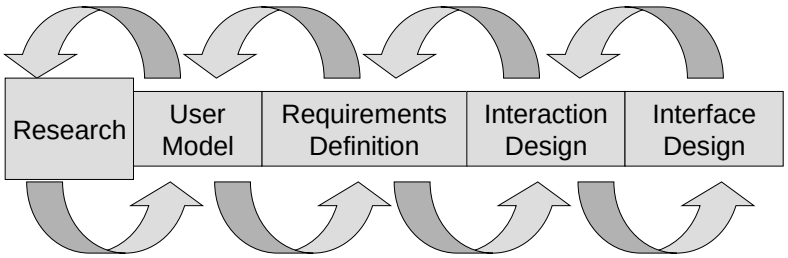
Human-Computer Interaction

- Design process
- Task and User Characteristics
- Guidelines
- Evaluation

An HCI Design Process



Good interface design is based on:

- User research:
  - user goals, needs, etc.
  - capabilities, expectations, mental models, etc.
  - drives system and interface design
  - Contextual inquiry, task analysis, etc.
- Knowledge of human cognitive capabilities and limitations
- Requirements that are defined from these …

Key user characteristics

- Range of expertise (Cooper & Reimann (2003) *About Face 2.0,* Indianapolis: Wiley)
  - Beginners
  - Intermediates
  - Experts
  - Most people start as beginners – *nobody* stays that way long!
  - It takes effort and continual practice to attain and maintain expertise, so …
- 'Optimize for intermediates.'
  - Provide tutorials, menus, & dialog boxes for beginners
  - Provide shortcuts & online reference for experts (& intermediates)
- 'Imagine users as very intelligent but very busy.'

Scenario-based design

- Design based on understanding of users, what they do, and why
- User models are used to develop personas
  - composite archetypes based on behavioral data from many actual users
  - personas represent a specific type of user of a particular interactive product
  - a means of understanding user goals in specific contexts
  - in general, each interface is designed for a single, primary persona
- Scenarios are narrative explanations of how personas use the product to achieve their goals
  - *goal-directed*
  - describe the interaction from the user's viewpoint
  - can be used to define design requirements, design the interaction, and specify interface design elements.

Your turn …

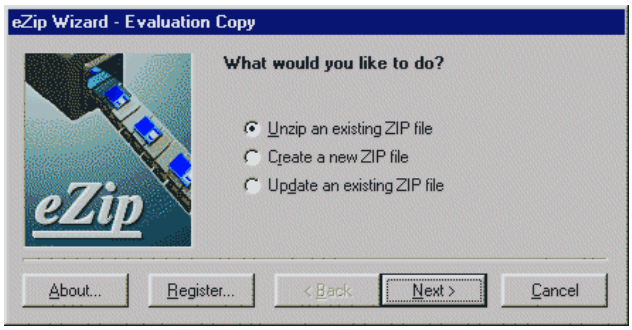
- For the design problem I have given you (based on your project) do the following:
  - Develop a user "persona", including
    - a name
    - a background
    - what this "persona" would use your device for (one or more)
  - Develop a scenario in which your "persona" is using your device to achieve a particular goal identifying at a minimum
    - the goal
    - what knowledge, skills, or capabilities does your "persona" bring to the task?
    - what is the setting in which the "persona" is using the device?
    - what constraints, resources, etc. will be available during use of the device?

To consider in HCI ...

- Usability issues
- Metaphors
- Visibility
- Terminology
- Error handling
- Interaction style

To consider in HCI ...

- Usability issues
  - mapping to understood concepts, methods, and goals
  - internal consistency
  - coherence
  - visibility
  - control



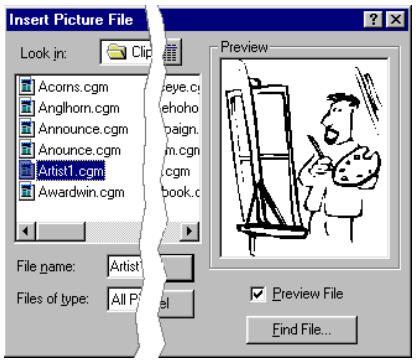
To consider in HCI ...

- Metaphors
  - using non-computer objects and events in a software system (e.g., "desktop" metaphor, "chat rooms," "email")
  - can provide a bridge between designer and user conceptual models
  - can assist users in understanding and performing appropriate actions
  - BUT … sometimes not adequate for mapping all system functions and capabilities one-to-one…
  - Careful design required when reality and metaphor don't match exactly

- Is there a metaphor that applies to your design problem? If so, describe how …

To consider in HCI ...

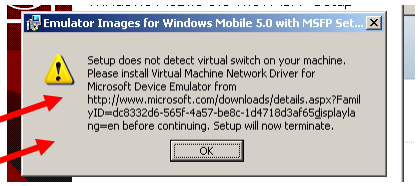
- Visibility
  - Tell the user …
    - what are the possibilities?
    - what input have I made?
    - what effect did that have?
    - was the action accomplished?
    - what's happening?
  - timely and accurate feedback
  - direct manipulation of objects

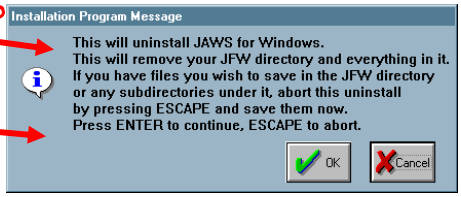


- Identify specific requirements for visibility and feedback in your design.

To consider in HCI ...

- Terminology
  - appropriate to …
    - age and education level
    - experience level
    - task environment
  - natural dialog
  - informative
  - simple, not too many words
  - words match possible options

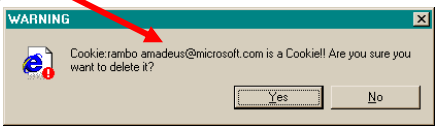




- What terminology issues will affect your design?

To consider in HCI ...

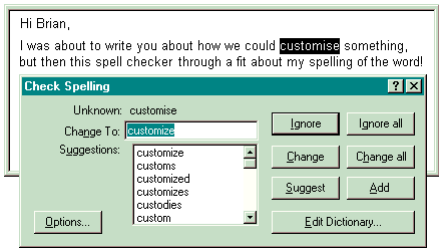
- Error handling
  - error tolerant systems
  - clear and precise error messages
  - clear and simple recovery methods

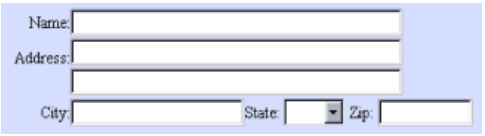


- What specific error handling situations can you predict will be needed for your design?

To consider in HCI ...

- Interaction style
  - menus
  - fill-in forms
  - question/answer
  - command languages
  - function keys
  - direct manipulation
  - restricted natural language





- What interaction style(s) will dominate your design? Why?

HCI Guidelines

- General design guidelines
  - e.g., pg. 398 of Wickens et al.
  - "8 Golden Rules …" (see next page)
  - online style guides
- Style guides for Windows, Mac, etc.

8 Golden Rules of Interface Design *

1. **Strive for consistency.**
   - Consistent sequences of actions; identical terminology; consistent commands
2. **Enable frequent users to use shortcuts.**
   - Abbreviations, function keys, hidden commands, and macro facilities for expert users.
3. **Offer informative feedback.**
   - More infrequent and major actions => more substantial feedback.
4. **Design dialog to yield closure.**
   - Sequences of actions should be organized into groups with a beginning, middle, and end.
5. **Offer simple error handling.**
   - Avoid errors; detect the error and offer simple, comprehensible mechanisms for handling the error.
6. **Permit easy reversal of actions.**
   - The units of reversibility may be a single action, a data entry, or a complete group of actions.
7. **Support internal locus of control.**
   - User is the initiator of actions rather than the responder.
8. **Reduce short-term memory load.**
   - Simplify pages; consolidate multiple pages & minimize window-motion frequency; train for mnemonics, codes, & sequences of actions.

* from : Shneiderman, Ben, Designing the User Interface, Addison Wesley, 1998, 3rd Edition

Your turn …

- Based on the work you have done so far, design 3 -5 screens for your device.
- Identify specific principles discussed today that were used in your design.