GUI and HCI principles

HCI and GUI principles

- Explore the HGP and GUI principles to the end of the course
- Notes are heavily based on this book
- Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules
  - By Jeff Johnson

HCI and GUI principles

- How are these related to the human mind and perception?
- Directly influences you as a developer
- If you are building GUIs you are likely to be working with designers
- Having a good understanding of the basics will enable you to implement their ideas
- Also if you need to do any GUI design on a project you will have some idea of how to go about it

HCI and GUI principles

- Interface design is not like cooking, there is no set recipe to follow.
- Design rules often describe goals not actions
  - Described in general to make them broadly applicable
  - Exact meaning open to interpretation

HCI and GUI principles

- To confuse matters further more than one rule may apply at any given time.
- You need to determine which one is more applicable to the given situation
- Design problems, even without guidelines can have conflicting goals
  - Bright screen and long battery life
  - Lightweight and sturdy,
  - etc

HCI and GUI principles

- There will always be tradeoffs and comprimise
- It is up to designers and developers to find the right balance
- How to determine that balance
  - Multiple methods but generally it will involve a lot of user testing

HCI and GUI principles

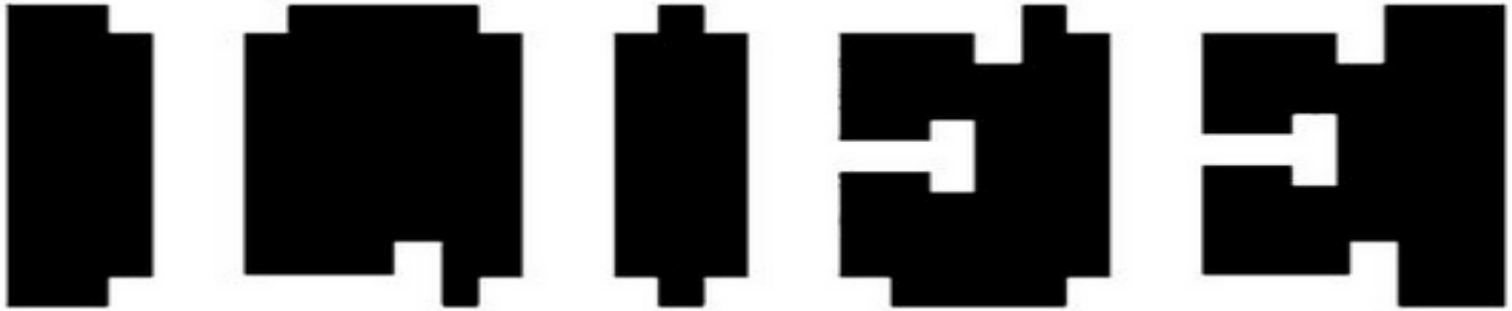
- Good user interface design requires a little knowledge of cognitive psycology.
- Thus why i recommend this particular book
- Gives the rationale for why these principles work
  - Book is aimed at software developers i.e. you
  - Most design rules are provided without any basis or guidance

HCI and GUI principles

- Design guidelines of the two best examples

Strive for consistency	Consistency and standards
Cater to universal usability	Visability of system status
Offer informative feedback	Match between system and real world
Design task flows to yield closure	User control and freedom
Prevent Errors	Error prevention
Permit easy reversal of actions	Recognition rather than recall
Make users feel in control	Flexibility and efficiency of use
Minimise short term load	Aesthetic and minimalist design
	Help users recognise, diagnose, and recover from errors
	Provide online documentation and help

Perception biased by experience



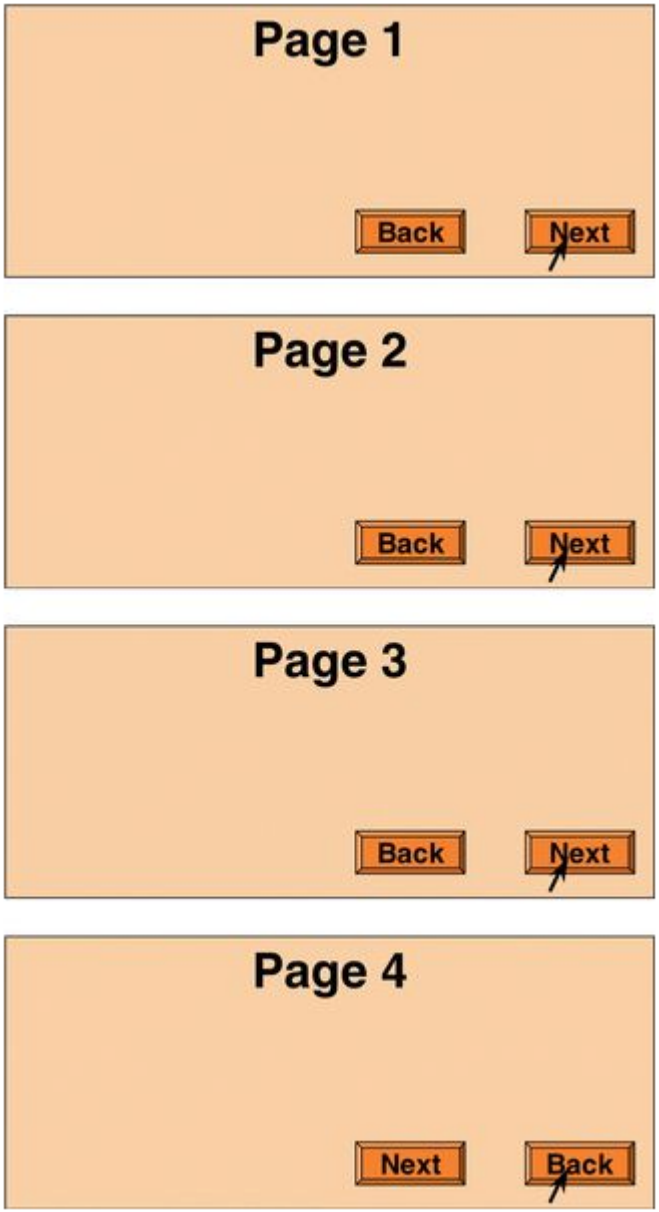
Perception biased by experience

- What you see depends on what you are told or expect to see
- Based on three factors
  - The past: our experience
  - The present: the current context
  - The future: our goals

Experience

- Experience can also bias perception
- Read this headline
  - “New Vaccine Contains Rabies”
- Different understanding based on things you've previously read or heard
  - Also happens in UIs if items are inconsistently placed

Experience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Experience

- Experience tunes us to look for expected features in expected places
- Expectation induced blindness
- Goals will also affect perception

Visual perception

- Visual perception is not a strictly bottom up process
- Word in which the character appears can affect how we identify it
- Depends entirely on the surrounding letters

Perception Bias

- Fold napkins. Polish Silverware. Wash dishes
- French napkins. Polish Silverware. German dishes
  - Overall comprehension of a sentance can also influence what words we see
  - Same letters can be read differently depending on words in the paragraph
  - Perception bias also works between the different senses

Perception Bias

- What we see can be biased by what we hear
- What we feel with touch can be biased by what we hear, smell, see
- Neural activity that recognises an object also includes neural input based on context
- Includes present and past recognition

Percepton Bias

- Are there Scissors in this toolbox?

Perception Bias

- Was there a screwdriver in there?
- Was there a ruler in there?
- Perception is influenced by goals and plans for the future
- Anything not related to goals is filtered out subconciously

Perception

- Why does perception matter?
  - Influences where we look (active vs passive)
- What are the design implications?
  - Look for things in our environment that matter
    - Filter out the rest
  - When looking for something specific the brain primes the senses to be sensitive to the features of that object.

Perception

- As we start to understand more about the brain and perception this will influence design
- How does it influence design?

Avoid Ambiguity

- Verify that all users interpret the interface in the same way
- If that ambiguity cannot be resolved
  - Either user a standard
  - Or an accepted convention
  - Or prime users to resolve it themselves in the intended way
  - e.g. for 3D effect buttons the light is assumed to be on top left of screen

Be Consistent

- Information and controls that serve the same function should appear in the same place
  - Same colour
  - Same text
  - Same text size
  - Same shape
  - Etc.
- Users will recognise them quickly

Vision is optimised to see structure

- Early 20th century psycologists experimented with human visual perception
- Visual system automatically imposes structure on what we see
  - We cannot process disconnected areas, shapes lines etc.
  - German word for shape is Gestalt
  - Thus we have the Gestalt Principles

What do you see here?

What do you see here?

Proximity Principle

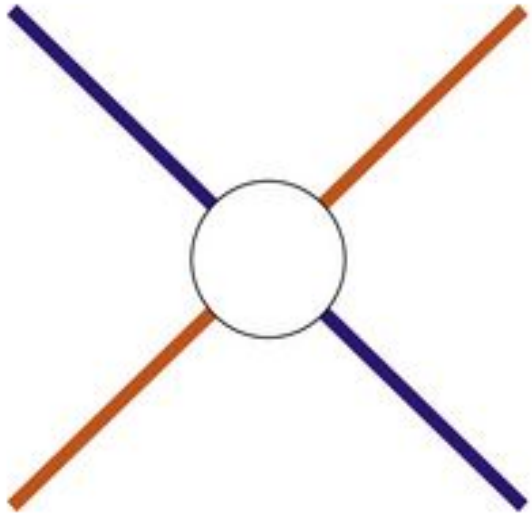
- Relative distance between objects in a display affects our perception of whether and how the objects are organised into subgroups
- Objects that appear near each other (relative to others) appear grouped
- Objects further apart appear not to be grouped
- First image you saw three rows
- Second image you saw three columns
  - Based on spacing

What do you see here?

Similarity principle

- Objects that appear similar appear grouped all other things being equal
- Because the larger hollow stars appear similar we percieve them as a single group
- By using similar shape and colour you can force a user to percieve items as belonging to a group

What do you see here?



What do you see here?

Continuity Principle

- Human mind will always try to resolve ambiguity or fill in missing data to percieve whole objects
  - Our visual system is biased to percieve continious forms rather than disconnected segments
  - In the first example you saw a crossing orange and blue line, but why not blue and orange V shapes
  - On the right you saw the loch ness monster not three parts of it.