Prototyping

- In the previous set of slides:
  - Prototyping
    - Taxonomy
      - Horizontal and vertical prototypes
      - Low and high fidelity prototypes
      - Wireframes
    - Testing with low fidelity prototypes
    - Examples of prototypes
- In this set of slides
  - Tools for prototyping
  - Design principles

Prototyping online tools

- wireframe.cc
- Balsamic: https://balsamiq.com/
- Figma: https://www.figma.com/prototyping/ (YouTube tutorial: https://www.youtube.com/watch?v=3q3FV65ZrUs)
- Adobe XD: https://www.adobe.com/products/xd.html#
- Axure: https://www.axure.com/
- Proto.io: https://proto.io/
- Fluid: https://www.fluidui.com/
- Merging paper with working prototypes (also a tool for wireframes)

  Marvel - https://marvelapp.com/ (https://www.youtube.com/watch?v=1439vIj-yDk)

  PopApp (on Apple store for iOS)- https://www.youtube.com/watch?v=JCEhCSDcj_I

Design principles

- Consist in some fundamental rules to follow when building prototypes
  - to achieve effective communication
  - to provide the user the ability to do something with the information received
    - take a decision
    - perform an action
    - or simply, assimilate the information

Design principles (2)

- Shneiderman's 8 golden rules
- Donald Norman's 6 principles
  - https://www.enginess.io/insights/6-principles-design-la-donald-norman
  - https://medium.com/@sachinrekhi/don-normans-principles-of-interaction-design-51025a2c0f33
- Nielsen's 10 usability heuristics
  - https://www.nngroup.com/articles/ten-usability-heuristics/

Design Principles

Good design is actually a lot harder to notice than poor design, in part because good designs fit our needs so well that the design is invisible, serving us without drawing attention to itself. Bad design, on the other hand, screams out its inadequacies, making itself very noticeable (The Design of Everyday Things, 2013).

A *good design should put an emphasis on utility, not only with beauty*; *it should provide a clear sense of purpose that contributes to our understanding of the set of actions possible and how to operate them. Objects that need not be complicated need not to have instructional materials to guide its user; rather, the product design should suggest the set of possible actions and intents of the design* (Norman, D. A. (1990). The Design of Everyday Things. New York: Doubleday.)

Shneiderman's 8 golden rules

- consistency
- universal usability
- provide informative feedback
- clarity in task completion
- error handling
- reversibility of actions allowing to revert actions easily
- control to the user
- minimal memorising

https://www.cs.umd.edu/users/ben/goldenrules.html

Shneiderman's 8 golden rules - consistency and universality

- consistency
  - in the sequence of actions for similar situations
  - in the terminology
    - identical terminology should be used in prompts, menus, and help screens
  - In the appearance
  - adopt different approach to draw the attention
- universal usability
  - alternatives to suit diverse types of users (e.g., offer shortcuts to the frequent/ experienced users and explanations for novices)
    - abbreviations, function keys, hidden commands, and macro facilities are very helpful to an expert user
  - alternatives for adapting the content

Shneiderman's 8 golden rules - feedback and clarity

- feedback
  - always inform the user on (the result of) the action performed
  - distinguish between major and minor actions
  - use visual elements when possible
- clarity
  - clear termination of the sequence of interrelated actions
    - sequences of actions should be organised into groups with a beginning, middle, and end
  - providing the user the sense of accomplishment

Shneiderman's 8 golden rules - error handling and reversibility

- error handling
  - foreseeing occurrence of errors and including simple error management
  - if data is entered incorrectly or wrong buttons are pushed, simple and objective instructions should be given for recovery
  - on the backend, the system should not process the erroneous data
- reversibility
  - capability to easily reestablish the original condition/situation after a change by reversing the change
  - through one or more steps depending on the situation
  - gives more confidence to the novice user
  - encourages exploration

Shneiderman's 8 golden rules - user control to the user and memorising

- control to the user
  - design the system to make users the initiators of actions rather than only the responders
  - users should have the feeling that they are in control
    - otherwise, anxiety may appear
- minimal memorising
  - Short-term memory of humans is limited
    - the rule of thumb is that an individual may memorise 7±2 items

6 principles according to Donald Norman

- Visibility to the most important elements
  - clearly indicating whether there are more options hiding deeper down
- Feedback to the user (every action needs a reaction)
  - especially, after a long sequence of actions
- Setting limitations in the interaction
  - to simplify and to not confuse
- Clear mapping
  - between elements/objects and the outcomes/effects
- Consistency
- Provide clues on how to use the objects (affordance)

10 usability heuristics by Nielsen

- System Status Visibility
- Equivalence between the system and the real world
- User freedom and control
- consistency and patterns
- error prevention
- Recognize instead of remember
- Flexibility and efficiency of use
- Aesthetics and minimalist design
- Helping users to recognize, diagnose and recover from wrong actions
- Help and documentation

How to communicate the conceptual model to the user?

- Adopting the Norman's principles, which are the most widely adopted ones for Web and interactive design:
  - Give clues about the use of objects
  - Prototyping using clear/intuitive mappings
  - Create prototypes giving visibility to the most important elements/ objects
  - Create simple scenarios and prototypes, imposing limitations on the interaction so as not to confuse
  - Give feedback to the user throughout the tasks

Provide clues about the use of objects

- Conceive objects in such a way as their function is intuitive
  - Shape is determinant
    - A chair suggests sitting
    - A table, eating or writing
    - A button, pushing
    - A box with a list of items, selecting
- When simple actions require great explanations, then it's because the design has failed!

References

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