Comp 341/441 - HCI

Spring Semester 2020 - Week 6

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Human memory

our brain forgets

- less frequently accessed chunks of information or skill processes
  - *more likely to be forgotten*
  - *natural aspect of our brain's memory structure*
- **recency effect** tends to protect daily routines…
- older facts more easily become hazy or unclear
- loss of long-term information is not universal
- highly developed motor & cognitive skills with sense of easy repetition
- some things are simply like **riding a bike**

Video - Human memory

Ten Second Tom

Ten Second Tom from 50 First Dates
Source - YouTube

Design for Memory

design considerations - part 1

- ensure interface is designed to reduce or eliminate need to memorise and recall
  - *interface elements etc within structure*
- Don Norman outlines this concept as the notion of
  - *knowledge in the world vs knowledge in the head*
- eg: creating menus or lists of options for users is a good example of
  - *knowledge in the world*
- user will be able to view the menu, read and recognise options, make selection
  - *no need to recall or memorise related information beyond the basics...*
- this same option on the command line requires memory of command...
  - *user would need to recall **knowledge in the head***
  - *increases potential for error and application issues*

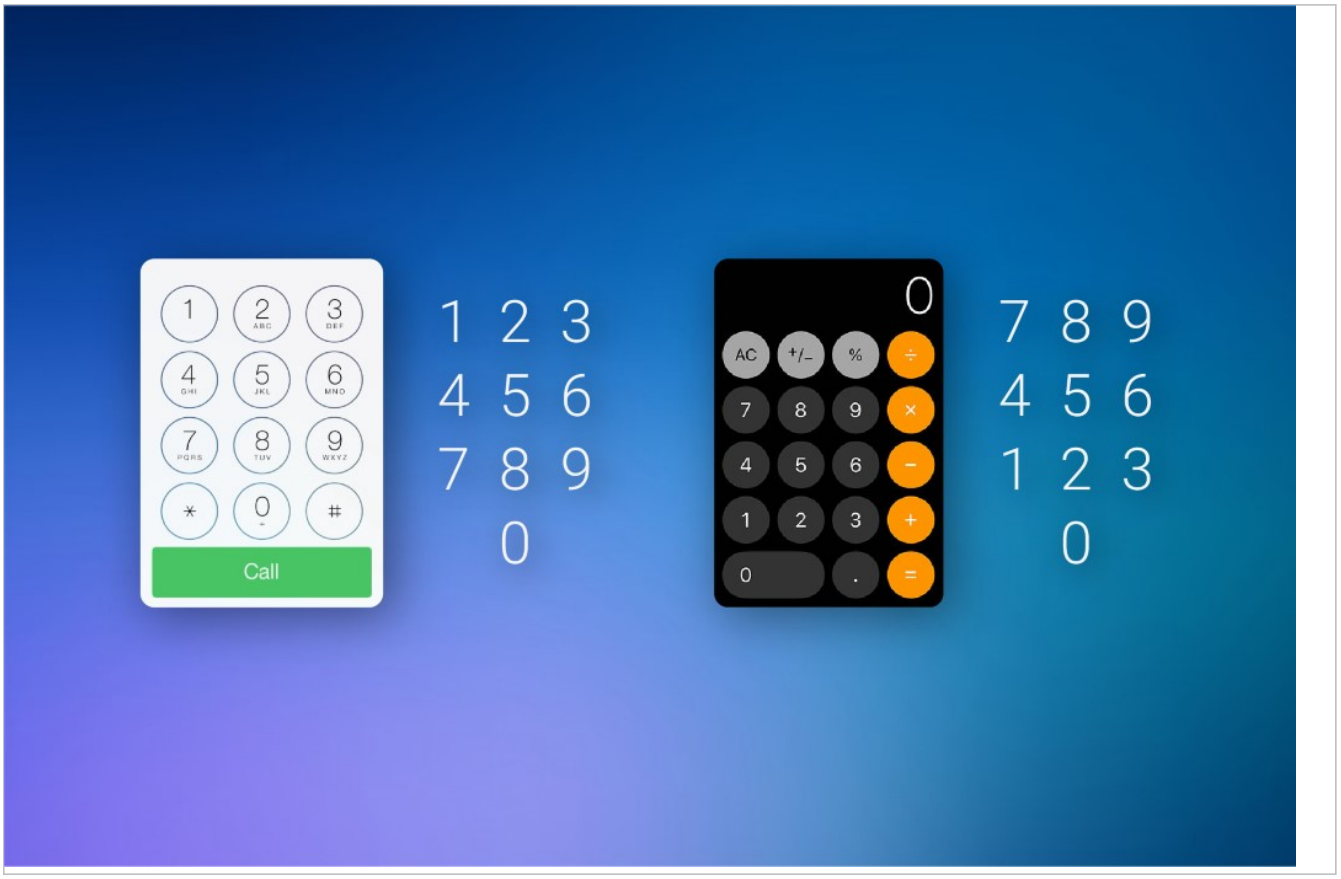
Design for Memory

knowledge in the world vs knowledge in the head

- Draw the layout of a modern push button telephone
- Draw the layout of a modern push button calculator

Image - Design for Memory

knowledge in the world vs knowledge in the head



- why different layouts

Design for Memory

design considerations - part 2

- we can guide users through sequenced tasks
  - *provision of defined sequence of steps*
  - *guide user through the task flow step by step*
- present forms and controls in a logical and sequential order
- might even consider a **wizard** style interface
  - *user can navigate multiple pages with standard **next** & **previous** links*
- trying to reduce the amount of navigation details required by the user
- thereby reducing the amount the user needs to memorise and recall

Design for Memory

design considerations - part 3

- interface design enhanced with recognisable icons and names
  - *user can easily find interface elements as they scan a list, menu...*
- icons can act as clarifying elements
  - *icons should represent concrete and recognisable things*
- goal is to make it easier for users to create hooks from working to long-term memory
- user should not have to memorise or struggle to recognise unfamiliar icons
  - *defeats the point of using simpler graphical representations*
- if you use abstract, original icons then add some accompanying text to help the user

Design for Memory

design considerations - part 4

- naming schemes & patterns in UIs are also important
  - *helps users remember & recall information*
  - *arbitrary names are harder to recall than representative names*
- non-representative naming schemes may add to user's cognitive burden
- command line interfaces violate this principle on a regular basis
  - *consider Unix commands **more** & **less***

Design for Memory

design considerations - part 5

- good help system and search tool
  - *allows a user to quickly check and recall lost or forgotten information*
  - *user can quickly reference documentation, check usage pattern or concept...*
- in search and index systems
  - *allow users to use variations, synonyms*
  - *user may not remember the exact term, query, spelling...*
- try to avoid personalised terminology for standard UI elements, interaction concepts
- try to avoid using abbreviations or acronyms unless they are obvious or standard practice
  - *eg: GUI, WYSIWYG are well known examples...*
- be consistent in your UIs application of actions and methods
  - *eg: an action should perform in the same manner from one context to another*

Video

Progress Bars

TED: How the progress bar keeps you sane
Source - YouTube

Cognitive Load

intro

- consider the physical act of interacting with a computer
  - *using a mouse, keyboard, touchscreen…touching, swiping, shaking*
- physical actions incur a cost of time and effort
  - *varying degrees of effort, both physical and mental*
- cognitive load refers to the mental taxation exerted on a user
  - *whilst performing a given task*
  - *refers to amount of sustained attention and cognitive effort required per task*
- the more complex the task, the higher the level of focused attention
  - *cognitive load will be higher as a result*
- good design strategy to try to reduce a user's cognitive load
- try reducing the amount a user has to think about
  - *general concepts, points of interaction, basic navigation, interface elements…*
- "Don't make me think , revisited: A common sense approach to web usability."
  - *Steve Krug, 2014.*

Cognitive Load

impact of interactions

Cognitive load may be impacted by the following interactions:

- scrolling, navigating, searching within an application
- choosing options such as menus, lists, forms…
- reading instructions, labels, titles…
- switching contexts (eg: switching between windows, tabs, pages…)
- switching visual attention
  - *reading text, then referring to an image, and then back to the text*
- memory recall for a specific ID, name, action, task sequence…
- simply waiting for the system or application to respond…
- recovering from a specific distraction
  - *such as an interruption not relevant to the current task at hand…*

Image - Xerox

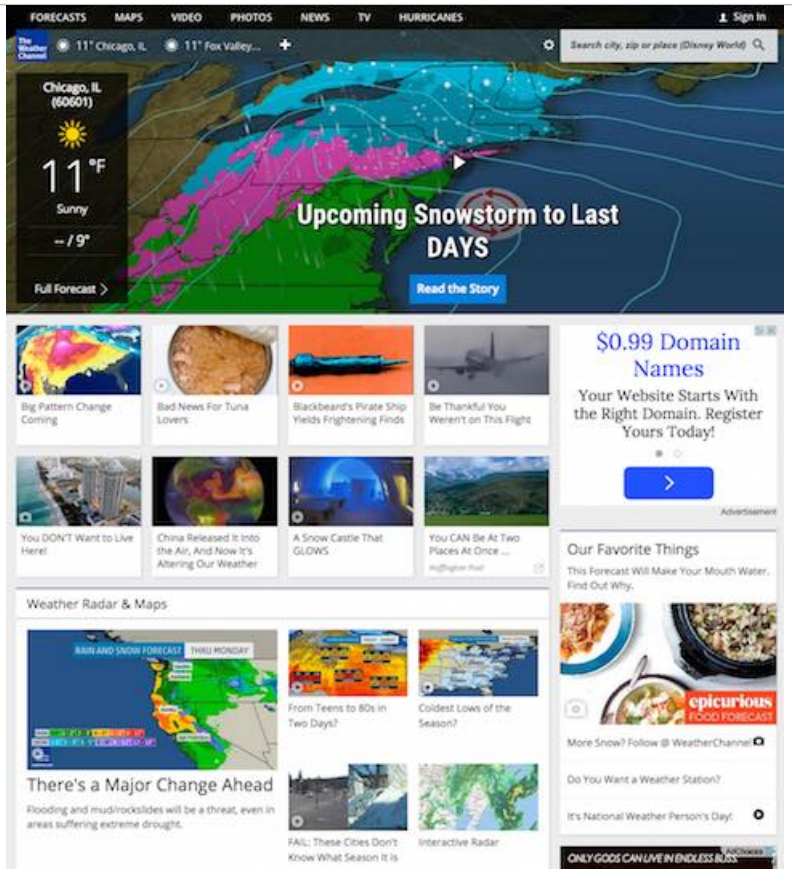
big green button...

Xerox's Big Green Button

Source - Fuji Xerox Printers

Image - Cognitive Load

Weather.com

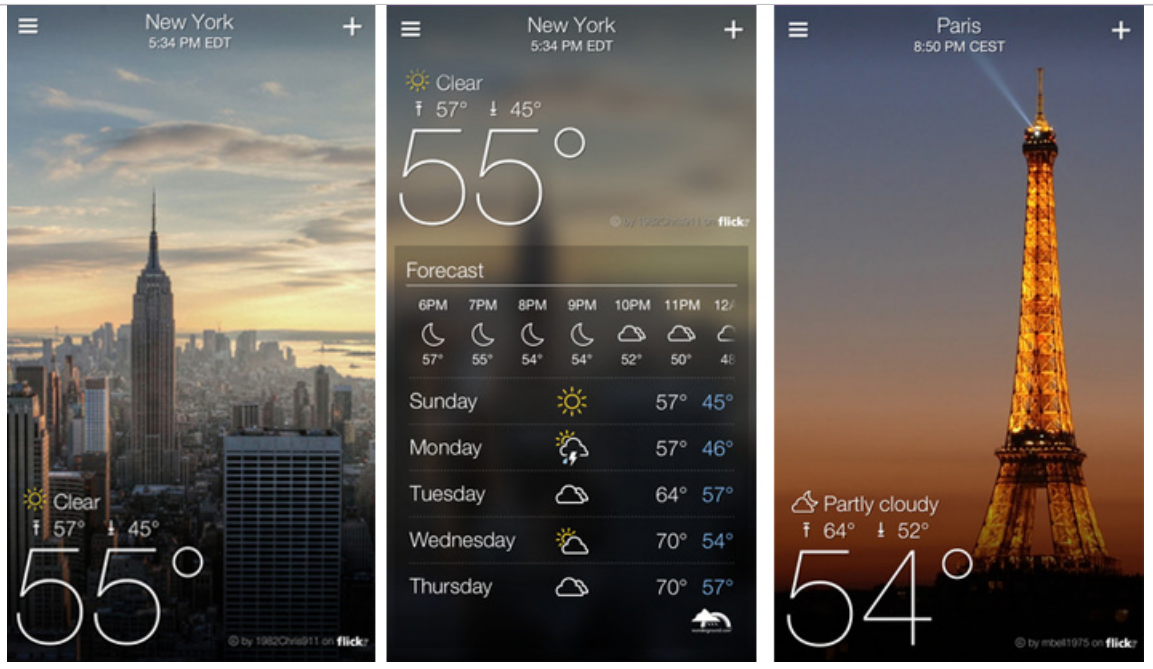


Weather.com

Source - Weather.com

Image - Cognitive Load

Yahoo Weather app



Yahoo Weather App

Source - Yahoo! Weather Mobile App

Cognitive Load

thinking

- reduce cognitive loads by awareness of types of user thinking an app requires
- for example:
  - *working out the next step in a procedure*
  - *using working memory to help complete an ongoing task*
  - *recall of commands, facts, procedures from long-term memory*
  - *memorising commands, facts, procedures etc for long-term memory*
  - *referencing information from another source*
  - *making decisions or considering judgements*
  - *mental integration of information from disparate sources*
    - including research, reference, or simply general peripheral sources…

Video - Cognitive Load

users and interaction - second try...

Filter photographs based on metadata

Source - Adobe Lightroom Tutorials

Resources

- Card, S.K., Moran, T.P. and Newell, A. *The psychology of human-computer interaction*. Lawrence Erlbaum Associates. 1983.
- Krug, S. *Don't make me think, revisited: A common sense approach to web usability.* 3rd Edition. New Riders. 2014.
- Norman, D. *The Design of Everyday Things.* Basic Books. 2013.