CSC9A2
Usability and Accessibility 2

Design Principles

- Today:
  - Universal Design Principles
  - Computing Design Principles
- These principles
  - may not always be easy to follow,
  - may not be possible to follow 100%,
- But knowing the guidelines helps when designing!

Seven Universal Design Principles

- A well designed product is:
  - Simple and intuitive to use,
  - Flexible in how it can be used,
  - Tolerant of errors,
  - Communicates information effectively,
  - Provides equal or equivalent functions for all users,
  - Requires low physical effort,
  - Has appropriate size and space requirements.
- We will look at each of these in more detail.

Seven Universal Design Principles (for inclusive design)

- Universal Principle 1: Simple and intuitive
  - Think about who it is being designed for.
  - It should be easy to use, regardless of the user's skills and experience.
  - Actions should correspond sensibly to their results.
  - Provide feedback for any actions done.
  - Let the user have a good mental idea of what is going on.

Universal Design Principles

- Universal Principle 2: Flexibility
  - The design should accommodate a wide range of preferences, abilities, and speeds

Universal Design Principles

- Universal Principle 3: Error tolerance
  - Minimize hazards and errors
  - The design should fail safely, not badly

Universal Design Principles

- Universal Principle 4:
  - Communicate information effectively
  - Make the relevant parts visible
    - or audible, or even touchable
  - Maximise legibility

Universal Design Principles

- Universal Principle 5:
  - Equal or equivalent use
  - Useful for people with diverse abilities
  - Provide the same or equivalent usage
  - Don't segregate or stigmatize users

Universal Design Principles

- Universal Principle 6: Low physical effort
  - Efficient comfortable design, with minimal fatigue

Universal Design Principles

- Universal Principle 7: Size and Space
  - Provide appropriate size and space for approach and use, regardless of body size, posture and mobility
  - Accommodate assistive devices

Computer-Specific Design

- The universal principles are all still relevant, but when designing computing products, the emphasis is somewhat different.
- User-centered design is different:
  - more is known about the user, e.g.
    - what sort of computer equipment they are likely to use
    - what assistive technologies they might be using
- Computers are sophisticated pieces of equipment, requiring skill to use, and capable of achieving complicated tasks.
  - users need more training
  - more common for users to not feel in control

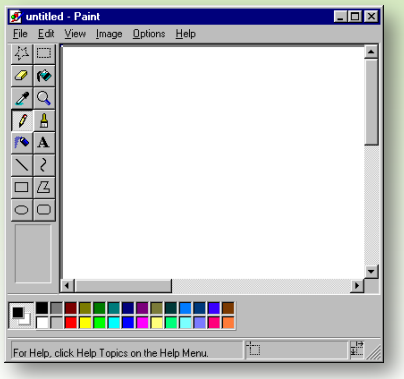
Four Computing Design Principles

For software, web pages, computer equipment, ...

- Principle 1: Let the User Feel in Control
- Principle 2: Don't Overload the User's Memory
- Principle 3: Try to Prevent and Fix Errors
- Principle 4: Know Thy User

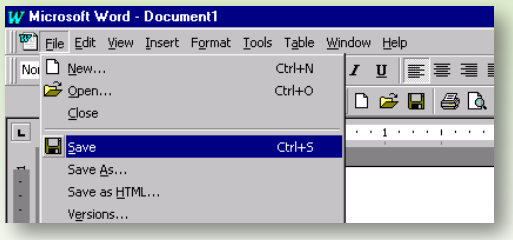
(1) Let the User Feel in Control

- Let the appearance be clearly laid out, with obvious controls
  - Communicate Information Effectively



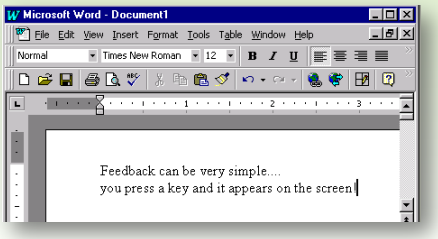
(1) Let the User Feel in Control

- Offer the user choices as to how they can perform actions
  - In particular, provide shortcuts, as experienced users appreciate quick ways to do things - Flexibility



(1) Let the User Feel in Control

- Requested actions should have feedback
  - "sending back to the user information about what action has actually been done"
- No unexpected actions
  - the computer shouldn't take it upon itself to do something without the user requesting it



(1) Let the User Feel in Control

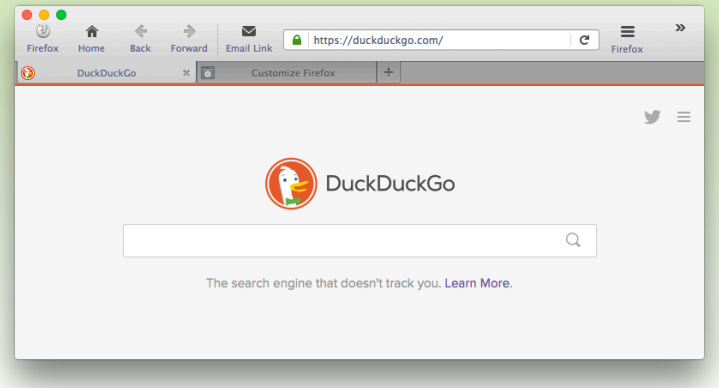
- Example: Lack of feedback

(2) Don't Overload the User's Memory

- It should be as simple and intuitive to use as possible
  - (Universal Design Principle 1: Simple and Intuitive)
- To reduce memory load, it helps to have:
  - consistency (with what the user is used to)
  - help files
    - for when the user can't remember what to do,
    - but of course the less the user needs to use the help, the better!
- Give the right amount of assistance. Two useful maxims:
  - "Don't make the user look stupid",
  - "Imagine users as very intelligent but very busy"
  - (Alan Cooper, in "About Face")

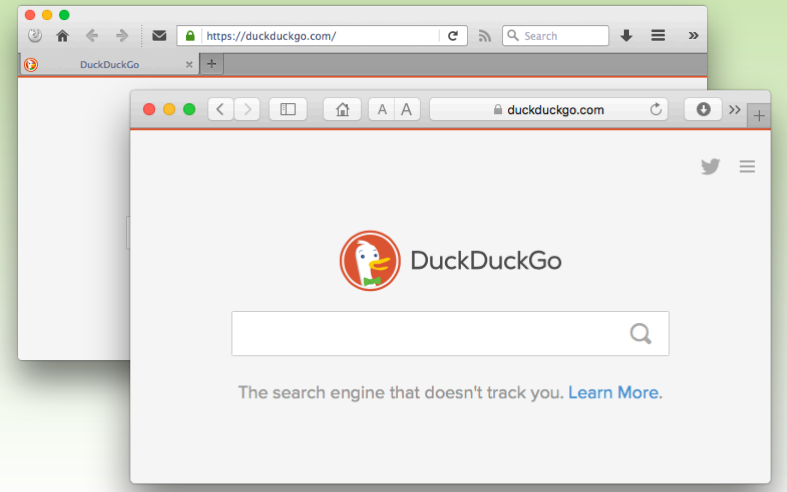
(2) Don't Overload the User's Memory

- Web browsers provide options to display buttons with descriptive text to make it easy to remember button actions



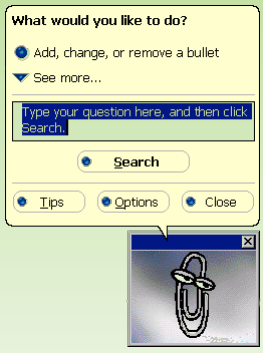
(2) Don't Overload the User's Memory

Example: Consistent use of icons



(2) Don't Overload the User's Memory

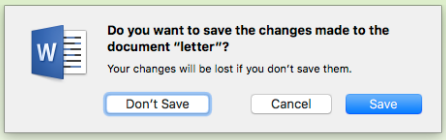
- Example: Providing help



  - Pluses:
    - Simple and intuitive to use
    - Help easily available
  - Minuses
    - Often too helpful!
    - A paperclip pretending to be smarter than you, and winking at you, can be patronising.

(3) Try to Prevent and Fix Errors

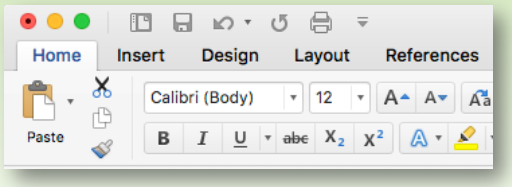
- Best of all, try and prevent errors happening in the first place!
  - Example:



  - The error of losing work is prevented.

(3) Try to Prevent and Fix Errors

- If errors do occur, try and fix them
  - Either correct the error, or allow a reversal to the previous state (an "Undo" action).
    - Universal Design Principle 3: Error Tolerance
- Example
  - Undo
  - Redo



- Undo buttons are very common (essential!).
  - A "Redo" is a way of undoing the "Undo" !

(3) Try to Prevent and Fix Errors

- Example: USB Connectors

(4) Know Thy User

- User-centred design - think who you're designing for
  - Don't exclude people unnecessarily
  - Allow assistive devices to be used
  - Universal Design Principles:
    - 5: Equal or equivalent use
    - 6: Low physical effort
    - 7: Size and space)

- The most important of the design principles, so important, that we will go into more detail about this in the next lecture…