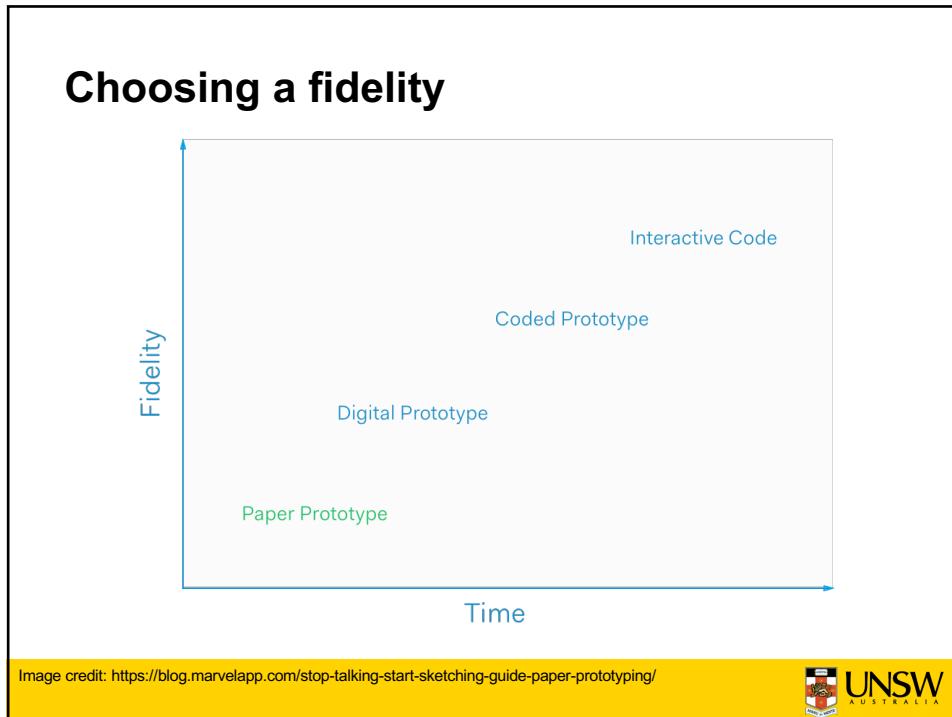
47

## The design process

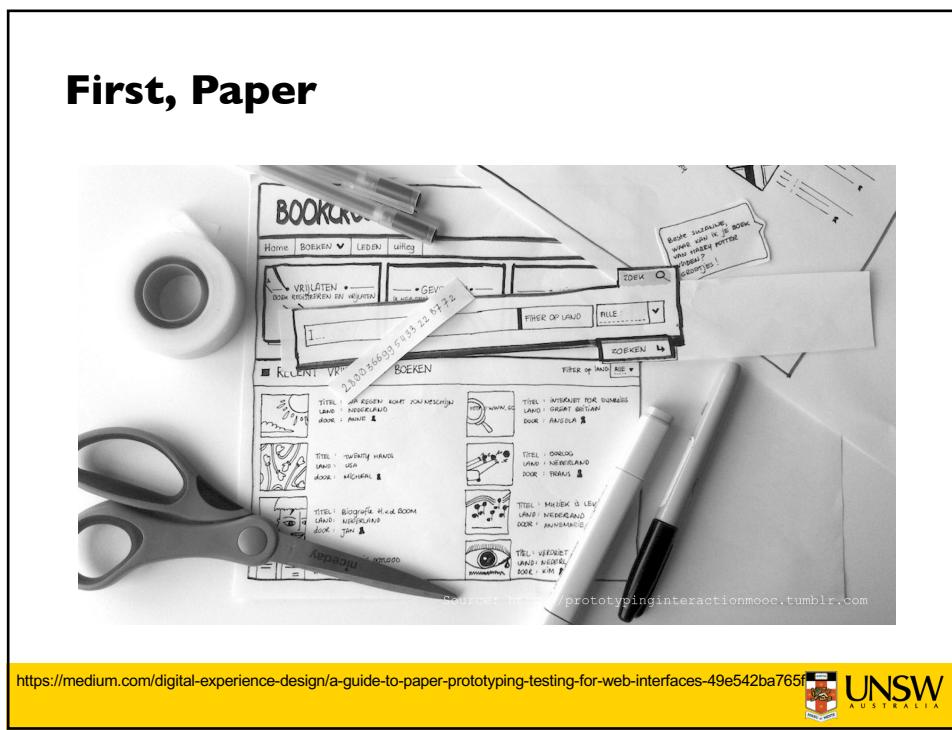
- Several stages:
  - Scoping
  - Planning
  - Sketching
  - Testing



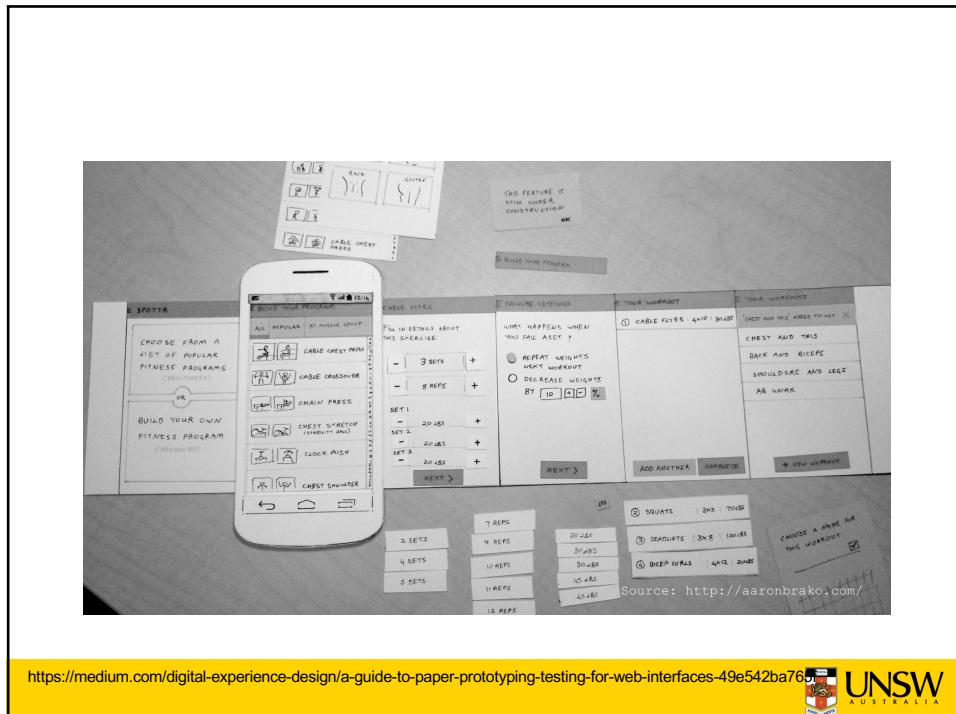
48



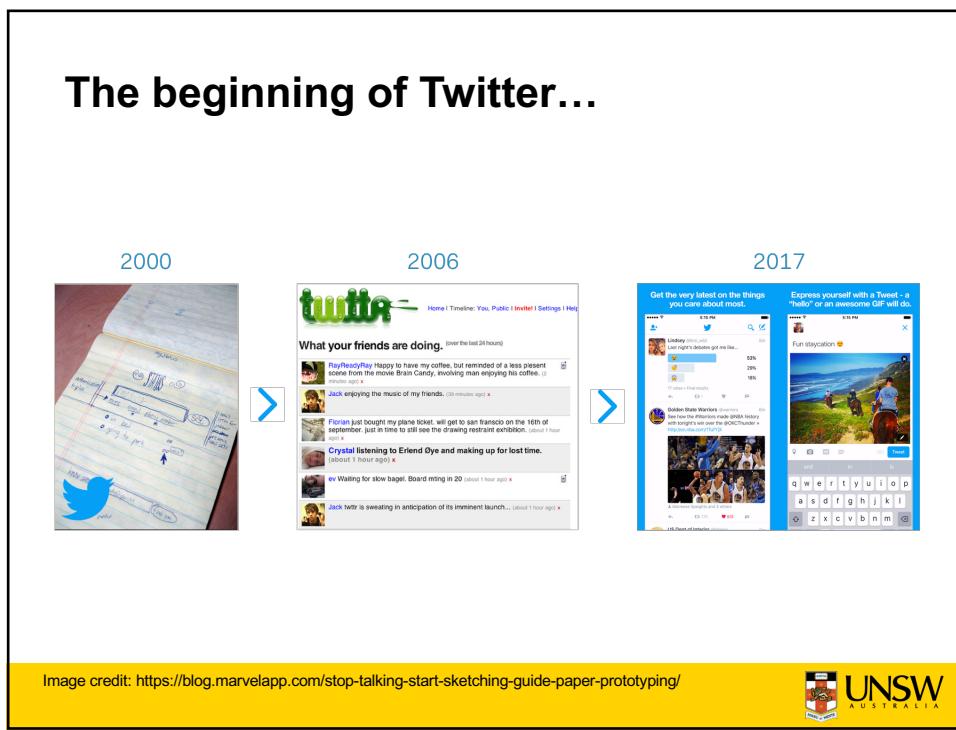
49



50



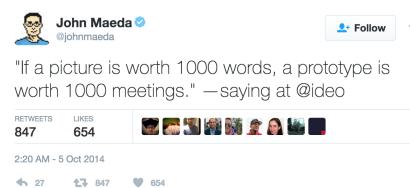
51



52

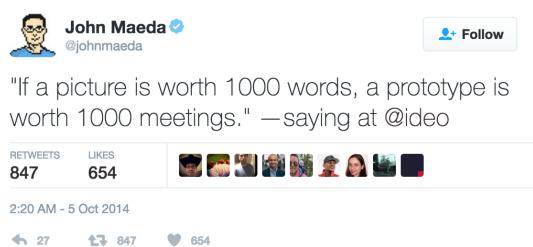
## Advantages

- Fast way of prototyping
- Highly collaborative
- Testing
- Promotes experimentation
- Lowers the bar
- Communication



53

## Advantages



- Lowers the bar
- Communication



54

**Great for:**

- Can establish terminology (and logical) flaws very early in design
- Designing and thinking through main user flows
- Determining key interactions



55

**Limitations**

- Less useful near the end of a production cycle
- Cannot convey specifics
- Animations
- Can't do proper timing measurements



56

## Limitations

- Rudimentary for working models
  - Electronic prototypes and the actual system eventually need to be built
- May appear less professional during user testing



57

## Why use a paper model?

- Do the users actually do things the way that the design currently works?
- Do the conceptual models (user / designer) actually match



58

## Quality

- Can be hand drawn
- Can be printed
- Can be best of both
  - E.g. Print the iPad ‘template’, and draw the screens inside
  - Interchangable parts



59

## Creating

- Consistency



60

## Creating

- Use post-it notes



61

## Creating

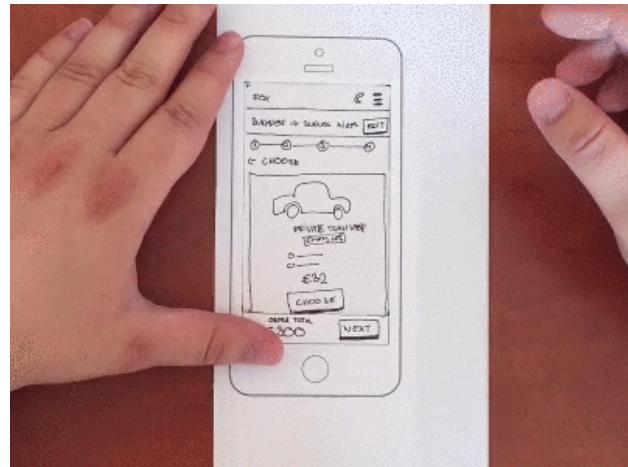
- Apply shadows



<https://uxplanet.org/the-magic-of-paper-prototyping-51693eac6bc3>

62

## Creating

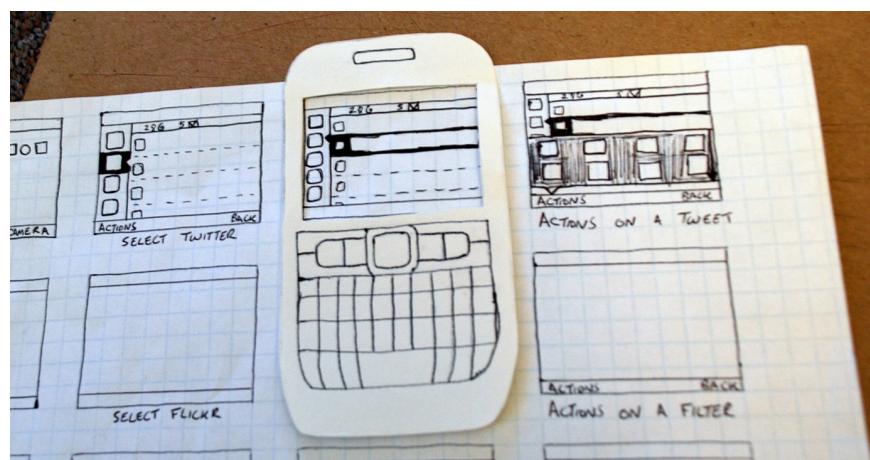


<https://uxplanet.org/the-magic-of-paper-prototyping-51693eac6bc3>



63

## Creating



64

## Creating

- Under Construction



65

## Testing

- Organise all the little pieces before the test
- Scenario-based tasks
- Employ think-aloud
- Facilitator/Observer



66

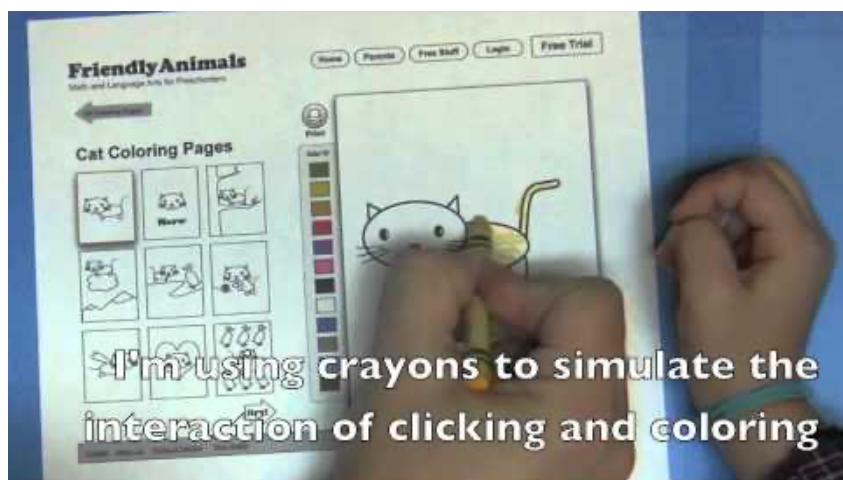
## Testing

- Facilitator/Observer



67

## Demonstration – colouring game



68

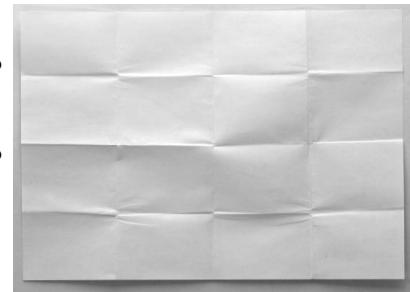
## Demonstration – basic prototype



69

## Exercise

- Screen sizes in paper prototyping:
  - Take an A4 piece of paper
    - What does this size most resemble?
  - Fold it in half
    - What would this size be?
  - Fold it in half again
    - What would this size be?
  - Fold again....

Image credit: <https://blog.marvelapp.com/stop-talking-start-sketching-guide-paper-prototyping/>

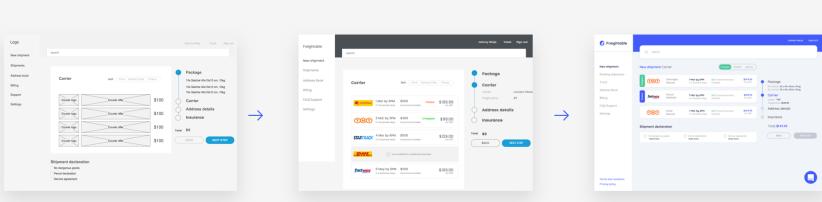
70

## Exercise

- Quick paper prototype to put your coffee order ahead to the coffee cart guy!
  - Groups of two or individual
  - Allow for three types of coffee: Capuccino (\$3.50); Latte (\$3) or Espresso (\$4)
  - Allow small (price as above); medium (add \$1) or large (add \$1.50) sizes
  - Allow for multiple drinks to be ordered at once
  - Request confirmation of each drink before adding to order
  - Calculate and display total amount
  - Confirm order



71

<https://medium.com/7ninjas/low-fidelity-vs-high-fidelity-prototypes-903a7befaa5a>

72

## Electronic Prototypes

- Develop proof of concept electronic prototypes that help explore the interactivity of the system
- Could be done as part of the software development process
  - Should be considered to be an ‘interim step’ toward a final design – not *the* final design \*\*
- Could be done with tools that can animate the future system
  - Closely related to the concept of storyboarding



73

## Electronic (Pros)

- Specific, realistic
- More valuable to developers than paper
- Realism can help project success
- Can incorporate technologies that Paper cannot (multi-touch, animation, etc)



74

## Electronic (Cons)

- Slower to iterate (depending on toolset and competence)
- Information Overload if used too early
- Costly (skillsets, time - cost rises with precision)
- Can be unreliable as interactivity is added
- In usability tests, participants not as comfortable providing critique
- Not as realistic to make on-the-go fixes in between users during usability testing



75

## Electronic Prototypes

\*\* Many people fall in love with their first design. This is BAD!

Design is all about *iteration* and *improvement* – why settle for anything less?



76

## Developing Electronic Prototypes

- Hand drawn scans placed into a viewing tool (eg. PowerPoint electronic walkthrough)
- “Photoshop” artwork to produce the look and feel
- “Flash” animations which use user actions to control the path through the animation
- User interface developer tools to prepare screen shots
- Actual code and user interface (via website, software tools, etc)



77

## Ready for an electronic prototype?

- Has the paper prototyping phase finished?
- Do you understand the sequence of user actions / work flow?
- Which tasks are the important ones to test?
- Which activities require interaction?
- Which activities are highly interactive?



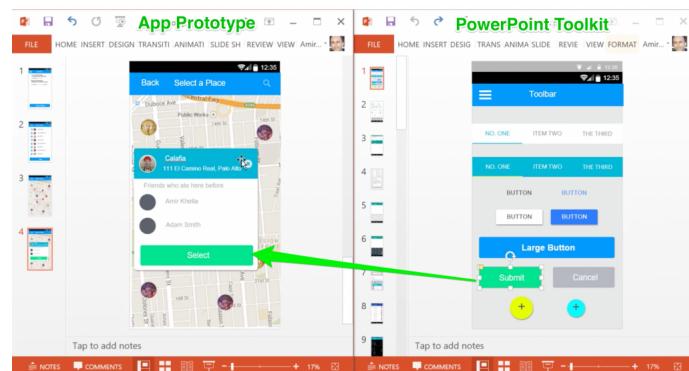
78

## Simple Tools

- PowerPoint (Microsoft)
  - Works well with images
  - Great for storyboarding/sequences
  - Links
  - Great at simulating shapes, charts
  - Remember that they are packages for presenting not UI design tools



79

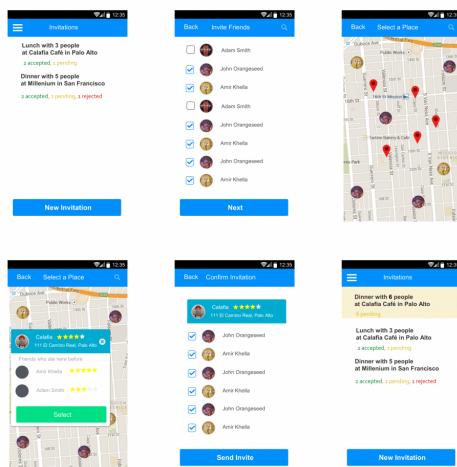


<https://keynotopia.com/guides-ppt/>



80

## Finished Prototype (Powerpoint)

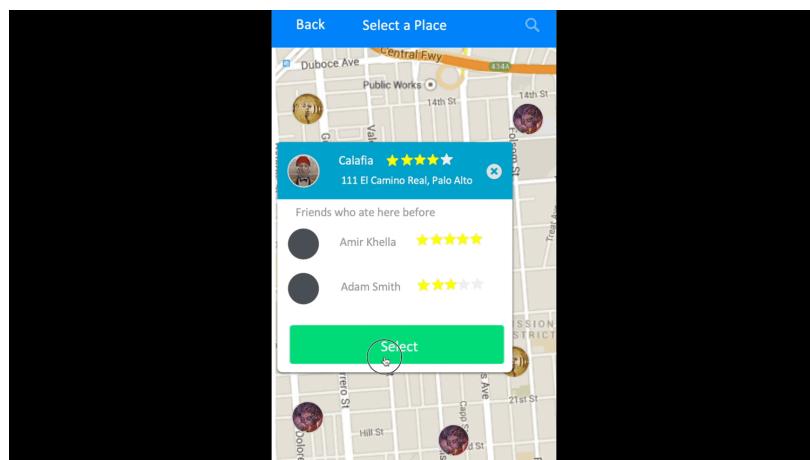


<https://keynotopia.com/guides-ppt/>



81

## Final after hyperlinks and animation



<https://keynotopia.com/guides-ppt/>



82

## PowerPoint Prototype Examples

- <https://www.youtube.com/watch?v=ZgbhkpaZG7k>
- [https://www.youtube.com/watch?v=oLCEKZy\\_QDg](https://www.youtube.com/watch?v=oLCEKZy_QDg)



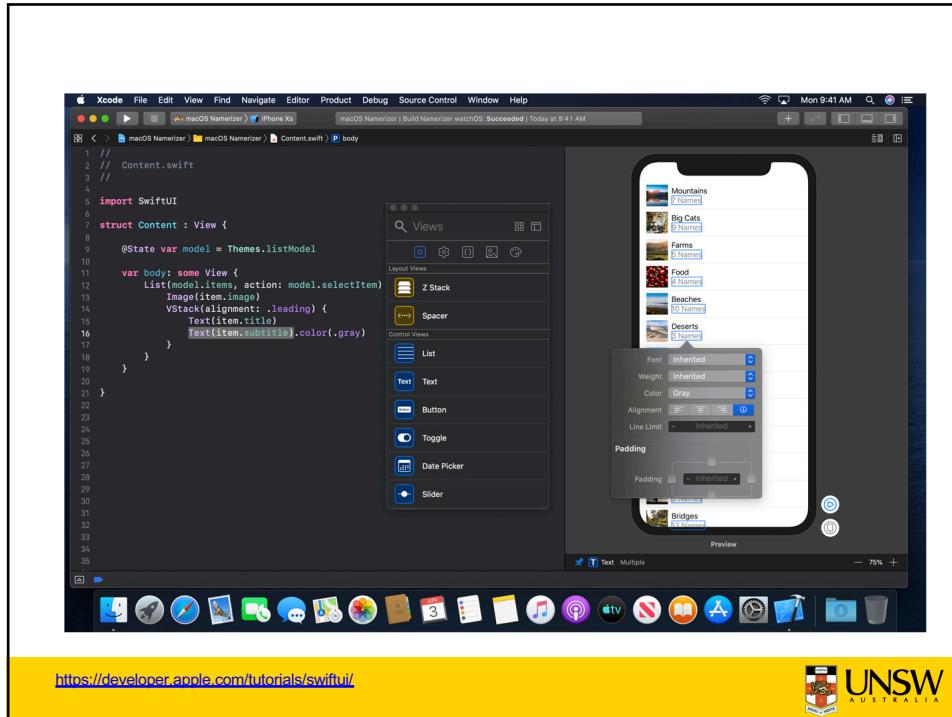
83

## Advanced Tools

- Interface Builder (Apple) – transition to SwiftUI
- Fully featured for iOS and OS X
- Windows, Dialogs, Menus, Popovers, Controls
- Complies with a world-class Human Interface Guide (Apple's)
- Drag and Drop!
- Converts to production (ie, code), easily



84



<https://developer.apple.com/tutorials/swiftui/>



85

## Advanced Tools

- Photoshop
  - Virtually freeform
  - Pixel perfect design - caters for screen density, resolution
  - Perfect for graphic designers
  - Advanced, complex



86

## Photoshop Prototype Examples

- <https://www.youtube.com/watch?v=CvV7xPOBmk&t=338s>
- <https://www.youtube.com/watch?v=w9atp-Bgx-k&t=1171s>



87

## Adobe XD

- Vector-based user experience design tool for web apps and mobile apps
  - Developed and published by Adobe Inc.

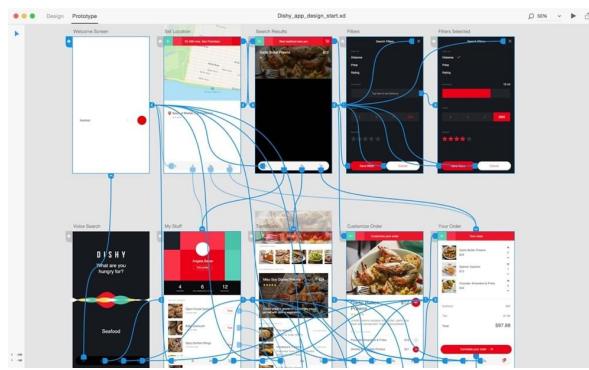


Image credit: <https://www.sitepoint.com/prototyping-with-adobe-xd/>



88

## Invision

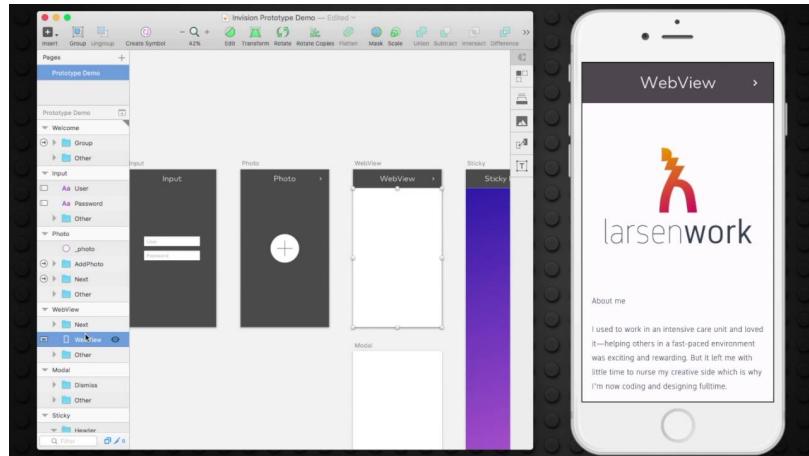


Image Credit: <https://www.youtube.com/watch?v=V4MXY7now54>



89

## Invision Prototyping Example

<https://www.youtube.com/watch?v=V4MXY7now54>



90

## Axure RP

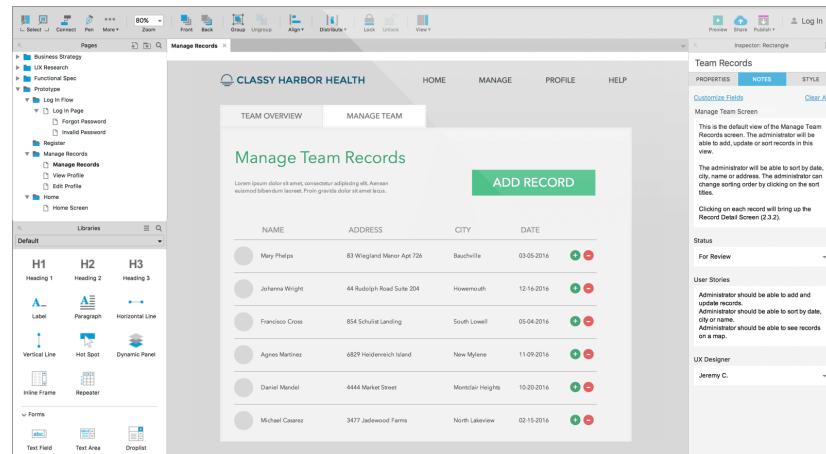


Image Credit: <https://www.axure.com/features/new-in-8>



91

## Fidelity vs. Tool

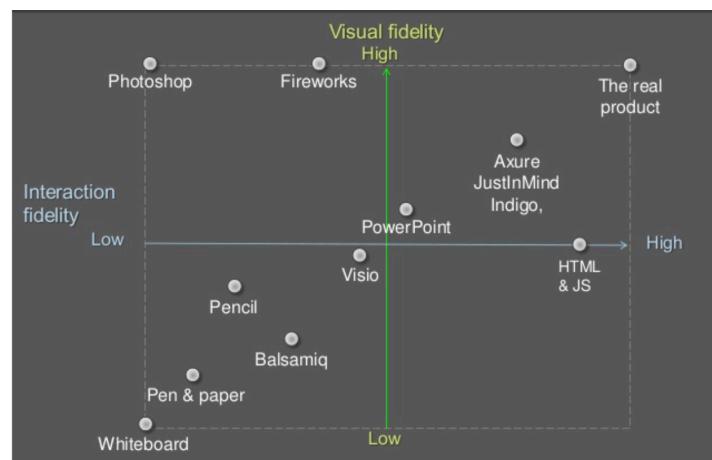


Image Credit: Slide 16, <https://www.slideshare.net/ranliron/prototyping-for-effective-ux>



92

## What kind of prototype should I create?

[www.zeetings.com/comp1000](http://www.zeetings.com/comp1000)



94

## Case Study for your interest

- Nintendo Switch: Smash Bros  
<https://blog.prototypr.io/ux-case-study-nintendoswitch-smash-bros-ultimate-online-sucks-64fc81d627f5>



96

## Forms of a Prototype

- Paper mock-up of screens
- Storyboard
- Cardboard mock-up
- Wizard of Oz
  - a prototype that works by having someone behind-the-scenes who is pulling the levers and flipping the switches
- 3D object (physical devices, Palm)
- Electronic mock-up



97

## Keep it?

- Evolutionary Prototyping
  - Each prototype is a real piece of the final product
- Throw away prototype
  - Prototypes don't go into production systems



98

## Horizontal vs Vertical Prototyping

- Horizontal
  - broad, lots of functions
- Vertical
  - analyse functionality quite deeply, not many functions



99

## Process

- Prototyping is iterative
- Communicate aspects of the design



100

Table 8.1 Relative effectiveness of low- vs. high-fidelity prototypes (Rudd et al., 1996)

Type	Advantages	Disadvantages
<b>Low-fidelity prototype</b>	<ul style="list-style-type: none"> <li>• Lower development cost.</li> <li>• Evaluate multiple design concepts.</li> <li>• Useful communication device.</li> <li>• Address screen layout issues.</li> <li>• Useful for identifying market requirements.</li> <li>• Proof-of-concept.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited error checking.</li> <li>• Poor detailed specification to code to.</li> <li>• Facilitator-driven.</li> <li>• Limited utility after requirements established.</li> <li>• Limited usefulness for usability tests.</li> <li>• Navigational and flow limitations.</li> </ul>
<b>High-fidelity prototype</b>	<ul style="list-style-type: none"> <li>• Complete functionality.</li> <li>• Fully interactive.</li> <li>• User-driven.</li> <li>• Clearly defines navigational scheme.</li> <li>• Use for exploration and test.</li> <li>• Look and feel of final product.</li> <li>• Serves as a living specification.</li> <li>• Marketing and sales tool.</li> </ul>	<ul style="list-style-type: none"> <li>• More expensive to develop.</li> <li>• Time-consuming to create.</li> <li>• Inefficient for proof-of-concept designs.</li> <li>• Not effective for requirements gathering.</li> </ul>



101

## Evolution

- As you understand more about your user goals and the business domain you will understand the priority of competing goals
- This should suggest high priority scenarios that are very important factors for success
- Cooper (About Face) refers to these as key path scenarios
  - Help us focus our designs on most appropriate solutions



102

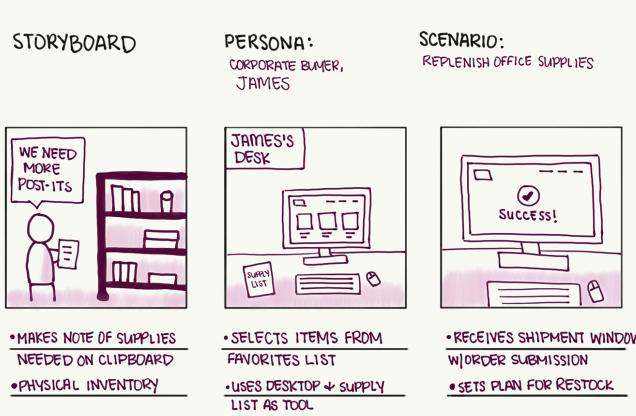
## Storyboards

- The sequence of interactions will be an important tool in the design process to help visualise the order of activities and events
- Screen layouts will be used in the storyboard images
- Also review any flow charts that were derived earlier in the process



103

## Storyboard example



<https://www.nngroup.com/articles/storyboards-visualize-ideas/>



104

## Scenarios

- Scenarios will help you validate your design
- Read the scenarios and compare against the design - do they still meet the original goals?



105

## Design Patterns

- There are common user interface elements used in user interface design.
- Design patterns can be thought of as a solution to a problem within a specific context.
- Button - presents an affordance to invite clicking, has a label, does something when pressed
- Breadcrumbs - gives a user a linear view of a hierarchy
- Accordion - grouped set of collapsible panels that gives access to large number of links in constrained space



106

## Questions?



107

## Links

- <http://ui-patterns.com/patterns>
- <http://ui-patterns.com/patterns/Breadcrumbs>
- <http://ui-patterns.com/patterns/AccordionMenu>



108

## Links

- Paper Prototype Demo  
<http://www.youtube.com/watch?v=GrV2SzURPv0>
- Paper laptop  
<http://www.youtube.com/watch?v=5xQAqQGpvbs&feature=fvwp&NR=1>
- Example Usability Test with a Paper Prototype  
<http://www.youtube.com/watch?v=9wQkLthhHKA>
- See Paper prototyping Case Study  
[http://www.id-book.com/casestudy\\_11-1.php](http://www.id-book.com/casestudy_11-1.php)



109

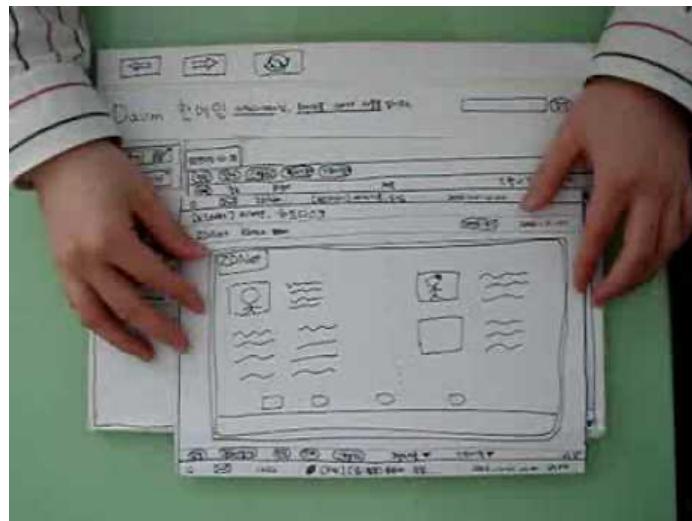
## Links

- Mobile Usability Testing: Paper Prototyping  
<http://www.youtube.com/watch?v=GkFJ9ZJJmF0>



110

## Demonstration – basic prototype



<https://www.youtube.com/watch?v=GrV2SZuRPvQ>



111

## Demonstration – ‘how to’



<https://www.youtube.com/watch?v=FS00UJlo12Xk>



112

## Summary of Paper Prototyping



113



## Visual Design

Never Stand Still

COMP3511/9511 Human Computer Interaction  
Dr Sasha Vassar

1

## References

- Cooper and Reimann (2003), About Face 2.0, Wiley
- Johnson (2000), GUI Bloopers, Morgan Kaufman
- Galitz (2002), The Essential Guide to User Interface Design, Wiley.
- McCracken and Wolfe (2004), User Centred Web Site Development, Ch 9
- See also id-book.com



2

## Overview

- Design Process context
- Relationship of layout to workflow
- Aesthetics of layout
- A couple of quick methods to assess layout
- Colour considerations
- Menu design - card sorting
- Windows
- Icon design
- Linking Heuristics to Cognitive Load Theory



3

## What does visual design mean?

- **Visual design** aims to shape and improve the user experience by strategically implementing images, colors, layouts, and other elements for better *usability* and *aesthetic appeal*.



4

## Context of Visual Design

- Need to have *requirements* sorted
- Need to know *who your users are* and their needs
- Need to understand *context of use*, as well as likely platforms eg. phones, desktops, etc.
- Not too early in the Design Lifecycle



5

## Process

- Computer design requires a consistent reliable process
- Define:
  - *Form factor* – what form (eg pc/mobile) will it be viewed in
  - *Posture* – how much user attention is assumed and what response is required
  - *Input methods* – user access limits



6

## What Screen Users Want

- An orderly, clean clutter free appearance
- An obvious indication of what is being shown and what should be done with it
- Expected information located where it should be

Galitz p.111



7

## What Screen Users Want

- A clear indication of what relates to what, indicating options, headings, data and so forth
- Plain, simple English (terminology)
- A simple way of finding out what is in the system and how to get it out
- A clear indication of when an action can make a permanent change in the data or system

Galitz p.111



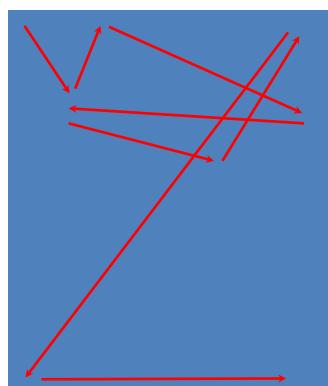
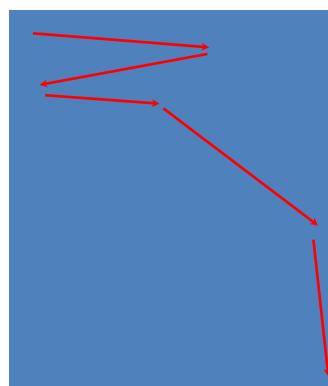
8

## Layout Orchestration and Flow



9

## Logical Flow

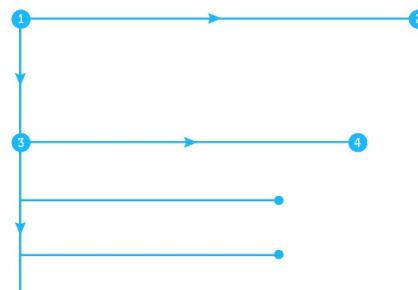


Cooper and Reimann



10

## F-Shaped reading on the web

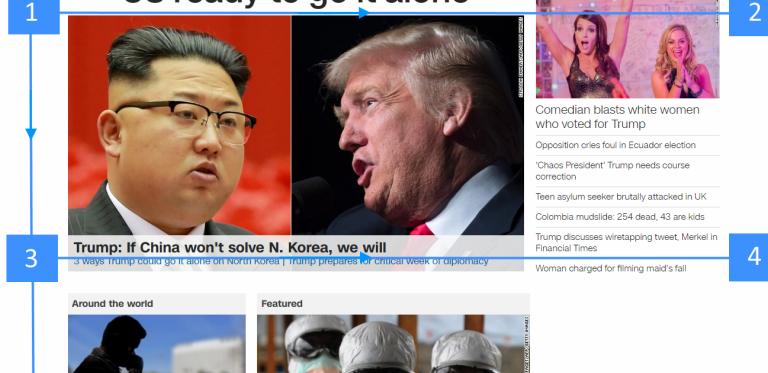


<https://uxplanet.org/f-shaped-pattern-for-reading-content-80af79cd3394>



11

## US ready to go it alone



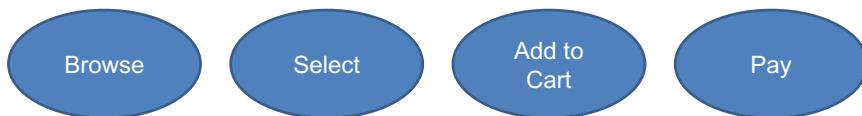
<https://uxplanet.org/f-shaped-pattern-for-reading-content-80af79cd3394>



12

## Layout Considerations

- Layout must have some relationship to the users workflow
- Everything we place in the user's view creates something to think about, increasing the cognitive load



13

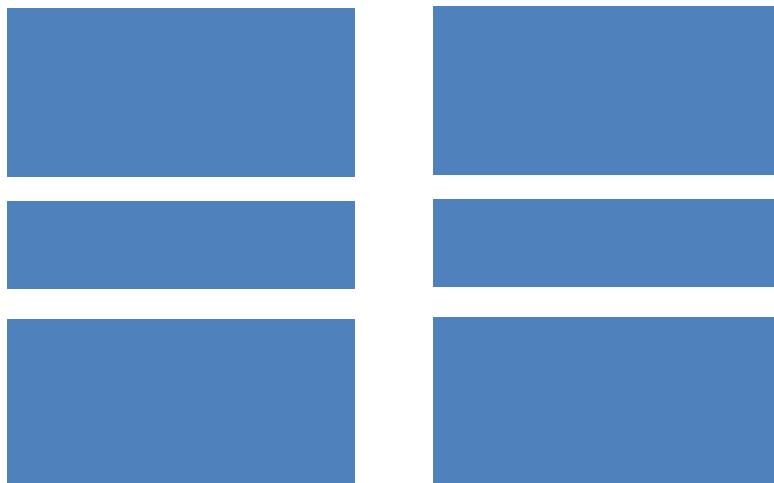
## Layout and Task

- Understand the tasks
- Study the ordering of the tasks
- Order the user interface elements so that it matches the workflow
- Consider visual groupings (reflect on the perceptual groupings)



14

## Symmetry



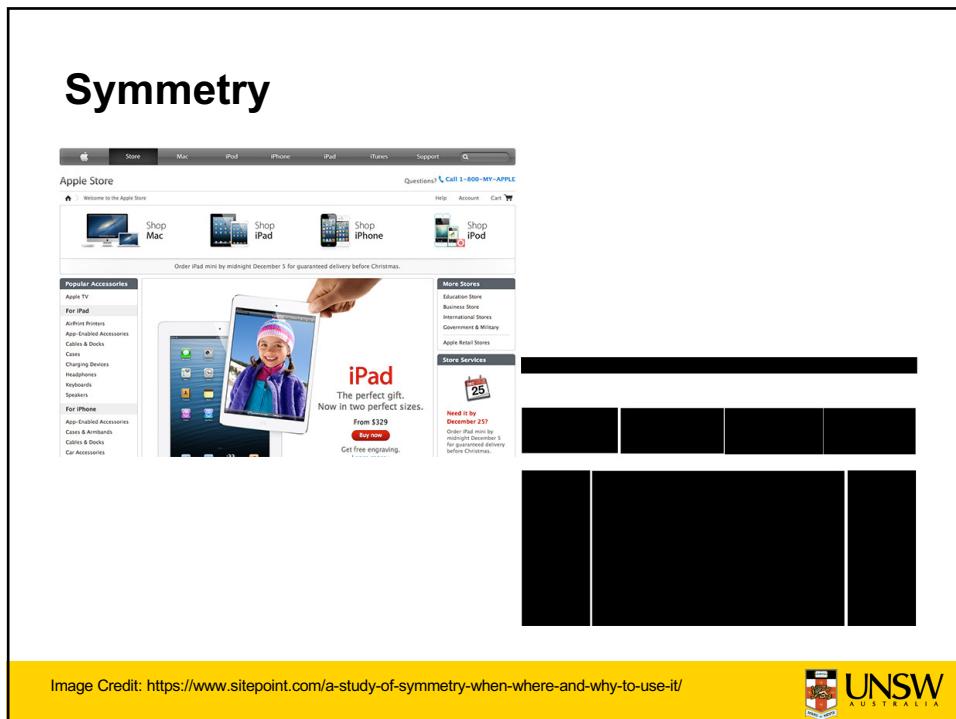
15

## Symmetry

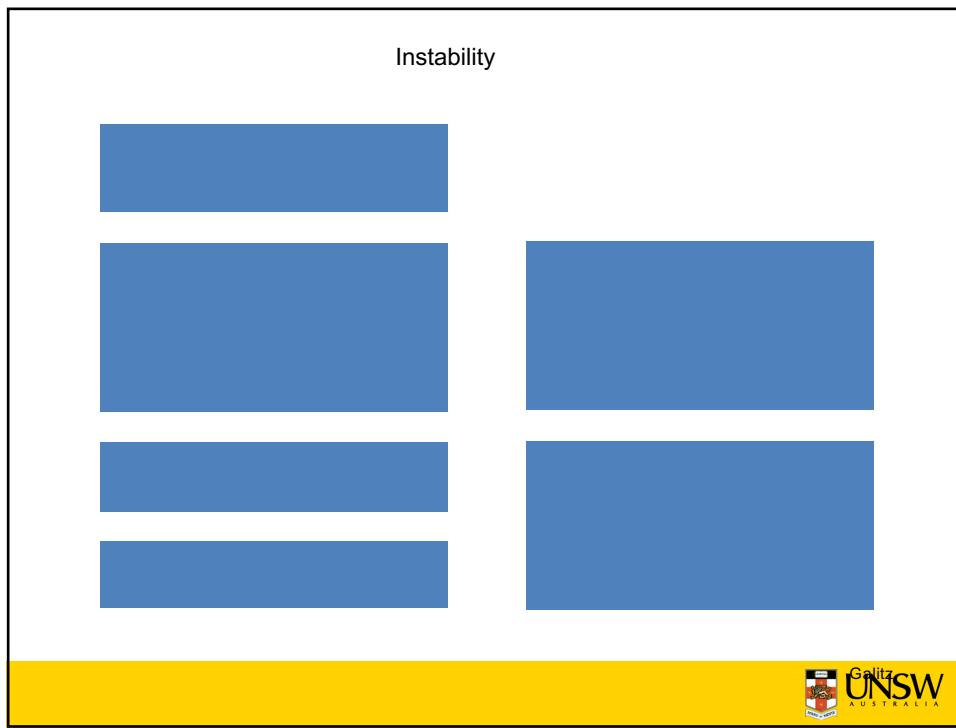
Image Credit of website: <https://www.smashingmagazine.com/2015/06/design-principles-compositional-balance-symmetry-asymmetry/>



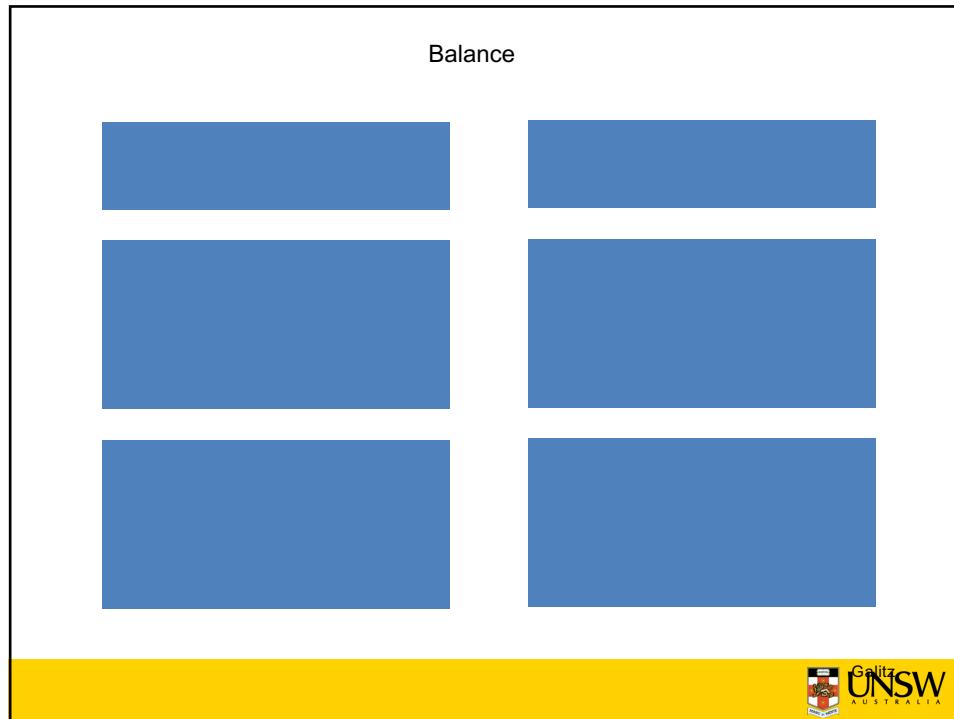
16



17



18



19



## Balance

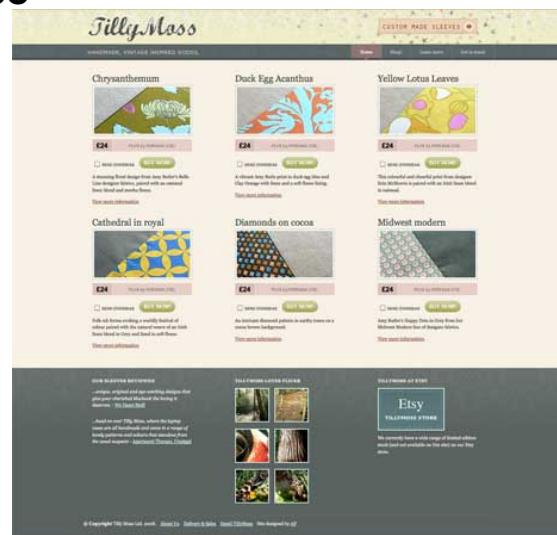
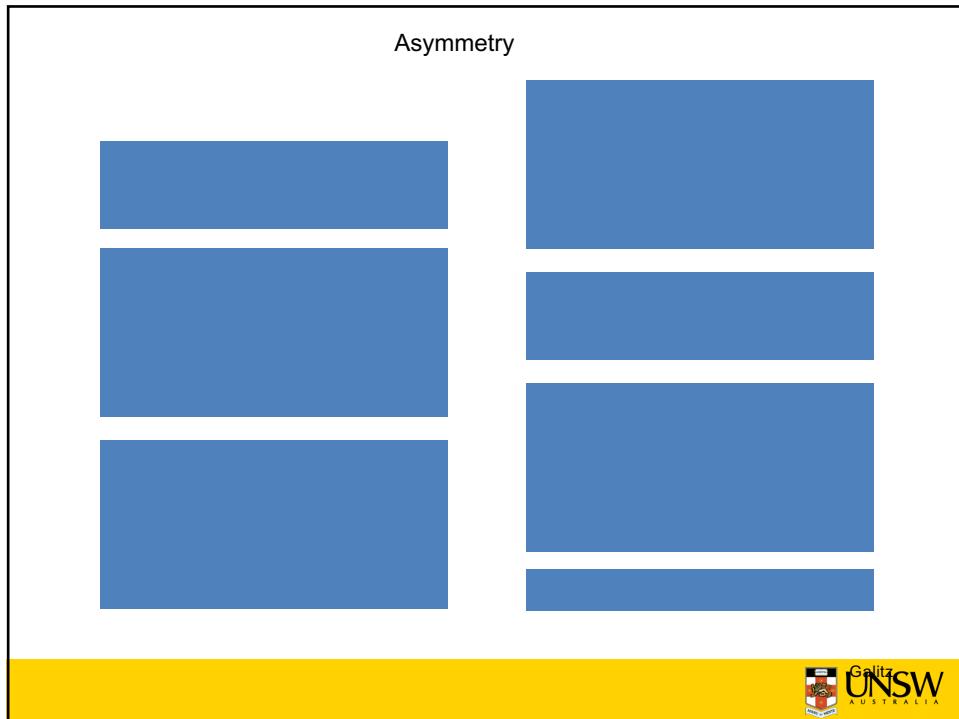


Image Credit: <http://vanseodesign.com/web-design/web-design-balance/>



20



21

## Assymetry

NBA Full Scoreboard | NCAAB | NCAAW | Soccer | NFL | NCAAF | myScores | All Scores | Regular Season: Nov. 26, 2012

myESPN NFL MLB NBA NHL NCAA FB NCAA BB NASCAR SOCCER MORE SPORTS | WATCH FANTASY espnW & PLAYBOOK RADIO

TOP STORIES | WATCH LIVE | ESPN | ESPN 2 | ESPN U | ESPN 3 | HEADLINES | MY HEADLINES | SHARES | Try the new ESPN 360°.

Miles stays at LSU, gets 7-year deal | Low  
No. 2 Duke fights past No. 4 Ohio St. | Reax  
Rondo, Humphries fight, ejected | Nets roll  
Report: Auburn interviewed Louisville's Strong  
Sources: Amar'e OK with bench | Knicks win | Bill  
Sources: Raiders to release McClain | Williamson  
Source: B.J. Upton chooses Braves | Law  
NHL union meet with mediator for six hours  
Veteran G Fisher agrees with Mavs | MacMahon  
Rubio OK to resume practice | Wolves lose  
FBD: Bama, UGA had a schedule advantage

**Another Challenge Met**  
Duke avenged last season's lopsided loss and added OSU to its early list of top-five wins this season. Reaction - Miami upsets MSU » Blog »

Struelier Licka/Getty Images

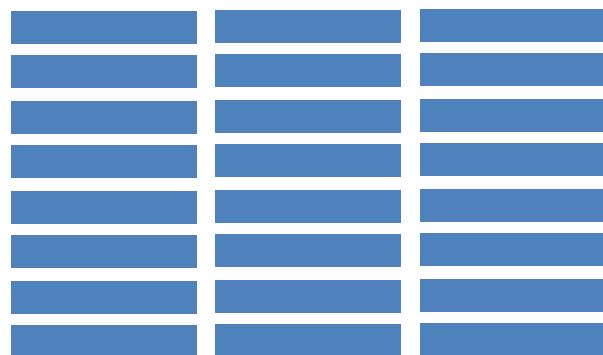
OSU 68 F DUKE 73 Recap

NUGGETS VS. LAKERS

Image Credit of website: <https://www.sitepoint.com/a-study-of-symmetry-when-where-and-why-to-use-it/>

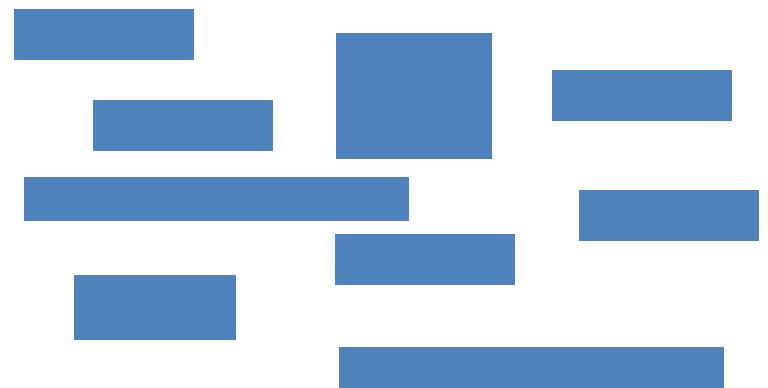
22

Regularity

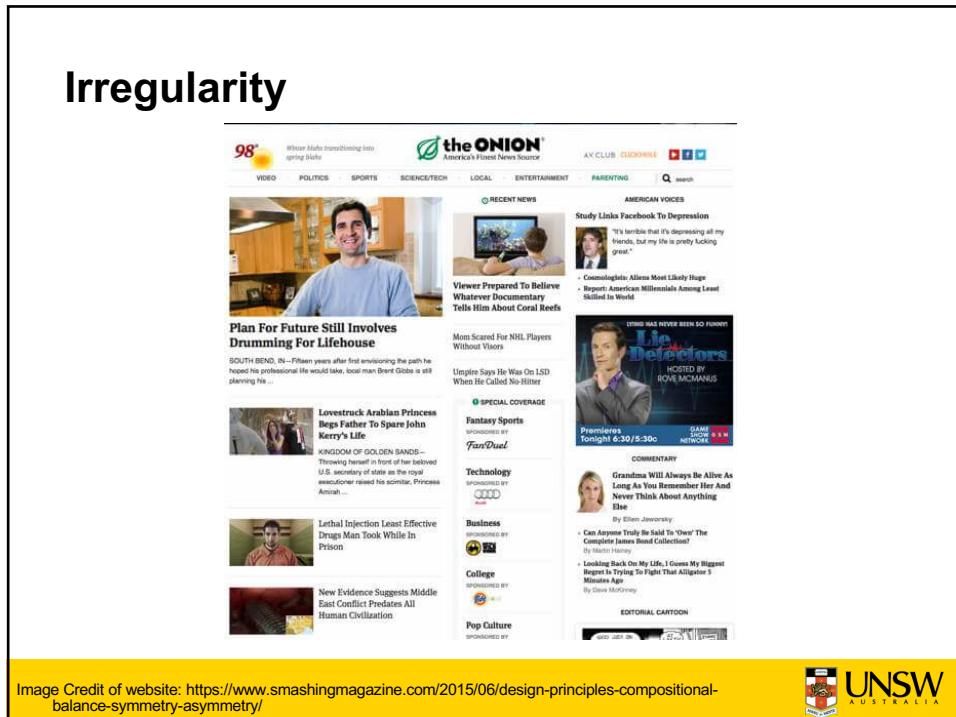


23

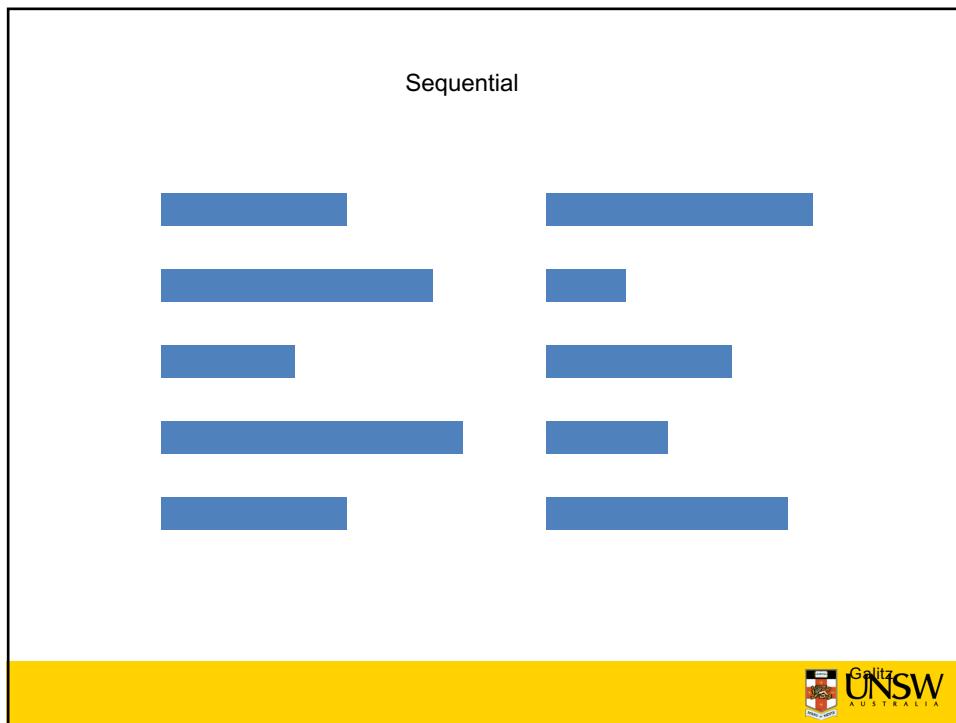
Irregularity



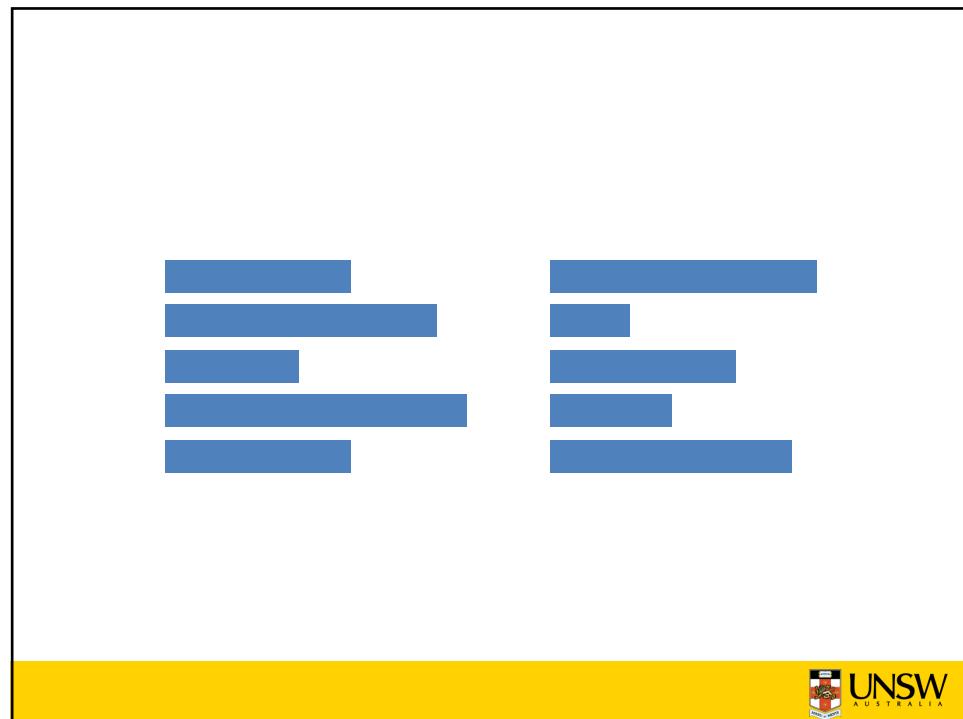
24



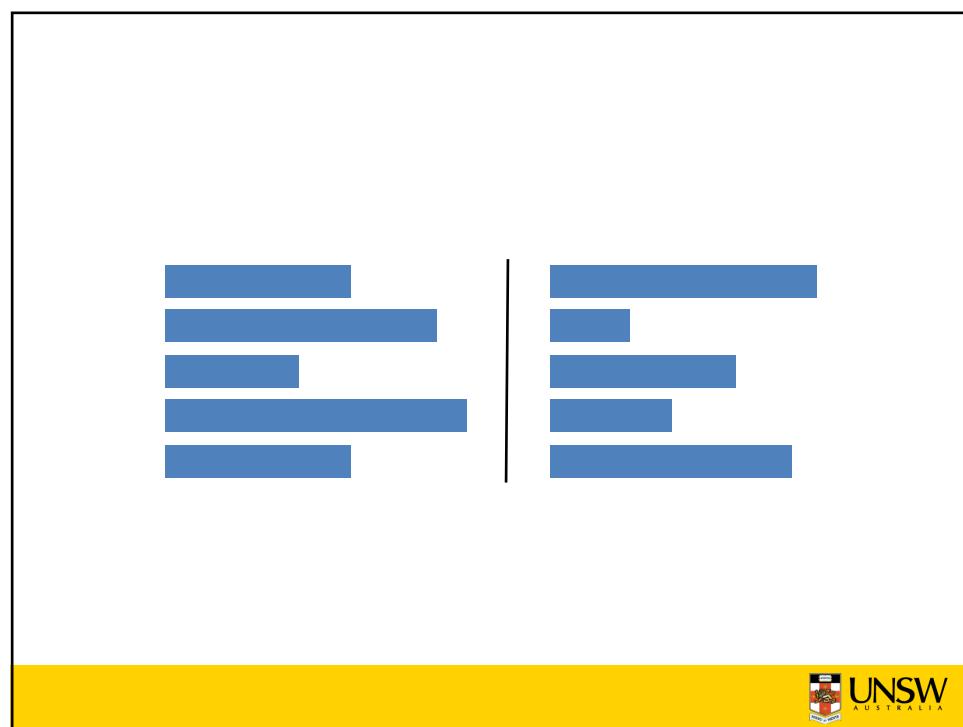
25



26



27



28



**Perfection is attained not when there  
is no longer anything to add, but when  
there is no longer anything to take  
away**

Antoine de Saint Exupery, in Cooper and Reimann p227



29

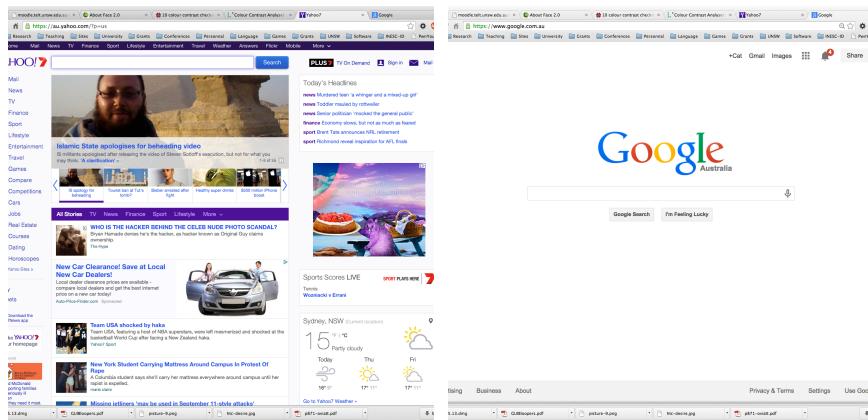
## **Some Visual Interface Design principles**

- Avoid visual noise and clutter
- Redundant info uses up limited processing capacity
- Keep things simple
- Too much clutter increases search



31

## Too much clutter increases search



32

## Simplicity example



**Figure 10.1: Southern Cross**



**Figure 10.2: Southern Cross and Other Stellar Objects**

Keep graphics uncluttered and simple and their meaning will be more obvious. Fig 10.1 is better than 10.2 for learning about the Southern Cross.



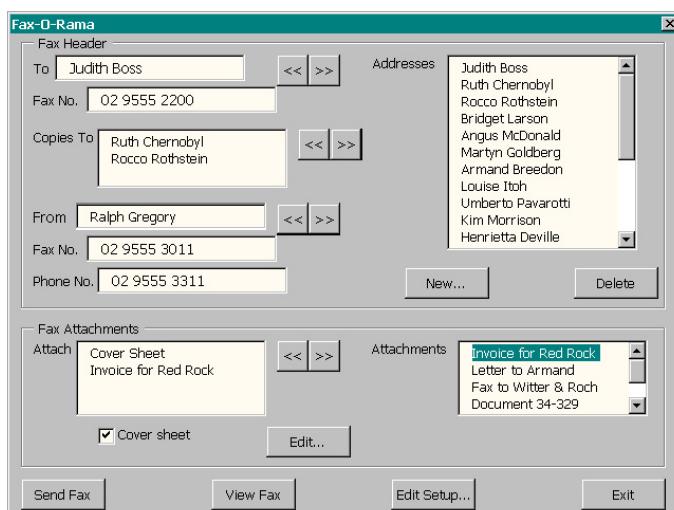
33

## Alignment

- Reduces visual noise
- Make it easier to scan information on screen
- Assist with visual orientation
- Make the window visually pleasing

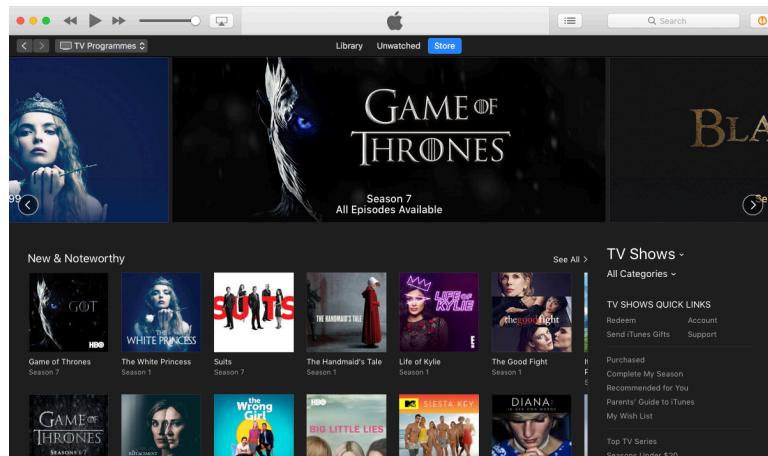


34



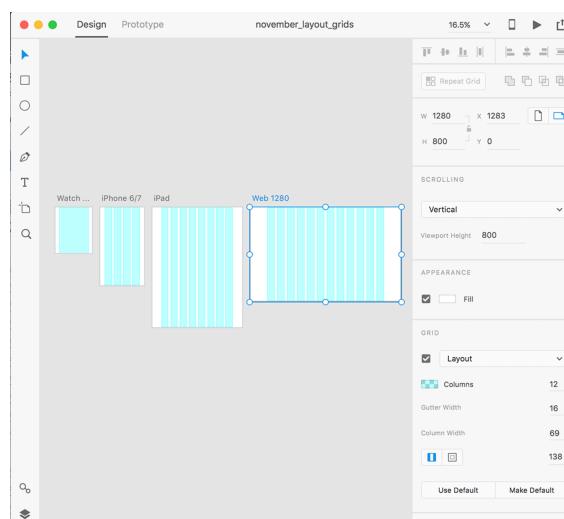
35

## Alignment - grid



36

## Adobe XD



37

## White Space

- Space provides a separation between elements
- Helps reduce visual clutter
- Used to help organise and structure related items
- Can assist with balance, clarity



40

## White Space

[Screenshot from a very popular design blog forum](#)

### What is the biggest UX mistake startups make when building a product?

The biggest mistake people make when building products is building something that nobody wants or needs. That's not specifically a user experience mistake, but it means that UX designers spend a huge amount of time working on the ideal way to allow people to do something that they have no interest in doing. That's a giant waste of everybody's time.

A specifically UI-related mistake that I see all the time is the failure to help users understand what they should be doing at any given part of the interaction. This happens most in complicated enterprise products, but it can happen anywhere. Designers get so focused on fitting everything onto a screen and making all sorts of features possible that they fail to think through how users will discover a feature or get started with a new process. When you're adding a feature to a product, you need to ask yourself how users will discover that feature, how they will get started using it, and how they will remember it exists when they need to use it again.



[Screenshot of same content in Medium.com](#)

### What is the biggest UX mistake startups make when building a product?

The biggest mistake people make when building products is building something that nobody wants or needs. That's not specifically a user experience mistake, but it means that UX designers spend a huge amount of time working on the ideal way to allow people to do something that they have no interest in doing. That's a giant waste of everybody's time.

A specifically UI-related mistake that I see all the time is the failure to help users understand what they should be doing at any given part of the interaction. This happens most in complicated enterprise products, but it can happen anywhere. Designers get so focused on fitting everything onto a screen and making all sorts of features possible that they fail to think through how users will discover a feature or get started with a new process. When you're adding a feature to a product, you need to ask yourself how users will discover that feature, how they will get started using it, and how they will remember it exists when they need to use it again.



Image Credit: <https://uxplanet.org/white-space-in-ui-design-8647d4f685a7>



41

## Example of White Space

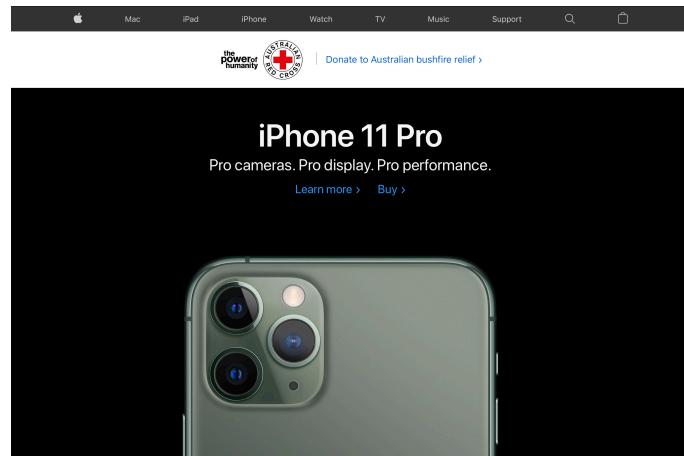
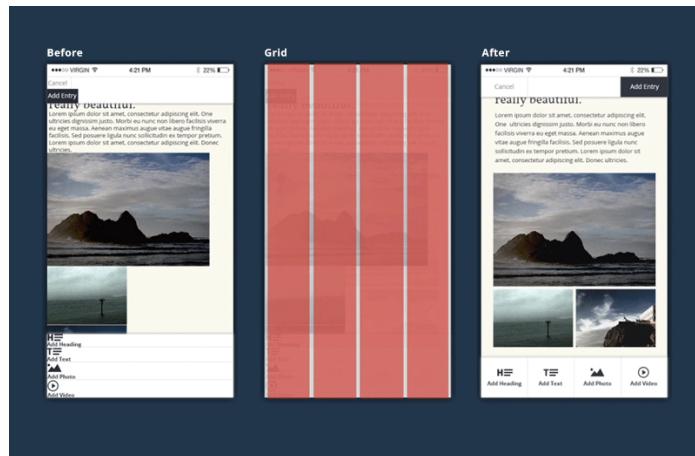


Image Credit: <https://uxplanet.org/white-space-in-ui-design-8647d4f685a7>



42

## White Space



<https://www.salesforce.com/blog/2015/04/4-aesthetic-concepts-every-non-designer-should-know-gp.html>



43

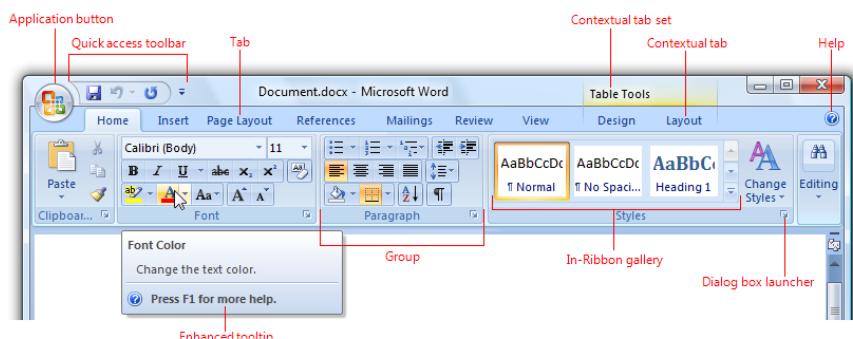
## Group Boxes

- A line drawn around a series of elements
- May have a label associated
- Use sparingly as the line may add to the visual noise



44

## Group Boxes



45

## Group Boxes



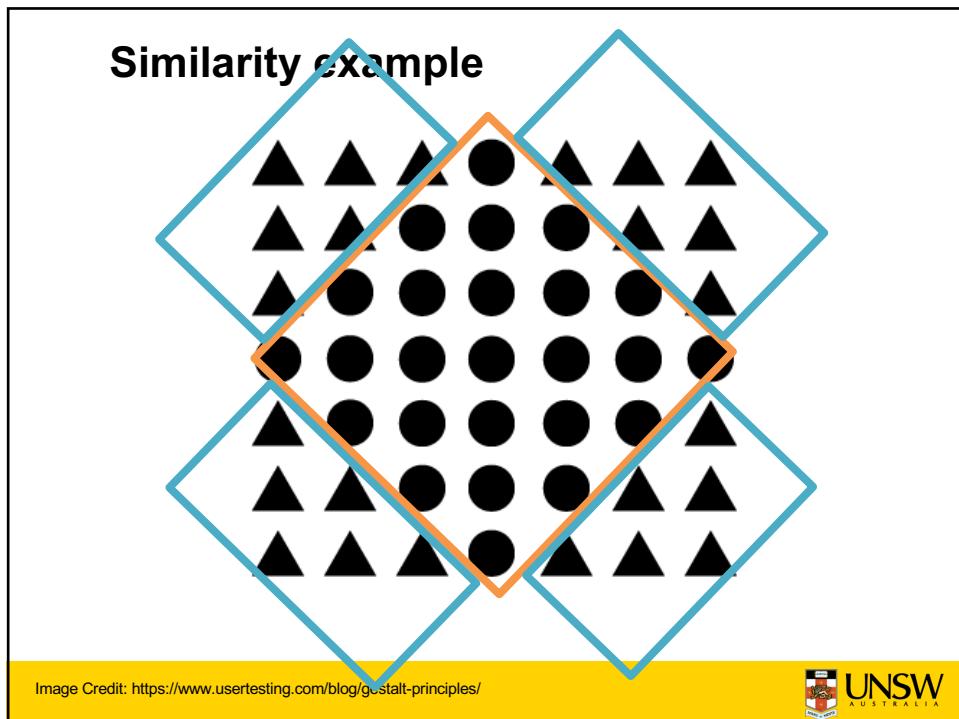
46

## Organizing interface elements

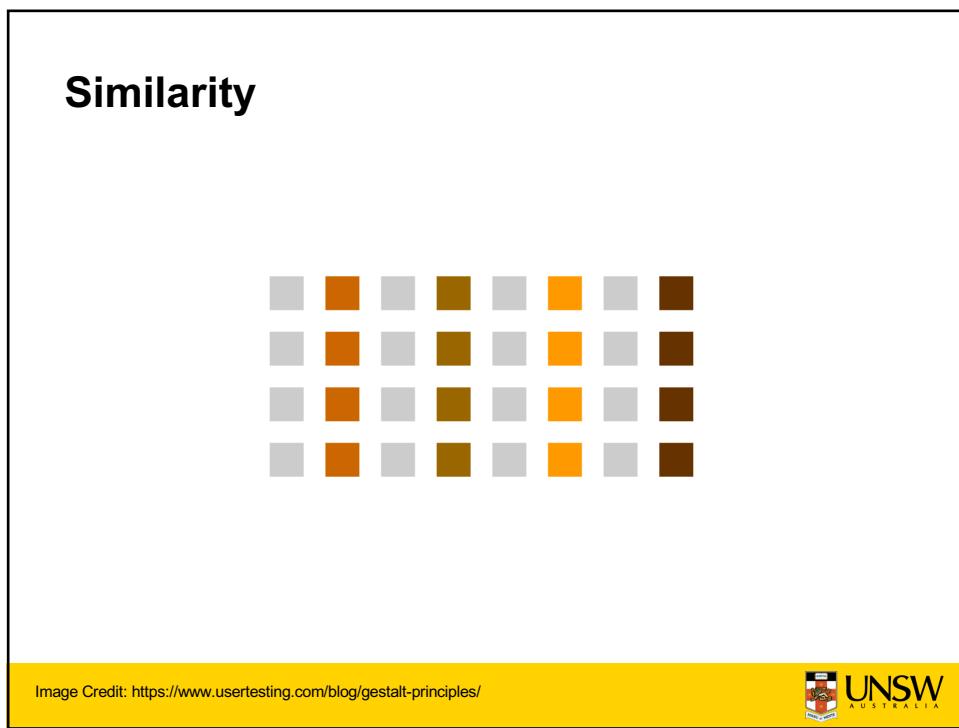
- Use contrast, similarity and layering to distinguish and organise elements
  - They help establish groupings
  - Provide contrast between active, manipulable elements of an interface vs. passive, non-manipulable elements
  - Can also use contrast of different sets of elements to communicate their function
    - Can use colour, spatial or shape contrast



47



48



49

## Similarity in websites: example

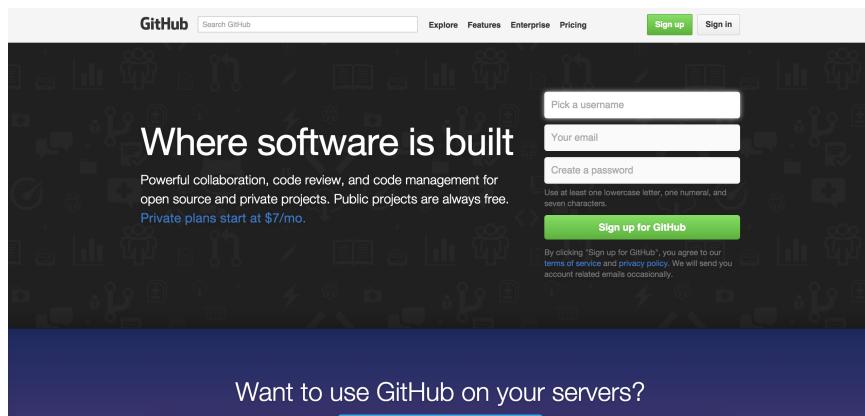


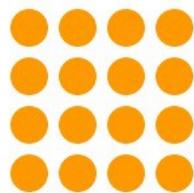
Image Credit: <https://www.usertesting.com/blog/gestalt-principles/>



50

## Proximity example

*This is perceived to be one group and the components somehow related to each other.*



*We perceive two groups here, and understand that there are differences between them.*

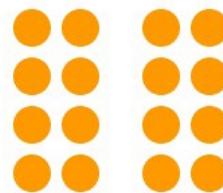


Image Credit: <https://www.usertesting.com/blog/gestalt-principles/>



51

## Proximity

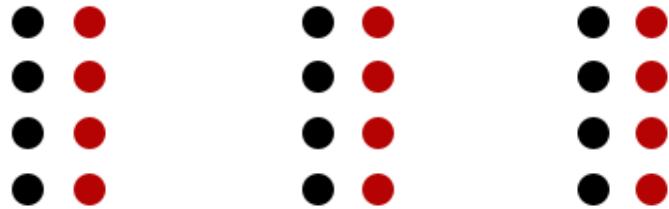


Image Credit: <https://www.usertesting.com/blog/gestalt-principles/>



52

## Proximity in websites: example

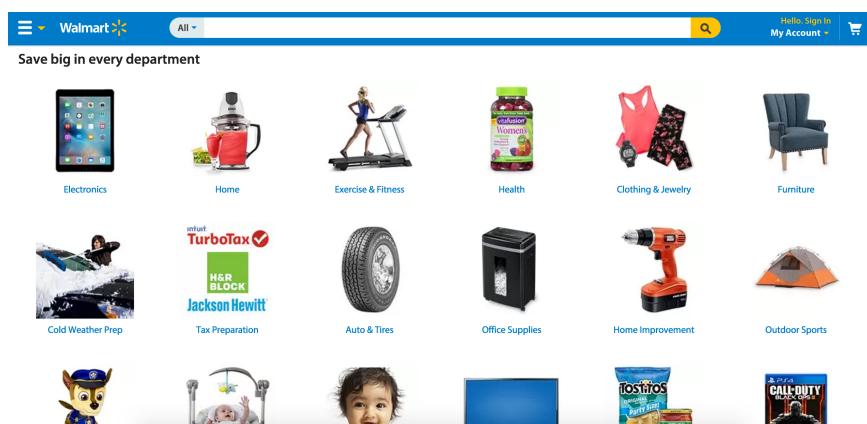


Image Credit: <https://www.usertesting.com/blog/gestalt-principles/>

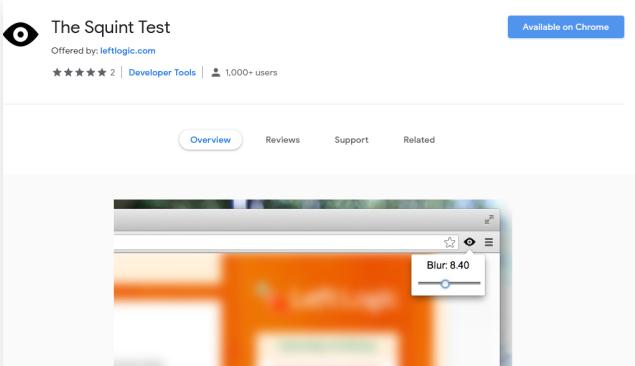


53

## Squint Test



Close one eye      Squint at the screen / design      Which elements stand out and which become fuzzy?      Which elements seem to group together?



The Squint Test  
Offered by: leftlogic.com  
★★★★★ 2 | Developer Tools | 1,000+ users

Available on Chrome

Overview    Reviews    Support    Related

54

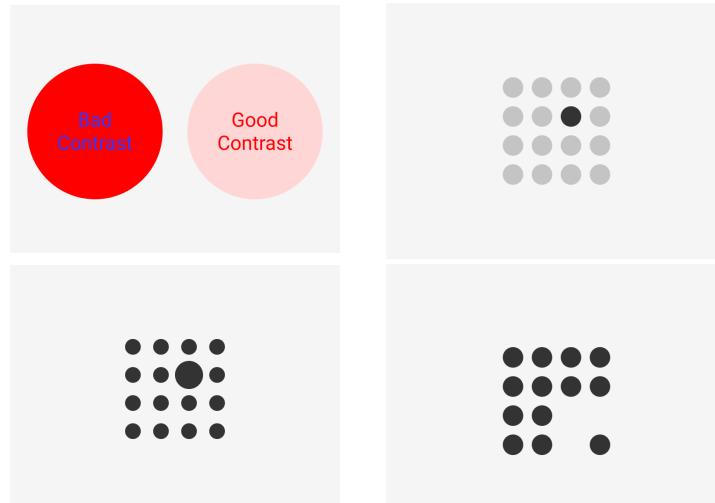
## Mirror Test

- Click to edit Master text styles
- Second level
  - Third level
    - Fourth level
    - Fifth level



55

## Contrast

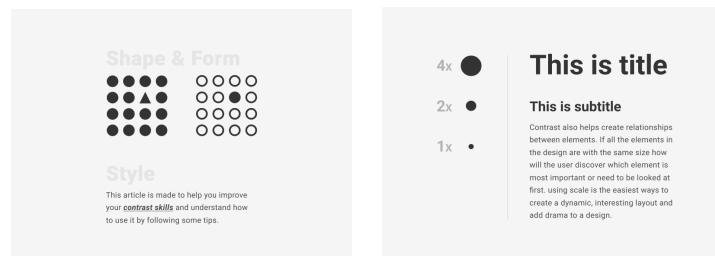


<https://medium.com/picsrush/web-design-tips-contrast-c73daf595606>



56

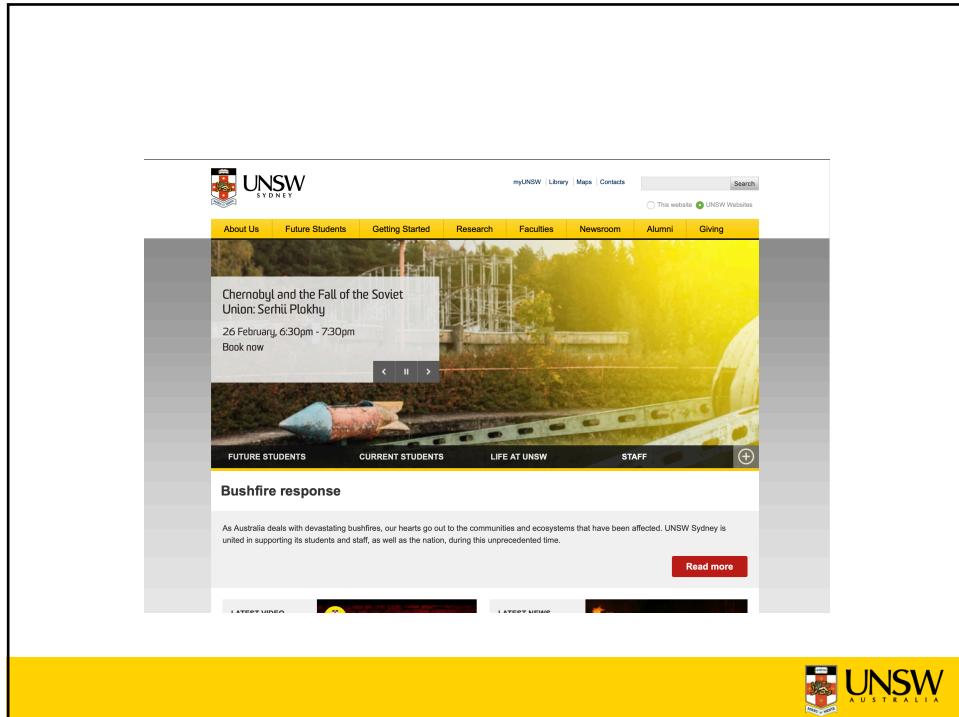
## Contrast



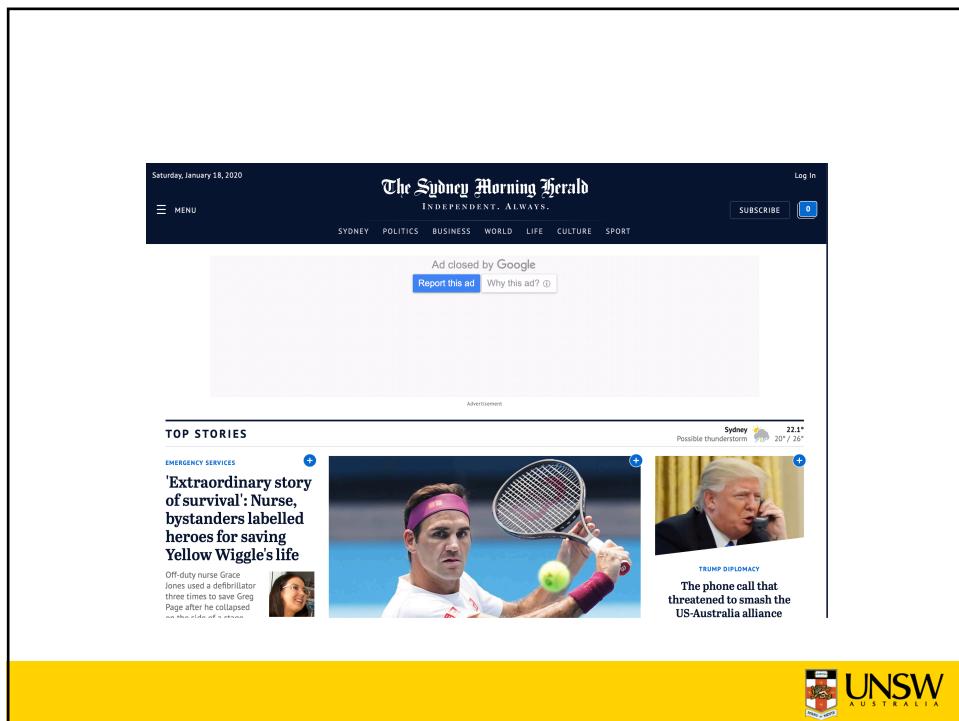
<https://medium.com/picsrush/web-design-tips-contrast-c73daf595606>



57



58



59

## Colour

- Important aspect of visual interfaces
- Should be used sparingly
- Should integrate well into the other elements
- Can draw attention to important items
- Indicate relationships
- Communicate status

McCraken



60

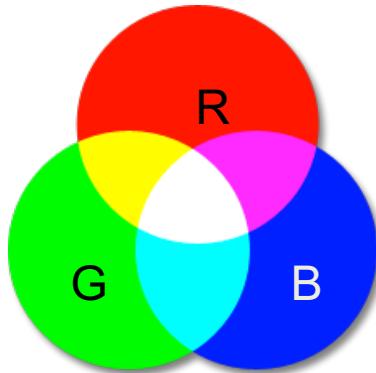
A screenshot of the St. George website. At the top, there is a green banner with a warning icon and text: "⚠️ If you are affected by the recent bushfires, we're here to help with our Disaster Relief package. You can also make a home insurance claim online or call us on 1300 855 489 24/7 for emergency assistance." Below the banner, the navigation bar includes links for Personal, Business, Corporate, Register/Activate, st.george, Bank &amp; Save, Home Loans, Credit Cards, Personal Loans, International &amp; travel, a search bar, and a Login button. The main content area features a large green background image of two people hugging. Overlaid on the image is the text: "Affected by the bushfires? We're here for you." Below this, smaller text reads: "Our Disaster Relief Package is here to lend you a hand during this difficult time." A "Learn more" button is visible. At the bottom, there are four navigation links: Products, Online services, Interest rates, and Locate us.



61

## Colour Schemes

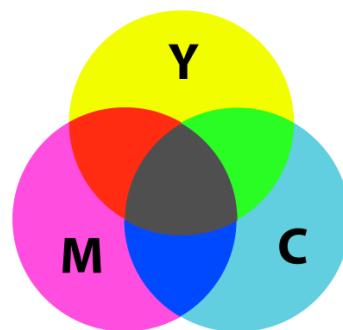
- RGB - Red Green Blue - light
  - additive, mixing two produces brighter



65

## Colour Schemes

- CMYK - Cyan Magenta Yellow Black - ink
  - mixing two colours creates a darker colour, known as subtractive



66

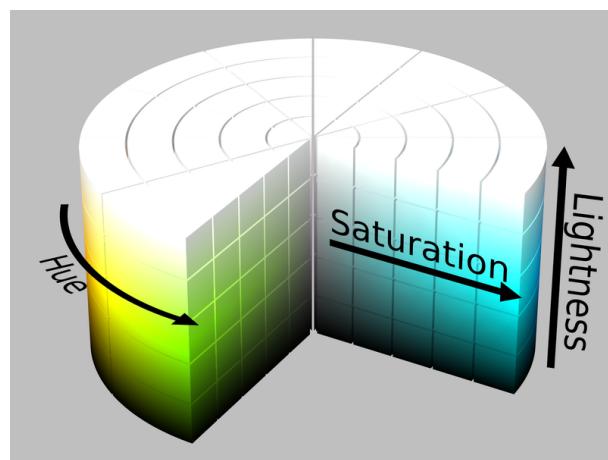
## Colour Schemes

- HSB - Hue Saturation Brightness
  - Hue is the colour name
  - Saturation is the purity of the colour
  - Brightness a black to white scale



67

## Colour Schemes



[https://commons.wikimedia.org/wiki/File:HSL\\_color\\_solid\\_cylinder.png](https://commons.wikimedia.org/wiki/File:HSL_color_solid_cylinder.png)



68

## Primary, Secondary and Tertiary Colours



Primary Colors



Secondary Colors



Tertiary Colors

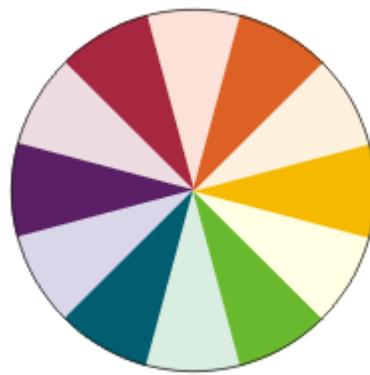


69

## Colour

Cool

Warm



Try to be consistent across your site in use of colours



70

## Colour Harmony

- Engages the viewer
- Creates a balance in the visual experience
- Delivers visual interest and a sense of order



71

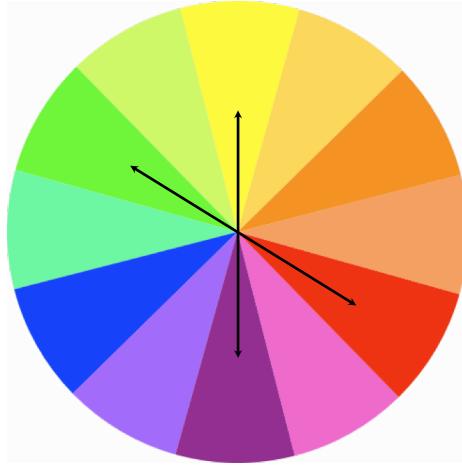
## Some basic formulas for colour harmony

- Analogous colours
- Complementary colours
- Colours found in nature



76

## Complementary Colours



Opposite in the colour wheel



77

## Example: Complementary Colours



78

## Example: Complementary Colours



It's easy to understand  
what's going on with your money.

Get a handle on your finances the **free** and fast way. Mint does all the work of organizing and categorizing your spending for you. See where every dime goes and make money decisions you feel good about.

[Free! Get started >](#)

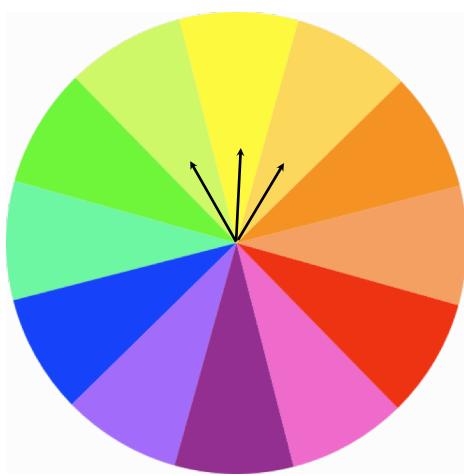


<https://www.crazyegg.com/blog/website-color-palettes/>



79

## Analogous Colours

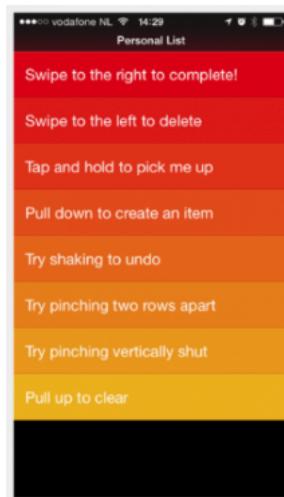


Hues lie close together



84

## Example: Analogous Colours



'Clear' from App Store

<https://uxplanet.org/a-guide-to-color-and-conversion-rates-f3a28e8e32bb>



85

## Example: Analogous Colours

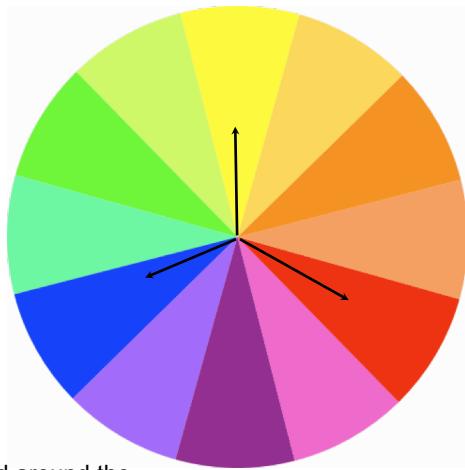


<https://www.crazyegg.com/blog/website-color-palettes/>



86

## Triadic Colours



Approximately spaced around the colour wheel

Creates the most difference - over powering



88

## Example: Triadic Colours



<https://design.tutsplus.com/articles/open-the-door-into-the-science-of-color-theory--vector-4048>



89

## Example: Triadic Colours

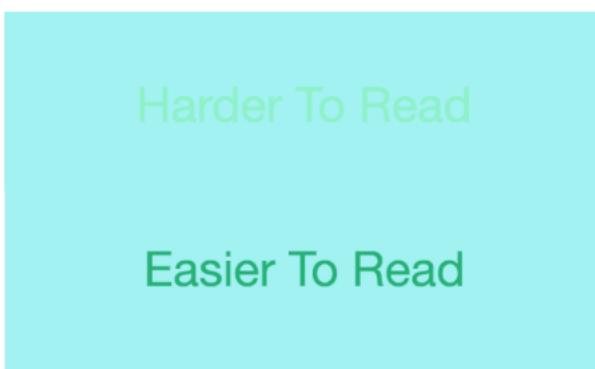


<https://www.crazyegg.com/blog/website-color-palettes/>



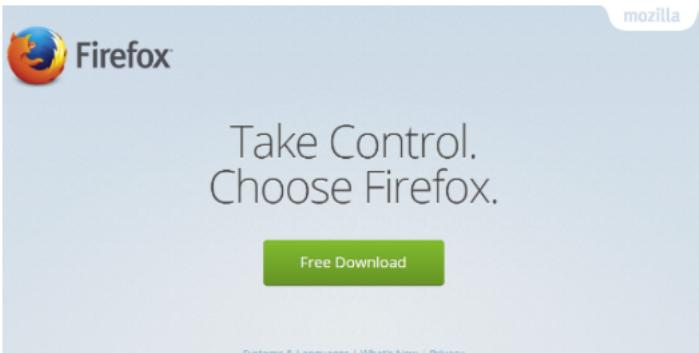
90

## Colour Contrast



95

**Colour Contrast**



mozilla Firefox

Take Control.  
Choose Firefox.

Free Download

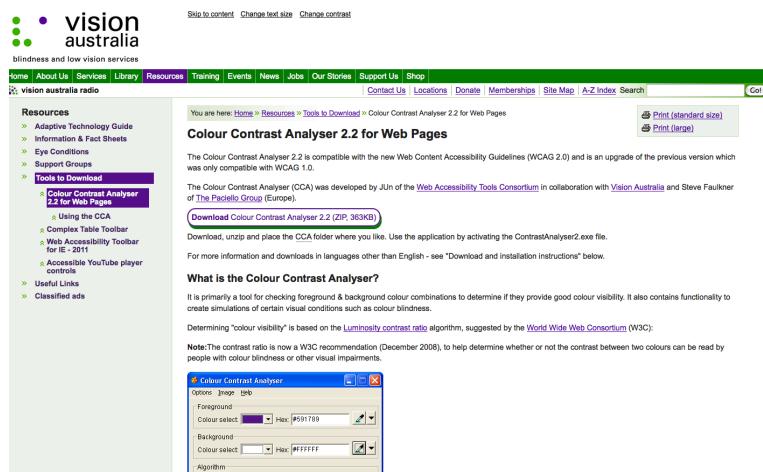
Systems & Languages | What's New | Privacy

<https://uxplanet.org/a-guide-to-color-and-conversion-rates-f3a28e8e32bb>



96

**Colour Contrast Analyser 2.2 for Web Pages**



vision  
australia

blindness and low vision services

Home About Us Services Library Resources Training Events News Jobs Our Stories Support Us Shop

Contact Us Locations Donate Memberships Site Map A-Z Index Search

You are here: Home > Resources > Tools to Download > Colour Contrast Analyser 2.2 for Web Pages

Colour Contrast Analyser 2.2 for Web Pages

The Colour Contrast Analyser 2.2 is compatible with the new Web Content Accessibility Guidelines (WCAG 2.0) and is an upgrade of the previous version which was only compatible with WCAG 1.0.

The Colour Contrast Analyser (CCA) was developed by JUN of the [Web Accessibility Tools Consortium](#) in collaboration with [Vision Australia](#) and Steve Faulkner of [The Paciello Group](#) (Europe).

[Download Colour Contrast Analyser 2.2 \(ZIP, 363KB\)](#)

Download, unzip and place the CCA folder where you like. Use the application by activating the ContrastAnalyser2.exe file.

For more information and downloads in languages other than English - see "Download and installation instructions" below.

**What is the Colour Contrast Analyser?**

It is primarily a tool for checking foreground & background colour combinations to determine if they provide good colour visibility. It also contains functionality to create simulations of certain visual conditions such as colour blindness.

Determining "colour visibility" is based on the [Luminosity contrast ratio](#) algorithm, suggested by the [World Wide Web Consortium](#) (W3C).

Note: The contrast ratio is now a W3C recommendation (December 2008), to help determine whether or not the contrast between two colours can be read by people with colour blindness or other visual impairments.



See <http://www.visionaustralia.org/digital-access-cca>, 2013



97

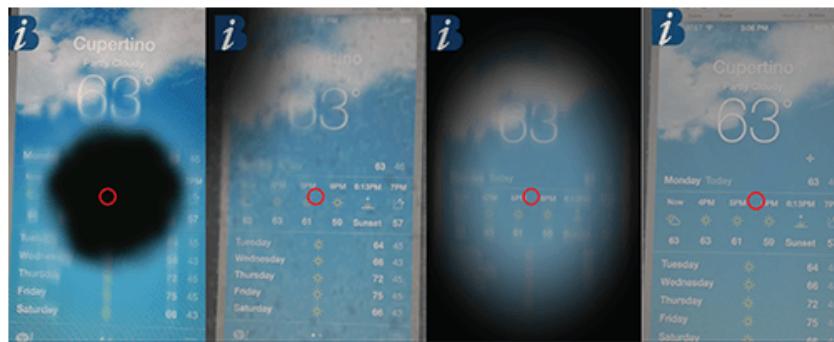
## Colour contrast checking tools

- [Colour Contrast Check](http://www.snook.ca/technical/colour_contrast/colour.html)
  - see [http://www.snook.ca/technical/colour\\_contrast/colour.html](http://www.snook.ca/technical/colour_contrast/colour.html)
- [Colour Contrast Visualiser](http://www.stainlessvision.com/blog/projects/colour-contrast-visualiser) -allows you to visualise good colour combinations
- - See <http://www.stainlessvision.com/blog/projects/colour-contrast-visualiser>
- [Contrast Analyser, Version 2.0](#)
  - Colour Contrast Analyser (CCA) helps you determine the legibility of text and the contrast of visual elements, such as graphical controls and visual indicators.
- [Vischeck](#) – colour blind check
- [Sim Daltonism](#) – colour blindness simulator
  - see <https://michelf.ca/projects/sim-daltonism/>



99

## Simulating vision impairments: checking for colour contrast



<https://www.smashingmagazine.com/2014/10/color-contrast-tips-and-tools-for-accessibility/>



100

## Simulating vision impairments: checking for colour vision deficiency



<https://www.smashingmagazine.com/2014/10/color-contrast-tips-and-tools-for-accessibility/>



101

## Simulating vision impairments: checking for colour vision deficiency



<https://www.usertesting.com/blog/2014/12/02/color-ux-conversion-rates/>



102

## Figure-Ground Principle example



Figure 4.1: Vase



Figure 4.2: Two Faces



Can use colours to change the focus and thus what you perceive.



104

A screenshot of the Foxtel website homepage. The header includes the Foxtel logo and navigation links: Shop, Discover, Support, Watch, Search, TV Guide, Log In, and a user icon. A red banner below the header states, "If you are affected by the bushfires, click here for support." The main feature is a large "2020 THE 20% SALE" graphic. Below it, a call-to-action button says "Save 20% all year long\*" and "Get Foxtel". To the right, there are promotional images for "John Wick Chapter One &amp; Two", "Outlander Season 5 series from \$17.95", "HGTV Big Beach House", "Ultra HD sports", and "The Witcher series from \$19.95". A "Premium &amp; Netflix Bundle" offer is also mentioned. At the bottom, there is fine print about the offer terms.



105

## Colour

- Use to enhance a design, rather than have the design depend on colour
- Design for monochrome first, then add colour
- No more than four colours should be used
- Use colours found in nature (particularly lighter colours)



106

## Colour

- Using distinct colours can show structure
- Similar colours imply relationship - make sure there is one if one is implied
- Warm colours imply action, response required, spatial closeness
- Cool colours imply status, background information, spatial remoteness



107

## Colour



<http://www.thelogofactory.com/choosing-great-logo-colors-help-brand-selection/>



108

## Colour



<http://www.thelogofactory.com/choosing-great-logo-colors-help-brand-selection/>



109

## Colour Overview

- Use colour conservatively
- Use a neutral colour (light grey or beige) for background
- Use colour to orient the eye to important or key areas on the screen
- Use colour redundantly with another cue if implying status
- Use black for general text (headings and titles can be in a colour)
- Want strong contrast between text and background colour



110

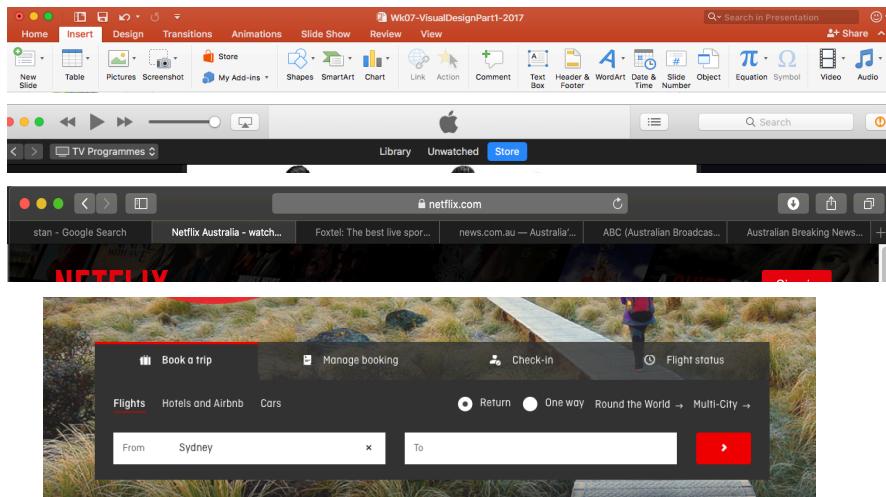
## Windows

- Windows were invented to overcome physical constraints of a computer display, enabling more info. to be viewed and tasks to be performed
- Need to organise windows to support tasks
  - Put related info. in same window
  - Minimise no. of windows needed to accomplish a task



111

## Tabs



112

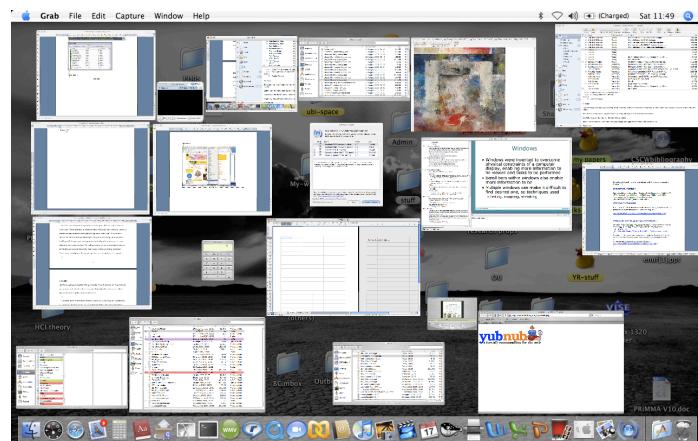
## Windows

- Window management can become an overwhelming task
- Multiple windows can make it difficult to find desired one, so techniques used:
  - Listing, iconising, shrinking



113

## Apple's shrinking windows



114

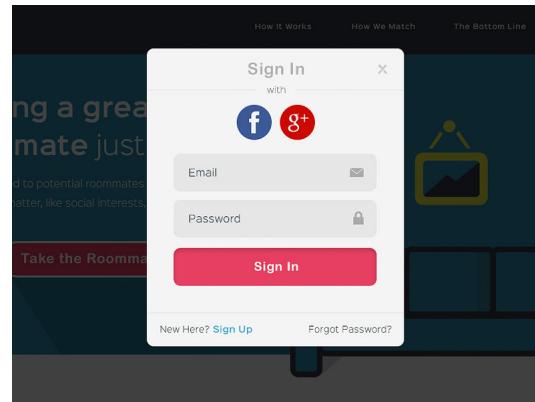
## Windows

- Can act as an external memory and so make it easier to switch between tasks
- Make sure window is large enough to present all relevant and important info, and is not too crowded; however, still want to minimise the need for scrolling
- Dialogue boxes used for infrequently used or needed info.



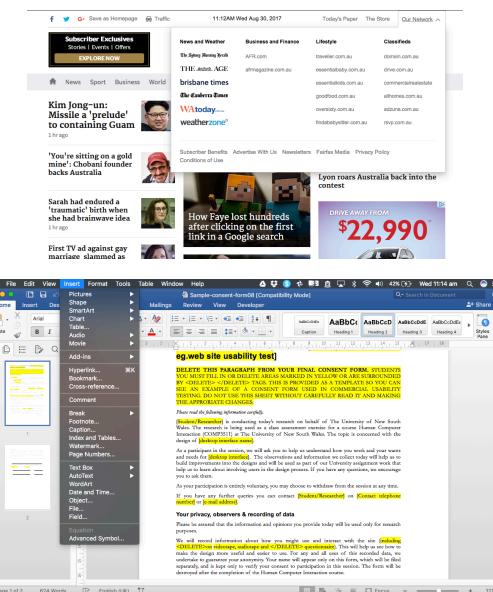
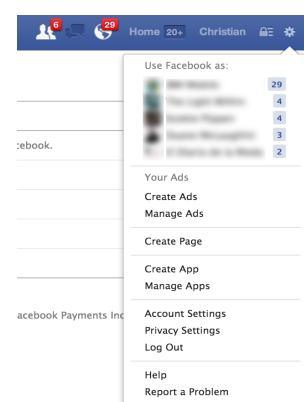
115

## Modal windows



116

## Menus



117

## Menus Grouping

- Order contents by frequency
- Group related commands within a menu
- Use separators between logical groupings
- Group items related to functions, then determine descriptive menu title
- Don't nest too deep



118

## Menu Patterns

- Use same verb tense across the menus
- Make menu titles and commands consistent when used in multiple windows
- Disable non-functional items by greying them
- In drop-down menus, ensure that the label of each menu item differs from the menu title.
- **Include Ellipses:** An ellipsis (...) at the end of a menu item indicates that an application needs additional user input to execute the item's command. A dialog requiring additional information will be displayed. Save As..., Open....



119

## Menus Styles

- A number of menu interface styles:
  - flat lists, drop-down, pop-up, contextual, and expanding ones, e.g., scrolling and cascading
- Flat menus
  - good at displaying a small number of options at the same time and where the size of the display is small, e.g., iPods
  - but 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



120

## iPod flat menu structure



121

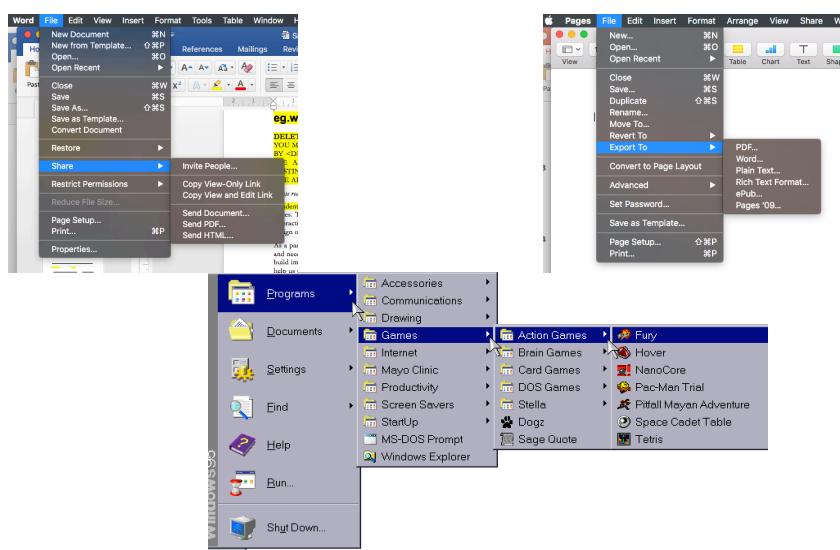
## Expanding menus such as cascading menu structure

- 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
  - not to be used for frequently used functions



122

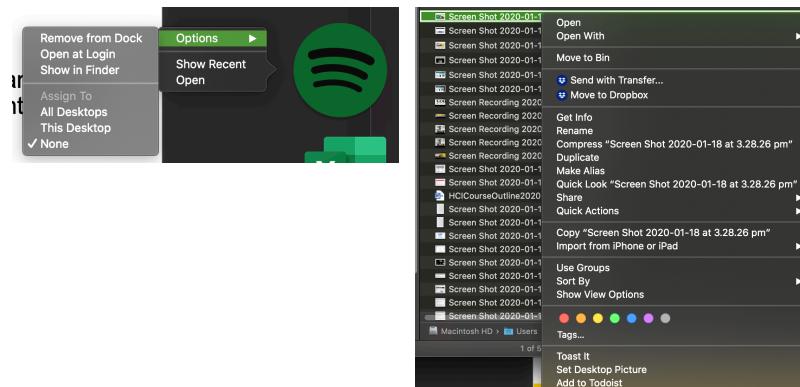
## Cascading menu



123

## Contextual menus

- Provide access to often-used commands that make sense in the context of a current task



124



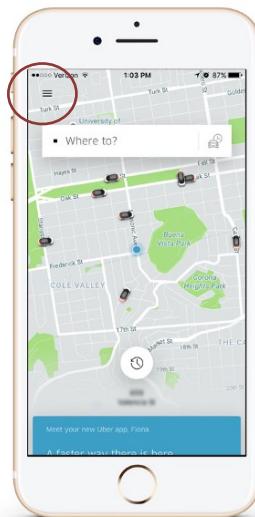
## Hamburger menus

- Mobile navigation
- Many arguments against
  - Hiding navigation behind an icon

125



## Example: Hamburger menus



<https://uxplanet.org/when-to-use-a-hamburger-menu-199d62f764aa>



126

## Menu research and design issues

- What are best names/labels/phrases to use?
- Placement in list is critical
  - e.g. quit and save need to be far apart
- Many international guidelines exist emphasizing depth/breadth, structure and navigation
  - e.g. ISO 9241 (see ID, 2007)
- <https://www.nngroup.com/articles/menu-design/>



127

## Card Sorting

- Used to establish hierarchical groupings with users
- Identify the topics (menu names) around 50, but less than 100
- Write the topics on index cards
- Also have blank cards available for new categories (could be a different colour)



129

## Card Sorting

1. Number the cards on the back
2. Arrange on a large table
3. Select participants
4. Explain the process and objectives eg. identify the best way to organise the elements and find out what groupings make sense



130

## Card Sorting

5. Ask each participant to sort the cards and speak aloud
6. Create groupings where appropriate
7. Blank cards can be used as new categories are identified
8. Take notes and observe the process
  - Understand the underlying reasons



131

## Card Sorting

- If there are too many groupings, ask the user to arrange the groups hierarchically
- Ask for a name for each grouping that describes the members of the group
- Using the numbers on the back, record the groupings
- Reshuffle for the next session



132

# Card Sorting

- Look for trends over the different card sorting sessions

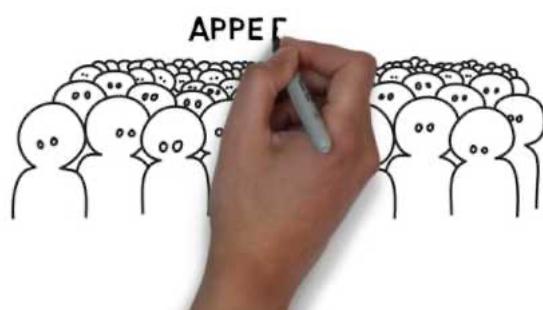


<https://www.livetiles.nyc/blog/card-sorting-can-rewarding-physical-user-feedback/>



133

# Card Sorting



<https://www.youtube.com/watch?v=PmioMessMbY>



134

# Icons

135

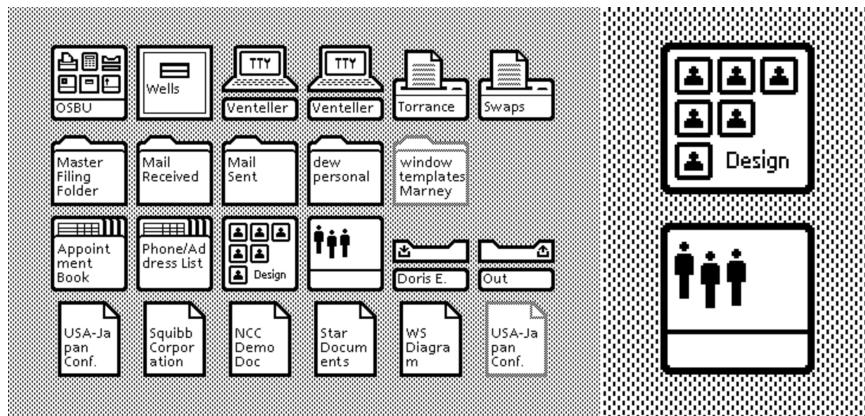
## Icons

- Icons are assumed to be easier to learn and remember than commands (pictures easier than words)
- Can be designed to be compact and variably positioned on a screen
- Now populate every application and operating system



136

## Early Icons: Xerox Alto (1981)

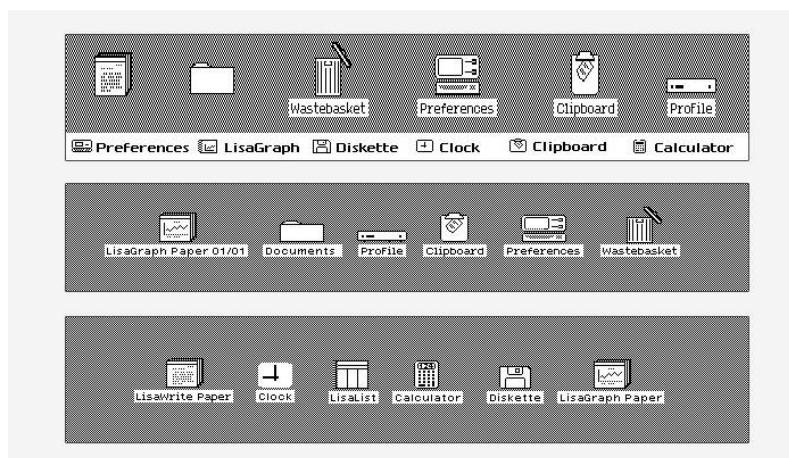


<https://www.interaction-design.org/literature/article/a-brief-history-of-the-origin-of-the-computer-icon>



137

## Apple Lisa and Apple Macintosh (1984)

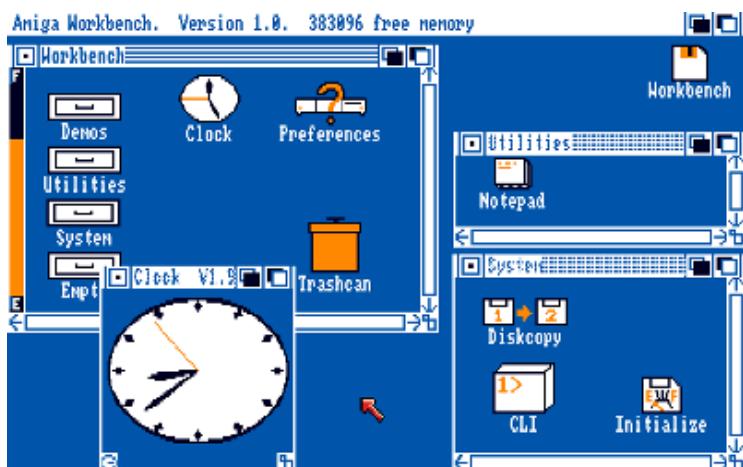


<https://www.interaction-design.org/literature/article/a-brief-history-of-the-origin-of-the-computer-icon>



138

## Amiga 1000 (1985)

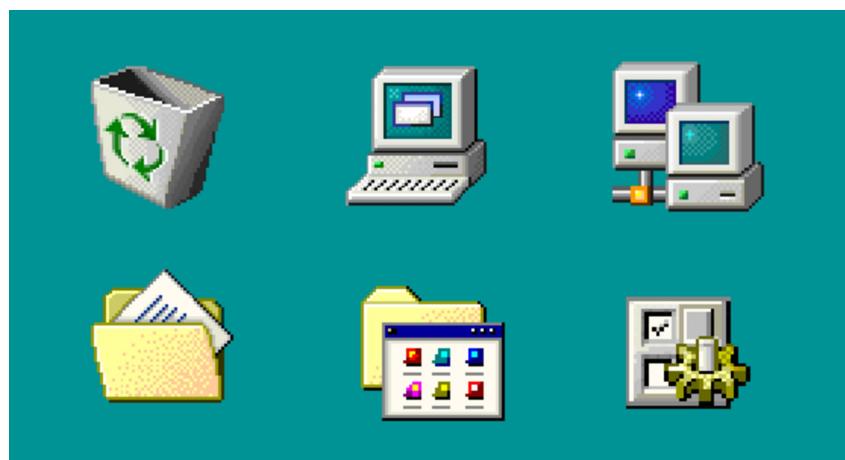


<https://www.interaction-design.org/literature/article/a-brief-history-of-the-origin-of-the-computer-icon>



139

## Windows '98



<https://www.interaction-design.org/literature/article/a-brief-history-of-the-origin-of-the-computer-icon>



140

## **Apple Mac (2001)**



<https://www.interaction-design.org/literature/article/a-brief-history-of-the-origin-of-the-computer-icon>



141

Apple (now)

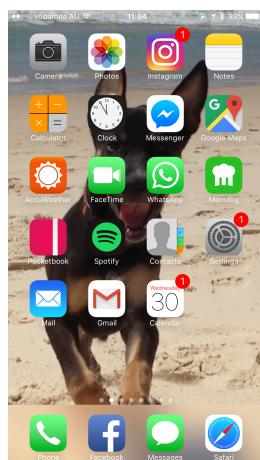




From id-book.com

142

## iPhone icons (now)



143

## Icons

- Since the Xerox Star days icons have changed in their look and feel:
  - Many designed to be very detailed and animated making them both visually attractive and informative



144

## Icon forms

- The mapping between the representation and underlying referent can be:
  - Similar
  - Analogical
  - Arbitrary



146

## Icon forms

- Some operations are actions - makes it more difficult to represent
  - use a combination of objects and symbols that capture the salient part of an action



147

## Research and Design Issues

- There is a wealth of resources now so do not have to draw or invent icons from scratch
  - guidelines, style guides, icon builders, libraries
- Text labels can be used alongside icons to help identification for small icon sets
- For large icon sets (e.g., photo editing or word processing) use rollovers

See:  
[www.iconfinder.com](http://www.iconfinder.com)



148

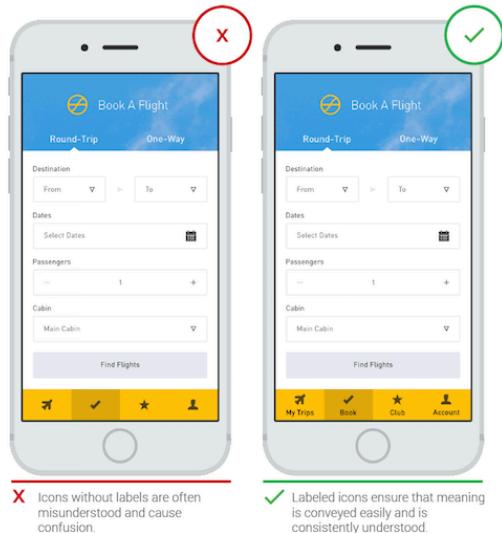
## Google Design Icons

<https://material.io/resources/icons/?style=baseline>



149

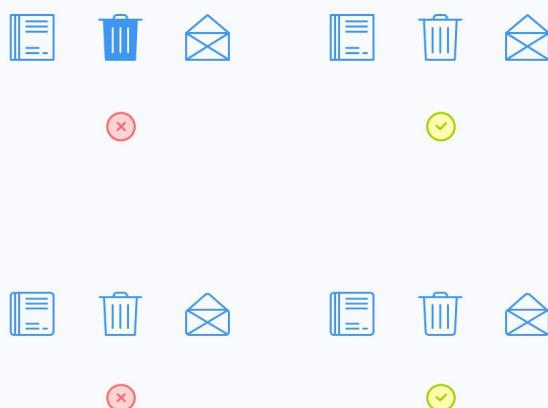
## Research and design issues



<https://www.smashingmagazine.com/2016/10/icons-as-part-of-a-great-user-experience/>



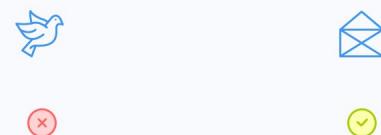
150



<https://uxplanet.org/12-tips-for-icon-designer-b238e7acb021>



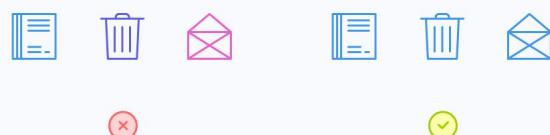
151



<https://uxplanet.org/12-tips-for-icon-designer-b238e7acb021>



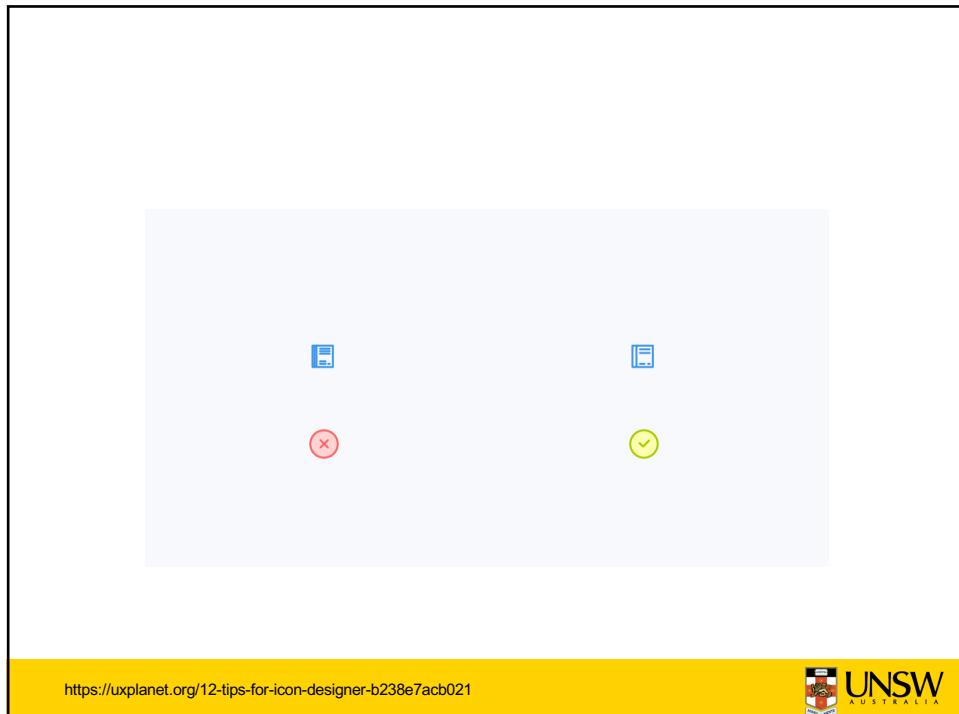
152



<https://uxplanet.org/12-tips-for-icon-designer-b238e7acb021>



153



<https://uxplanet.org/12-tips-for-icon-designer-b238e7acb021>



154

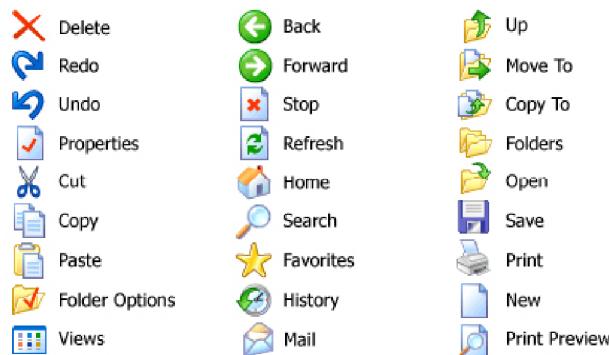


<https://uxplanet.org/12-tips-for-icon-designer-b238e7acb021>

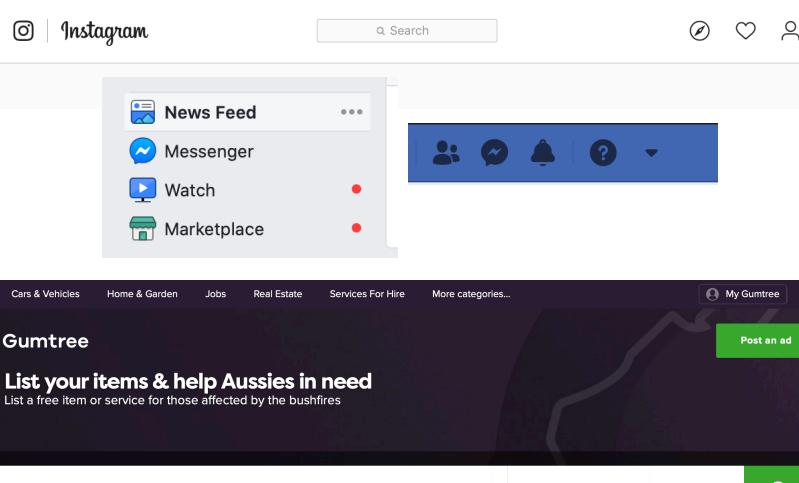


155

## Simple icons plus labels



156



157

## New icons

- Standards: ISO/IEC TR 11581
- Are they easy to decipher at a glance?
- Are they distinguishable?
- What representation forms are used?
- How clear are your icons?



158

## Lecture Activity

- Sketch simple icons to represent the operations to appear on an interactive reading app for children:
  - Add a book to the list
  - Delete a book from list
  - Read along with the book text
  - Use the flash cards with sounds



159

## Human Interface Guidelines

- Available for most of the main graphical user interface environments
- Describes generally how to use controls and widgets properly, in order to maintain some form of consistency on the platform
- Tend to focus on the look and feel
- Can be detailed down to the pixel dimension



162

## Human Interface Guidelines

- They are guidelines, not law
- Use the guidelines to maintain consistency on the platform
- Use the guidelines if you don't have anything that offers a superior solution



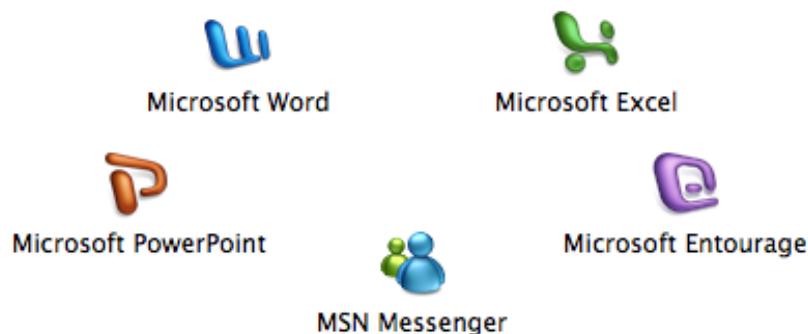
163

## Branding

- The interface is an important part of the brand the software or web site represents
- Users quickly develop a first impression about the software

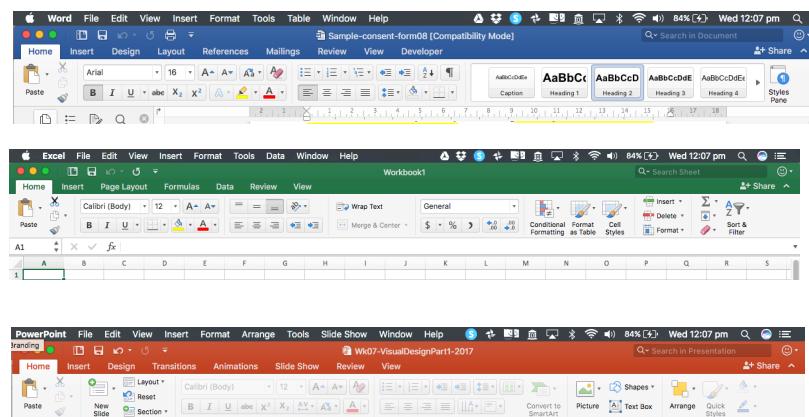


164



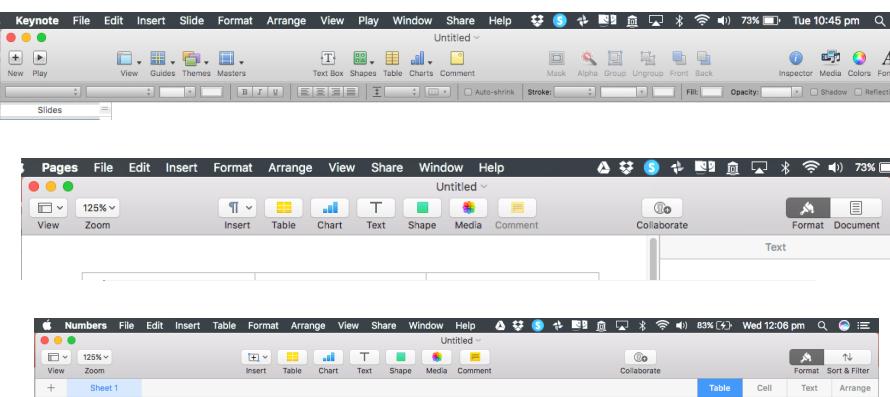
165

## Microsoft Office Suite



166

## iWork Suite



167

## Questions: to be answered in your Design Diaries

- What relationship should the layout have with the work flow?
- How do we visually create groupings?
- How might you choose colours that have emphasis using a colour wheel?
- How would you use card sorting to help in the design of menus?



168

## Summary

### Visual Design:

- Relationship of layout to workflow
- Aesthetics of layout
- A couple of quick methods to assess layout
- Colour considerations
- Menu design - card sorting
- Windows
- Icon design
- Human Interface Guidelines



169

## Summary

- Layout and workflow
- Aesthetics of layout
  - Alignment
  - White Space
  - Proximity
  - Similarity
- Contrast
- Colour
  - Figure-ground principle



170



## Usability Evaluation Techniques

Never Stand Still

COMP3511/9511 Human Computer Interaction  
Dr Alexandra Vassar (Sasha)

Adapted from slides by Dr Nadine Marcus and Dr Daniel Woo

1

## Readings/References

- Interaction Design , Ch 15 &16
- Rubin and Chinsell (2008) Handbook of Usability Testing How to Plan, Design and Conduct Effective Tests (2nd Ed)
- Nielsen (1993), Usability Engineering



2

## Overview

- Why, when, what and how to test
- Test preparation
  - Who and where to test, task scenarios, what data to collect, usability test plan, etc
- Running the test
  - Need a log
- Analysis of test data
  - Summarise the findings
- Other testing issues



3

## Why test

- Ensure application can be used
- Ensure application works as expected
- Ensure application meets particular criteria
- Measure productivity gains between using this application and another



6

## What to test

- Part of an application
- All of an application
- Competing designs
- Icons/graphics
- Online help



7

## When to test

- Prototypes (starting early)
  - paper first
  - then electronic
- Alpha/beta code
- Deployed application



8

## Ethical issues when testing

- Participants must be assured of the following:
  - that this is a ‘test’ of the software or the prototype, not of them
  - they may stop at any time
  - their performance and opinions will be kept anonymous (if desired)
  - signed consent must be obtained



9

## Usability testing phases

1. Planning the sessions -> test preparation
2. Running the sessions/test
3. After the test -> analysing, documenting, and presenting the results



10

## Test Preparation



11

### Preparation for the test

- Set goals
- Determine what and how to measure
- Define scenarios and tasks
- Decide how to collect data
- Select participants and define test roles



12

## Preparation for the test

- Prepare materials
- Create a Usability test plan
- Invite and brief users and observers
- Select environment and set up equipment
- Select and obtain software and hardware
- Conduct dry run



13

## Design to evaluate

- Your team will have planned to have certain aspects of the design complete and ready for testing
- Designs that reflect the important paths through the design (keypaths)
- Designs that have aspects that need to be tested



14

## Design to evaluate

- Questions that the design team has that need to be answered using representative participants / users
- Prototype that will be tested needs to cover enough of the functions / tasks for the evaluation to be effective



15

## Design to evaluate

- Paper prototype
- Electronic mock up
- Code based prototype
- Will need to organise different aspects depending on the type of prototype used



16

## Setting goals

- Defining goals
  - learnability
  - efficiency
  - memorability
  - minimal errors
  - satisfaction
  - ...



17

## The most appropriate goals

- The nature of the application determines goals and criteria



18

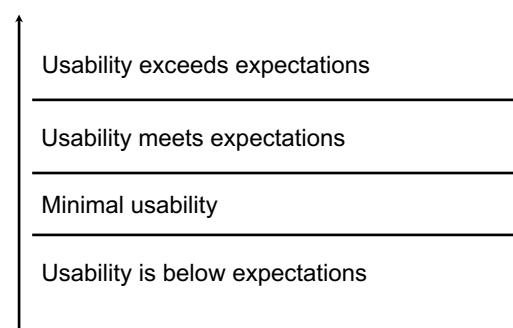
## Criteria for achieving goals

- Usability goals should be measurable, objective, and concrete



19

## Acceptability of results



20

## What to measure

- Initial reactions
- Users' exploration
- Successful completion of tasks
- Timely completion of tasks
- How well tasks are supported
- Users'satisfaction
- Errors



21

## Possible metrics

- Task success
- Time required to learn
- Time required to complete tasks
- Number of errors
- Severity of errors
- Amount of assistance required
- Ratings and comments
- Subjective ...



22

## Determining what to test

- Those 20% of the functions used 80% of the time
- Problematic or critical functions (even if used infrequently)
- Functions difficult to design
- Functions difficult to document
- Functions difficult to teach
- Consider the scientific method



23

## Scenarios

- *Task scenario*
  - provides context for usability testing;
  - are a representation of actual work that a user would likely perform interacting with a system;
  - do not use a person's name;
  - provide usability test participants with an end goal and an understanding of what is required of them.



24

## Scenarios

- *Context scenario:*
  - are used early in the UCD lifecycle to help identify requirements;
  - remove focus on technology so can open up design possibilities;
  - narrative description that discusses users goals, habits and character traits;
  - don't focus on *how*.



25

## Task scenarios

- Provide a context and some explanation of why the user is doing X
- Ensure that each task scenario:
  - is realistic and typical for how people actually use the system
  - encourages users to interact with the interface
  - doesn't give away how the interface should be used.

<http://www.nngroup.com/articles/task-scenarios-usability-testing/>



26

## Task scenarios - examples

- Make the Task Realistic
  - User goal: Browse product offerings and purchase an item.  
Poor task: *Purchase a pair of orange Nike running shoes.*  
Better task: *Buy a pair of shoes for under \$40.*

<http://www.nngroup.com/articles/task-scenarios-usability-testing/>



27

## Task scenarios - examples

- Make the Task Actionable
  - User goal: Find movie and show times.  
Poor task: *You want to see a movie Sunday afternoon. Go to www.fandango.com and tell me where you'd click next.*  
Better task: *Use www.fandango.com to find a movie you'd be interested in seeing on Sunday afternoon.*

<http://www.nngroup.com/articles/task-scenarios-usability-testing/>



28

## Task scenarios - examples

- Avoid Clues and Describing the Steps
  - User goal: Look up grades.  
Poor task: *You want to see the results of your midterm exams. Go to the website, sign in, and tell me where you would click to get your transcript.*  
Better task: *Look up the results of your midterm exams.*

<http://www.nngroup.com/articles/task-scenarios-usability-testing/>



29

## Tasks

- set activities presented in a logical order
- derived from scenarios



30

## Lecture Activity

- You are employed in the usability testing team of a software company building an interactive note taker app for students. What would be some task scenarios that you could use?



31

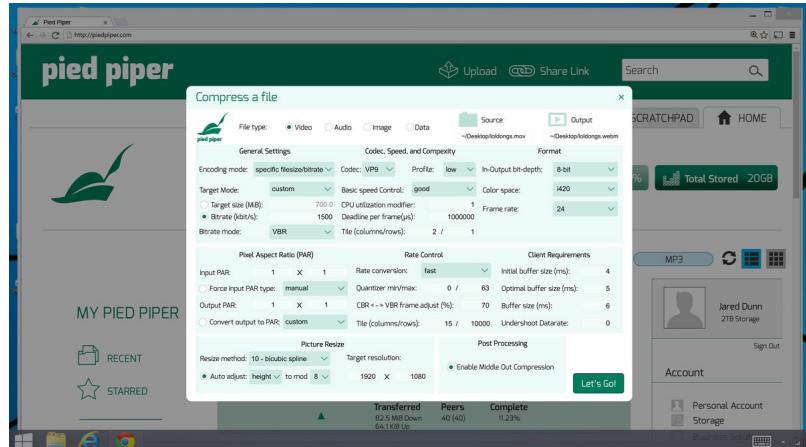
## Selecting who to test

- Representative users from each category
- Wide range of experience
- Wide range of usage
- Cross-section of user population
- Try to select randomly
  - Consider the scientific method



32

## Who to test?

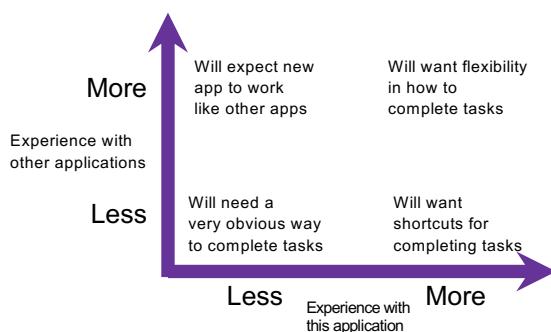


<https://uxdesign.cc/why-pied-piper-failed-and-why-you-should-always-test-with-real-users-b00c2ba40f9e>



33

## Implications of experience



34

## How many users

- Be realistic about time and budget
- Four to five per category
- When trends emerge, stop
- If no trends emerge, continue



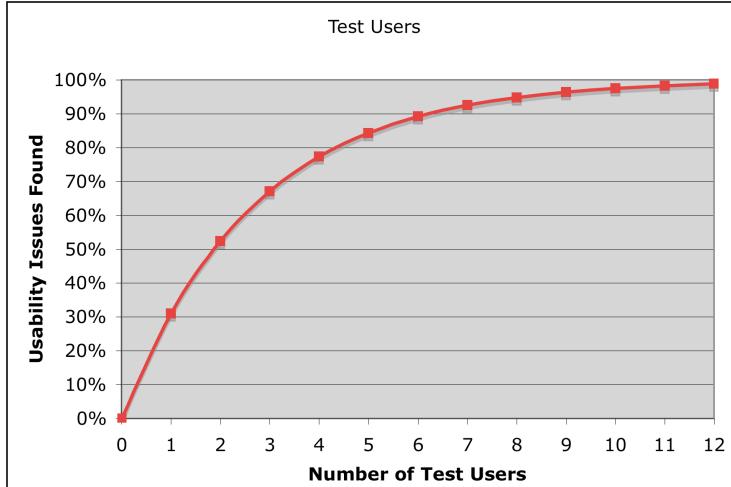
35

## Approximation

- Nielsen and Landaur (1993, in Nielsen, Usability Engineering) proposed that an approximation to assessing the number of usability problems found is given by:
- $\text{Problems\_found}(i) = N(1 - (1 - L)^i)$ 
  - $i$  = number of test users
  - $N$  = total number of usability problems in the interface
  - $L$  = probability for finding any single problem with any single user



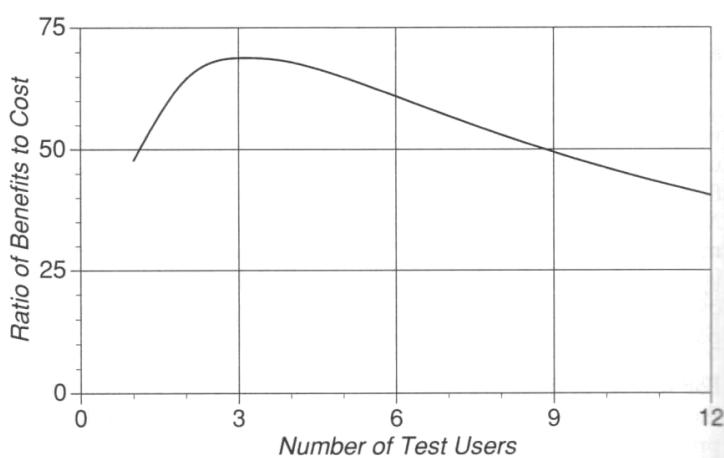
37



Based on Nielsen p173, N=41, L=31%



38



**Figure 18** The pay-off ratio (how much larger the benefits are than the costs) for user tests with various numbers of test users under the assumptions for a "typical" medium-sized project described in the text.

p174, Nielsen, Usability Engineering, 1993



39

## Usability test plan

- documentation about the execution of the tests
- could you give this documentation to a person not in the team?
- is there sufficient discussion to carry out the test and provide results?



40

## Usability test plan

- what is going to be tested (screens)?
- what tasks are going to be carried out?
  - document the *script* for the task scenarios
  - task scenario - gives the participant a high-level goal but does not describe how to do the task



41

## Usability test plan

- what are all the resources needed to run the test
- who is responsible for different aspects of the evaluation
  - participant organisation
- contact details
- paper work eg. consent forms



42

## Test roles

- Test co-ordinator
- Test facilitator
- Observer(s)
- Camera/equipment operator (if permitted to record)



43

## Data collection techniques

- Verbal protocols
- Active intervention
- Co-discovery
- Questionnaires



44

## Verbal protocols

- Useful for establishing learnability and effectiveness
  - users participate individually
  - users work through scenarios or tasks
  - users think aloud
  - facilitator may assist if user is frustrated



45

## Active intervention

- Useful for establishing effectiveness
  - users participate individually
  - facilitator probes and asks specific questions
  - requires skill in knowing when to intervene



46

## Co-discovery

- Useful for assessing general design of early prototypes
  - two or more participants
  - participants encouraged to talk to each other as they explore



47

## Eliciting verbal feedback

- ‘What are you thinking?’
- ‘Describe the screen for me.’
- ‘What do you think will happen?’
- ‘Did you expect that to happen?’



48

## Error handling

- Give users a hint after x minutes
- Give users a hint after x errors
- Give answers after x minutes or errors and go on to next task
- If it is difficult, it is the interface (not the user) at fault!



49

## Questionnaires

- Capture demographic information
- Capture feedback on usefulness and usability of the application
- Ensure appropriateness of terminology
- Capture opinions not expressed during the test



50

## Format of questions

- Rating scales for usefulness and usability
- Rating scales for terminology
- Series of statements about the application, rating how much they agree with each statement
- Open ended questions (e.g., what are the three things you like best/worst?)



51

## Tips on creating questionnaires

- Keep questionnaires short
- Use plain language



52

## Briefing participants

- Application background
- Importance of involvement
- High-level overview of procedure
- Incentive for participation
- Results will remain anonymous
- It's a test of the interface, not the user



55

## Logging sheets

- Two basic kinds of (manual) logging sheets:
  - task-specific log sheets (with correct steps listed)
  - general log sheets (with space for errors, accuracy, and time)
- Be sure to allow plenty of room to record comments



56

## Consent forms

- Necessary for any data collection
  - what will be observed
  - what will be recorded
  - how the data will be used



57

## Appropriate environment

- Test on appropriate environment
  - minimum hardware/software configuration
  - typical hardware/software configuration
- Identify (and test with) applications expected to co-exist with the application
- Try to mimic the real world as much as possible



59

## 'Dry run'

- Ensures that scenarios/tasks can be performed with current state of prototype and/or software + hardware
- Ensures tasks make sense
- Validates usability of questionnaire and logging sheets
- Provides an estimate of time required for each participant



60

## Running the Test



61

### Steps to running the test

- Ensure equipment is functional
- Ensure materials are available
- Ensure observers have assembled
- Introduce user to test procedure
- Emphasise that participant not being tested



62

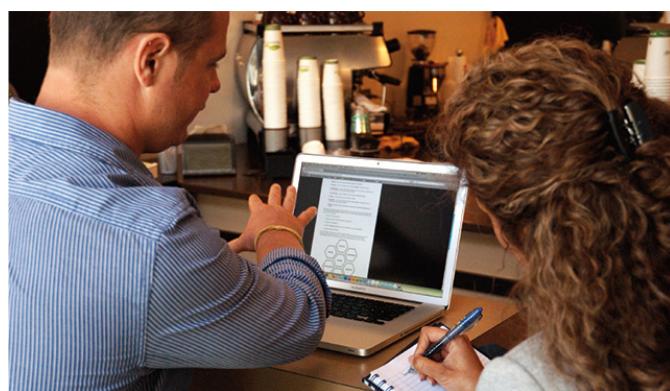
## Running the test - continued

- Participant signs consent form
- Complete demographic questionnaire
- Facilitator instructs participant from a script (so each participant given same information)
- Participant completes tasks
- Complete feedback questionnaire
- Thank participant



63

## Facilitator



64

## Observers



65

## Debriefing

- Ideally done immediately after each participant
- Allows rapid turnaround of results
- Facilitates collation of observations
- Provides opportunity to summarise
- Helps categorise and prioritise
- Helps obtain consensus on issues



68

## Issues table

- What was discovered ?
- When it was found (time index, date, which test)
- Categorise / prioritise - might not have enough time during the test, depends on note taking method



69

## Issue Table

	P1	P2	P3	P4
Selected wrong menu item in view menu	X			
Did not understand zoom icons	X		X	
Choices pop up menu needed Other... option to add		X		
Confused about modifier keys	X	X	X	X
Incorrectly used date field		X		X
...				



70

## After the Test



71

## Analyse, Document, Report results

- Collate results
- Interpret results
- Document results
- Deliver results



72

## Data analysis

- Log sheets
  - summarise
- Results of debriefing
- Questionnaire results
  - May use stats for quantitative data
- Video (if used)
  - NO video allowed for assignment 2 due to ethical considerations



73

## Diagramming the results



<https://uxdict.io/design-thinking-methods-affinity-diagrams-357bd8671ad4>

Can use affinity diagramming for identifying patterns in the observations and trends in the analysis

See pg 323 in Interaction Design, 5<sup>th</sup>ed



74

## Prioritising the results

- Assign severity ratings
  - frequency of problem
  - impact if problem occurs
  - persistence of problem



76

## Sample Severity Ratings

- 4 = showstopper (cannot release until fixed)
- 3 = major problem (must fix)
- 2 = minor problem (should fix)
- 1 = cosmetic problem (fix if there is time)
- 0 = not a usability problem (e.g., bug)



77

## Reporting the results

- Summarise and present findings immediately
- Document for future reference
  - executive summary
  - introduction
  - method
  - results and recommendations
  - appendices



78

## Problem reporting

- Use problem reporting structure of development environment
- Lends more credibility to usability issues
- Makes someone accountable for addressing problems



79

## A bit of advice

- When presenting results of a usability test, always try to find something positive to say!



80

## Other Testing Issues



81

## Testing desktop vs. web sites

- A lot of similarities
  - ensure proper users
  - ensure proper tasks
  - understand the business and user drivers



82

## Testing desktop vs. web sites

- Many differences
  - desktop applications focus primarily on functionality while visual design also becomes important on the web
  - users' expectations of the web is different
  - clicking and interactivity



83

## Testing mobile devices

- Similar to websites in terms of visual design and interactivity being important to test
- Screen real estate an issue that should be considered
- Ease of use and simple navigation are important



84

## To video or not to video

- Reviewing user interactions
- Creating a highlights tape for development teams
- Multi-media reports
- Teaching purposes
- *Cannot video in this course due to ethical concerns!*



85

## Comparison of techniques

	effectiveness	impact	effort
Live Observation	high	high	none (automatic)
Video Highlights	medium	high	lots (weeks)
Written Report	low	medium	days



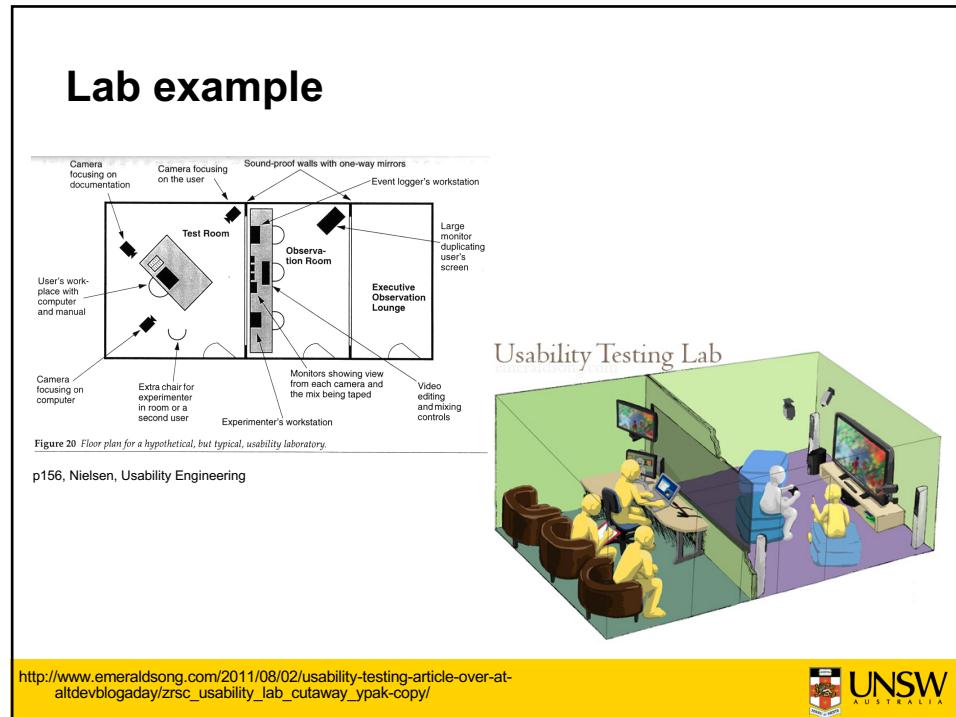
86

## Usability testing labs

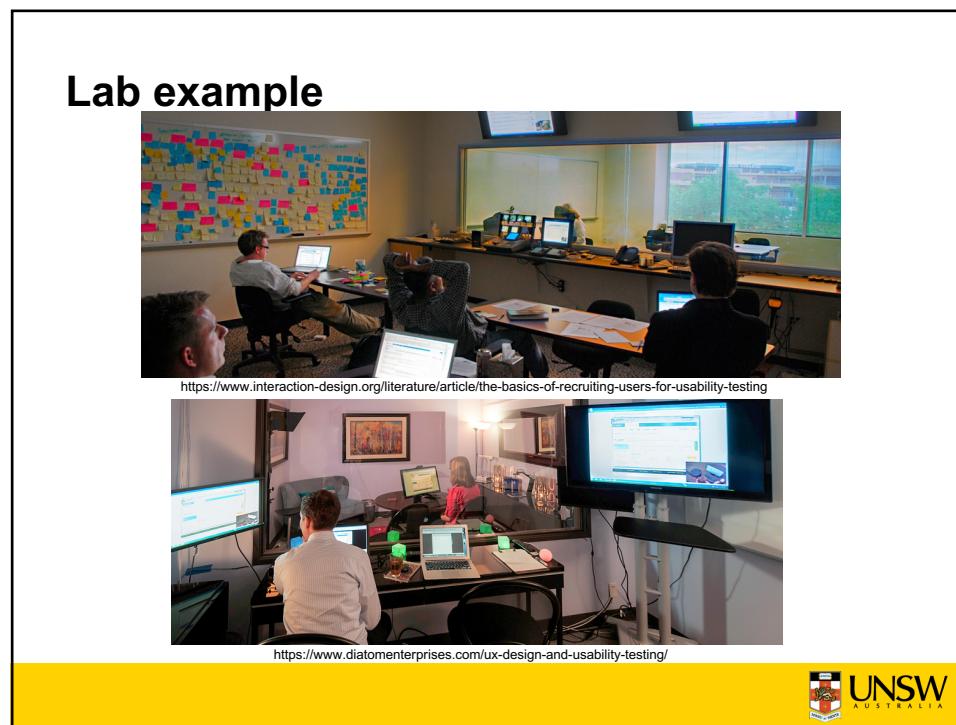
- Observation & test areas
- Audio/video recording and editing equipment
- Monitors for observing
- Logging software



87



88



89

## Usability testing labs

Pros	Cons
Facilities in place	Expensive
Many ways to capture data	Can be overkill
Higher quality results	Requires users to travel
Minimises interruptions	Artificial environment
Shows commitment to usability	Can be intimidating



90

## Users' work area

Pros	Cons
Captures true context of use	Moving equipment
Most convenient to users	Environment may be inappropriate or noisy
Inexpensive	



91

## Other sites



92

## Other sites

Pros	Cons
Flexibility in location of users	Difficult to organize from off-site
Cost Effective	Moving equipment
Minimises interruptions	Contextual information is minimal



93

## Do-it-yourself testing

- Users install software
- Users step through tasks and record responses on logging sheets
- Users complete questionnaires



94

## Do-it-yourself materials

- Software
- Documentation
- Tasks
- Logging sheets
- Questionnaire



95

## Indirect observation

- Diaries
  - ask users to provide a record of what they did
- Interaction logging
  - tracking users' actions (e.g., key presses, mouse or other device movements)
  - Other counters (e.g., page hits)
  - Consider the ethical issues



96

## Remote testing

- Via the web
- Via teleconferencing facilities



97

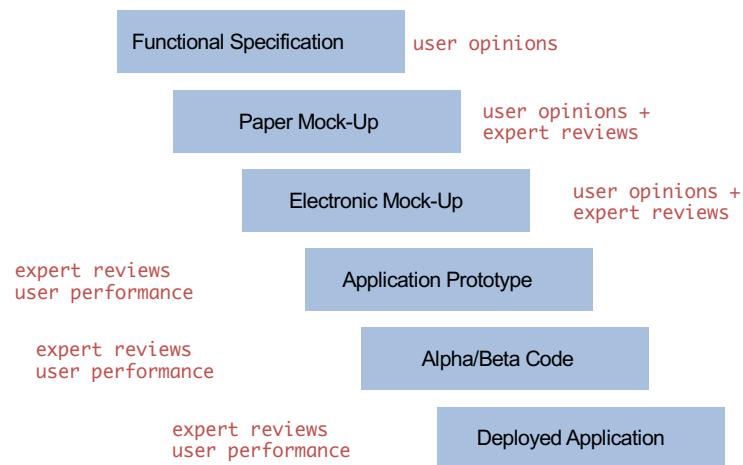
## The value of evaluations

- Usability evaluations are essential for ensuring an application meets its users' needs
- Usability evaluations should be conducted throughout the development of an application



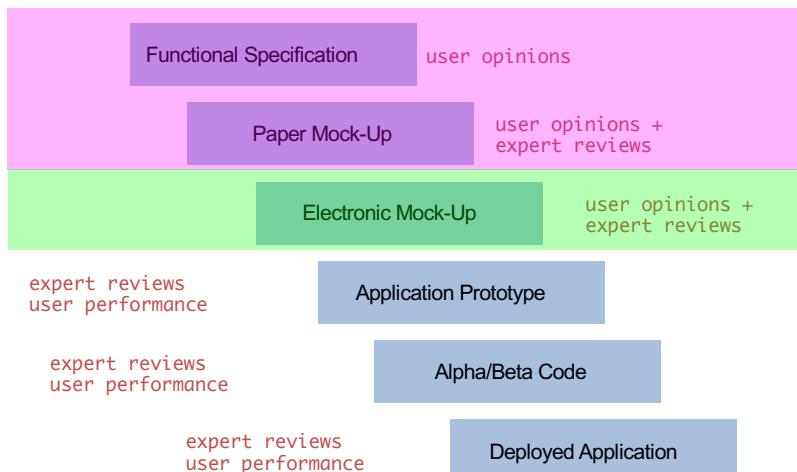
98

## Evaluations throughout development



99

## Evaluations throughout development



100



## Summary

- Why, when, what and how to test
- Test preparation
  - Who and where to test, what to measure, task scenarios, usability test plan, etc
- Running the test
  - Need a log of the data
- Analysis of data
  - Summarise the findings
- Other testing issues



101